

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton of Information</u> (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_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0192.pdf?csf=1&e=BXVg7s	9/12/1980	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/sites/USAEC_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0106.pdf?csf=1&e=bkT7Bp	7/19/1988	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, geoligal, 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:/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:/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%20Region%205/FTBELVOIR0069.pdf?csf=1&e=waueFC	6/2/1996	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%20Region%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%20Region%205/FTBELVOIR0101.pdf?csf=1&e=WkYha6	1/27/1997	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	2/21/1997	Transmittal of Shop Drawings, Equipment Data, Material Samples, or Manufacturer's Certificates of Compliance (Results of DAA)	Environmental Restoration Company	No relevance to PFAS
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%20Region%205/FTBELVOIR0141.pdf?csf=1&e=orIRxR	8/1/1997	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/FTBELVOIR0108.pdf?csf=1&e=tGRDbr	12/9/1997	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%20Region%205/FTBELVOIR0018_Site_Characterization_Bldg_1132_and_1133(2).pdf?csf=1&e=F5Q2Ov	12/2/1998	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%20Region%205/FTBELVOIR0018_Site_Characterization_Bldg_1132_and_1133(2).pdf?csf=1&e=F5Q2Ov	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%20Region%205/FTBELVOIR0018_Site_Characterization_Bldg_1132_and_1133(2).pdf?csf=1&e=F5Q2Ov	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)	Law Engineering and Environmental Services, Inc.	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	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	Mactec Engineering and Consulting, Inc.	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/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0014_2003_1st_qtr_bldg_1805_CMV.pdf?csf=1&e=8eecl	4/9/2003	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%20Region%205/FTBELVOIR0014_2003_1st_qtr_bldg_1805_CMV.pdf?csf=1&e=8eecl	4/29/2003	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_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0015_T_17_scanned_final_report.pdf?csf=1&e=MhsAAs	6/24/2003	Hydrogeologic Report (T-17 Area)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_2003_2nd_qtr_bldg_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_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0014_2003_2nd_qtr_bldg_1805_CMV.pdf?csf=1&e=6azJSD	7/17/2003	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_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_2004_1st_Qtr_256_GWMR.pdf?csf=1&e=viJ10w	5/27/2004	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_PFOA/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_PFOA/PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_3rd_Qtr_2004-Post-Op_GW_Monitoring_Report.pdf?csf=1&e=L6JaY2	1/12/2005	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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From Site Visit - CERCLA Admin Record - CERCLA	5/1/2005	Site Investigation Summary Hydrocarbon Spill Area, M-26	Dewberry	Repetitive information. Mentions the transferring 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, Installation Action Plan	(multiple)	No relevance to PFAS
Admin records	5/27/2005	FY 2006 U.S. Army Garrison Fort Belvoir, Virginia, Compliance-Related Cleanup Installation Action Plan	(multiple)	No relevance to PFAS
https://arcadiso365.sharepoint.com/:b:/r/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0013_2005_1st_Qtr_Bldg_717_Post-Op_Rpt.pdf?csf=1&e=SpW7H0	5/31/2005	Ground-Water Gauging Report- First Quarter 2003 (Building 717)	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	6/1/2005	Groundwater Investigation Summary Report SWMU M-27	Dewberry	SWMU M-27 was used in the mid-to-late 1950s for waste ammunition and explosives.
Admin records	7/18/2005	Case Closed; Fort Belvoir Storage Depot, Building 717	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/FTBELVOIR0187.pdf?csf=1&e=2zwFv	7/20/2005	Summary of History and Current Status of Solid Waste Management Units (SWMUs)	Department of the Army	Includes site description and cleanup strategy for Fire Control Training Area and related sites
Admin records	8/29/2005	Veeder-Root Systems, Annyal Evaluation Report- Year 2005	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA	9/1/2005	Response to Comments: Site Investigation Summary Report Hydrocarbon Spill Area M-26	Dewberry	Repetitive information. Depicts the Right of Way boundary for VDOT.
Admin records	9/2/2005	Injection Well- Building 324	Mactec Engineering and Consulting, Inc.	No relevance to PFAS
Admin records	9/9/2005	Solid Waste Management Units Background and Scope of Work	Tetra Tech, Inc.	No relevance to PFAS

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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.	Repetitive 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 mogratng 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	6/27/2006	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 abandoned 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 groudwater 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 groundwater 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 necessary 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	6/1/2007	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. Provdiess good summary of previous activities. Carbon tetrachloride was detected in one groundwater sample collected from a well in AOCPC-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.	Repetitive 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	12/1/2007	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:/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0003.pdf?csf=1&e=k3f6ca	3/1/2008	Investiigation 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 ordor 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 suppression 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	4/18/2009	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:/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0177.pdf?csf=1&e=2Zz6Fx	7/15/2009	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:/sites/USAEC_PFOS_PFOA/PFAS/General%20Documents/READ%20DATA/Belvoir%20Region%205/FTBELVOIR0202.pdf?csf=1&e=zIGGWb	6/7/2010	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	10/1/2011	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_PFOA_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	4/28/2014	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	11/24/2015	Letter - FTBL North Area: FTA (FTBL-66) Draft Sampling and Analysis Plan (SAP) EPA approval	USEPA	
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/Sewer%20Mapbook%20-%20ALL.pdf?csf=1&web=1&e=8PRWUN	12/21/2015	Sewer Mapbook - ALL	American Water, Military Services Group	No relevance to PFAS
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	12/31/2015	Quality Assurance Project Plan for Data Collection Activites for SWMUs	TriEco Tetra Tech, Joint Venture	Likely irrelevant; could not load document properly.
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	2/1/2016	Final Sampling and Analysis Plan For Data Gap Investigation and Feasibility Studeis FTA (FTBL-66)	TriEco Tetra Tech, Joint Venture	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	
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 Crash 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 adjacent to the airfield 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 Belvoir Fire Department & DPW	Describes incident inside Building 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.
	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	1/11/2018	Letter - VDEQ approval of Final Uniform Policy Quality Assurance Plan	VDEQ	
From Site Visit - CERCLA Admin Record - CERCLA 2017 Admin Record Update	1/11/2018	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	2/20/2018	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 Hanger), 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_Deliverables/11%20-%20SI%20Scoping%20Call%20Slides/Resources/Reports/2018-November_Building%203233%20SCR_Final.pdf?csf=1&web=1&e=kyVE68	11/1/2018	Final Building 3233 Site Characterization Report Addendum	AECOM	No relevance to PFAS

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From Site Visit - CERCLA Admin Record - CERCLA	12/1/2018	Final FTBL-68: Semi Annual Groundwater Monitoring Report	AECOM	<p>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).</p> <p>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 tributary of Accotink Creek. The gas ignited subsequently burning and destroying the bridge over I-95 and nearby buildings.</p> <p>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.</p> <p>70,000 tons of soil was excavated</p>
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)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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.

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton of Information</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)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton of Information</u> (type, general subject and PFAS relevance)
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

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton of Information</u> (type, general subject and PFAS relevance)
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=rboqvs	Various	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
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.

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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	2017-04-12 AFFFF spill inside Bldg 1436 - LRC Files	Unknown/Kelsey Ross	<p>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.</p> <p>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 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,</p>
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	<p>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.</p> <p>Other - Storm Utility map provided showing drainage flow and spill area. Photos depict the foam quantity and spill measures.</p>
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	<p>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.</p> <p>Other - Storm Utility map provided showing drainage flow and spill area. Photos depict the foam quantity and spill measures.</p>

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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	2019-04-25 FAAD Fire Station Training Area AFFF Thursday Incident Files	Unknown/Kelsey Ross	<p>Photos - Foam on cracked concrete and adjoining grassy areas. Standing water mixed with foam. Soil removal and vacuuming.</p> <p>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.</p> <p>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</p>

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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	<p>Photos - Transformer with straw covered area around it. Burned fench poles and straw covered area extending into backyard.</p> <p>Other - SDS for Ansulite ARC 3x6 (Likely PFAS containing but not listed on sheet).</p> <p>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.</p>

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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	2019-04-28 DAAF Fire Station Training Area AFFF Sunday Incident Files	Unknown/Kelsey Ross	<p>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.</p> <p>Other - SDS for Ansulite ARC 3x6 (Likely PFAS containing but not listed on sheet). Map with Outfall 003. Map with foam extent depicted and drainage paths. Stormwater utility maps provided.</p> <p>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 Same email between Jero Sebek and Gary Smith (above).</p>
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	

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton 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	<p>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).</p> <p>VDEQ Report/ Pollution reponse text - Accidental 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.</p> <p>Other - Storm Utility Map shows water flow impacted by foam trending northeast towards stream/river</p>
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 groudwater 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> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Descripton of Information</u> (type, general subject and PFAS relevance)
From Site Visit - CERCLE Admin Record - CERCEL Information Repository	Unknown	Unknown	Unknown	Self explanatory.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Restoration	Unknown	Map - Ft Belvoir North Area Restoration Site	Unknown	Depicts location of FTBL-66, -68, , FTBL-005-R-01, etc.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Restoration	Unknown	Map FTBL-66	Unknown	Depicts location of groundwater monitoring wells, surface water, benzene plume, etc.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Restoration	Unknown	Map FTBL-68	Unknown	Depicts location of groundwater monitoring wells, and surface water
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	Unknown	2019 ArcMap Army Compatible Data	Unknown	Unable to open - GIS sent to Charlie.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	Unknown	Stormwater Utility Maps by Grid	Unknown	Stormwater map for AOPIs
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	Unknown	MS4 Outfalls Map	Unknown	Unable to keep open; appears to be a map with outfalls installation-wide.
From Site Vist - Documents from Kelsey for AEC for PFAS PA - Stormwater	Unknown	Wastewater Map	Unknown	Likely the most up-to-date waste water map; depicts lines, lift stations, manholes, etc.
From Site Vist - from DAAF interview - 1958 Crash Report	Unknown	July 1958 Crash	Unknown	Helicopter crash; two men died while putting a three passanger reconaissance 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 - 1983 Crash Report	Unknown	3/11/1983 Crash	Unknown	Low fuel caused plane to crashed in a wooded area 500 yards short of RWY 32. No fuel; likely no fire or need for AFFF.
From Site Vist - from DAAF interview - DAAF Hangar Map	Unknown	DAAF Hangars Map	Unknown	Depicts locations of 7 hangars.
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 PFAS PA	Unknown	Unknown	Unknown	Map of the FBNA with various FTBLs.
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 Extraction and Aquifer Sparge Remediation System, and Free Product Recovery System	Enviro-Industries, Inc.	No relevance to PFAS

<u>Document Location</u> (name/type/location)	<u>Document Date</u>	<u>Document Name</u>	<u>Author</u>	<u>Description of Information</u> (type, general subject and PFAS relevance)
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



Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log

Installation: Fort Belvoir **State:** VA

Date/Time: 6/4/2019

Interviewer(s): Courtney Ingersoll, Jessica Travis, Katie Mageland, Carla DaParma, Lauren Henderson, Afton Hess

Other Attendees: 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
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.mil	
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	

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log		
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 provide permit.		
Fire Department has been funded to replace AFFF in suppression systems to the new approved AFFF (C6). Any new construction of hangars will include suppression systems with newer AFFF. IMCOM Fire Chief has issued OPORDS concerning AFFF use. Ms. Rhodes can provide waste manifests for disposal of old AFFF.		
Drinking water intake (Corbalis intake; surface water) 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. DPW can provide. Pesticide management before 2000 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 silver reclaim operations. The old hospital and these two buildings are now demolished.		
Car washes (wash racks) at tactical facilities do not use soap. The only car wash with soap is the MWR Car Wash.		
FTBL-66/68 are in the NGA area and visits have to be coordinated with NGA (Mr. Moloney) ahead of time. Previous PFAS sampling has occurred at the FTBL-66 IRP site.		
Dye tests occurred on oil-water separators in May 2011.		
Fort Belvoir just completed the stormwater inventory.		
Fort Belvoir has two abandoned WWTPs, now used as lift stations.		
CERCLA administrative record can be provided via disc.		

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log						
Installation:		Fort Belvoir			State: VA	
Date/Time:		6/4/2019				
Interviewer(s):		Courtney Ingersoll, Jessica Travis, Katie Mageland, Carla DaParma, Lauren Henderson, Afton Hess				
Other Attendees:		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						

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log		
Installation: Fort Belvoir	Interviewee: Airfield	Date: 6/4/2019
General Knowledge Discussed		
Three hangars are currently being renovated 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 Britten Drive		
Building 3126 (Night Vision hangar) - Current and historical suppression system was water only		
Building 3132 (Night Vision hangar) - Contains Ansulite AFFF suppression system, installed when building was built approximately 8-10 years ago. Tested annually with chemical called PlanIt Safe. Testing performed by Vector contracting.		
Lakota/O'Neil Hangar - Building 3140/3141 - Spill occurred May 18, 2018. Building filled with foam and some ran out onto pavement and into french drain. Spill report can be provided by DPW. Chemical used is JetEx 2% (hi-expansion foam therefore, likely non-PFAS). This is the oldest hangar; in use since 1950s.		
<u>Accidents discussed:</u>		
1983 - Class B accident (non-lethal). Plan ran out of fuel and crashed. Since there was no fuel left, it is likely that AFFF was not used. Accident report was found, but could not pinpoint the exact location. Accident occurred while trying to land, therefore, near the runway. Runway was shorter than it is now, therefore, best guesstimate of location is just before Route 1 around curve..		
1958 - A lethal helicopter crash (Class A), not many details could be found. Would have been near the runway that was 500-feet long at the time. AFFF use is not confirmed. Pictures of the crash show a fully burned helicopter, therefore, it is suspected that the fire department let the helicopter burn instead of attempting to put out (general practice confirmed by fire department).		
A Fort Belvoir plane crash occurred sometime in 2017 off-post; Fort Belvoir fire department did not respond.		
Pentagon Heliport - there was a massive response with mutual aid from many surrounding fire stations for 911 (September 11, 2001).		
Fire training occurs once per year at the end of the runway. Mr. Redmond doesn't think they use foam.		
Have had previous mass casualty training events on the airfield but never flowed any water/foam.		
Oil-water separators attached to hangars get overloaded very quickly.		
Fort Belvoir operates a helipad at Fort Meyer - 1 concrete pad and 4 helipads on top of roof; no known issues where they would have used AFFF		

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log		
Installation: Fort Belvoir	Interviewee: Airfield	Date: 6/4/2019
Documents Obtained		
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 from DPW)		
When were suppression systems installed? (Information discussed with fire department, some data gaps remain).		

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log

Installation: Fort Belvoir **State:** VA

Date/Time: 6/5/2019

Interviewer(s): Courtney Ingersoll, Jessica Travis, Katie Mageland, Carla DaParma, Lauren Henderson

Other Attendees: 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
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.mil	

Potential Areas of Potential Interest Discussed

AFFF spill responses

Fire Stations

Building 1436

Hangars

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log		
Installation: Fort Belvoir	Interviewee: Spill Response	Date: 6/5/2019
General Knowledge Discussed		
April 2017 - AFFF spill occurred in front of DAAF Fire Station, someone accidentally hit the AFFF button instead of the water button on the fire engine. AFFF flowed into the street and across into a ditch. Some also went into retention area adjacent to fire station driveway.		
April 2017 - Building 1436 - Approximately 10-gallon AFFF spill occurred inside. Spill was contained, plug was over drain therefore no release into sanitary sewer. Material was containerized by fire department and submitted for disposal off-post.		
November 2017 - Building 1436 - AFFF discharge in parking lot of building, just outside bay doors while repairing a JBMHH fire engine. Approximately 10 gallons spilled onto asphalt.		
May 2018 - Lakota Hangar spill		
<u>April 2019 - 3 spills</u>		
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.		
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 testing.		
A sewer service agreement has been in place with Fairfax County since 1976; only domestic wastewater goes to Fairfax County.		
Wastewater treatment is performed by American Water.		
3 drinking water systems, all ultimately from Fairfax County.		
Historical drinking water treatment plant was located near Pohick off the Accotink Creek; now a homeless shelter.		

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

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log

Installation: Fort Belvoir **State:** VA

Date/Time: 6/6/2019

Interviewer(s): Courtney Ingersoll, Jessica Travis, Katie Mageland, Carla DaParma, Lauren Henderson

Other Attendees: 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
Scott Ross	Fire Chief/Fire Training Coordinator				703-806-7306 / christopher.s.ross.civ@mail.mil	
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

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

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 AFFF, 3% C-8 Ansulate AFFF		
3-4 hangars have foam, the rest are water deluge systems (Bldg 3140-Lakota Hangar, Bldg 3151-behind ARNG hangar, Bldg 3156-new Night Vision hangar, Bldg 3232-currently being renovated). Everything was water-based in 1995. Hangar 3151 was newly renovated. First hangar that went to AFFF suppression system was the ARNG hangar.		
First hangar that went to AFFF suppression system was the ARNG hangar.		
Hangar AFFF 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		
Building 1495 (Hazardous Waste Building) has 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		
AFFF has solidified in the engines before which causes valve issues every 3 years; LRC cleans it out – AFFF is very corrosive		
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; 2 Big foam units – 420 gallon and 201 gallon		
Current fire engine maintenance building is 1436; Building 707 is permanent LRC, currently being renovated.		
Fire department does not perform nozzle testing with AFFF, only done with water.		
Training is always with water, might have trained with fluoroprotein in the past.		
Fire department is not aware of any training with foam on the airfield. No other training sites or accidental releases (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.		

Per- and Polyfluoroalkyl Substances Preliminary Assessment
Fort Belvoir, VA

Interview Log		
Installation: Fort Belvoir	Interviewee: Fire Department	Date: 6/6/2019
Documents Obtained		
SDS for AFFF		
Data Gaps or Items for Follow-Up		
Follow up with Hazardous Waste about suppression system in Bldg 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)
 - o Tested with Planet Safe chemical; Vector contractor that did the testing? (instead of Anuslate)
 - o 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
 - o 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
 - o 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 on top 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 unrolling 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 overgrown and vegetated
- Roads built sometime after/around 2006/2007

FTBL 68

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

INTERVIEWS 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
- November 2017: Foam discharge at 1436 on asphalt outside, approximately 10 gallons
- May 2018: Lakota hangar release – non-AFFF
- 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
 - 1984 plane crash south of DAAF
 - S. Training area
 - Helicopter crash
- First DAAF spill (April 2017) Kelsey called everyone; 5-10 gallons released; some got into grass
 - 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**
 - 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)
 - 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 Accotink 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

- 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 from fire truck spilled out – 20-30 gallons of AFFF or maybe just 10
- All AFFF stored here – Chemguard, PurpleK
- According to Sean, no nozzle testing has occurred in the past 5 years
- 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

- 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 –

- 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 then 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**
 - o 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
 - o 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
 - o All renovated – had water dilute system; don't know what the new system will be
 - o 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
 - o Ask Felix about this
- **5 Engines total** (S-Post, here, DAAF, Belvoir North, Reserve Engine [currently at S. Post])
 - o 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**
 - o Non AR 3% ansulate; housed at DAAF
 - o 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

- * FTBL-12 think based on GIS is same as K&D sites behind air tower (Fire Control Training Area)
- * Duffel blog - satire website?

has PFAS data at FTBL-66

only wells on site irrigation @ golf course
100% water purchased from American Water
1980s switched to municipal water/ww

GW/clarinated water
Stormwater
Pond source

No prescribed burning occurs here

* Slides 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 - current no PFAS

historic 1980s maybe ant bait?
* Steve Watters - 2000-2010 list pesticides
prior to that - ~~an~~ O&M contractor? not
sure who would have info

* Kelsey has maps of wells at FTBL-66 and
PFAS sampling data

6-4 Ft Belvoir Site Visit

- * FTBL-12 think based on GIS is same as K&D sites behind air tower (Fire Control Training Area)
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historic 1980s maybe ant bait?
* Steve Watters - 2000-2010 list pesticides
prior to that - ~~an~~ O&M contractor? not
sure who would have info

* Kelsey has maps of wells at FTBL-66 and
PFAS sampling data

fire training ^{on airfield} - 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

* ask for spec from MICC

3 hangars with systems being rehabbed
fire dept will know approx installation dates for suppression systems

- Guard hangar still has AFFF (Lease from Garrison)
- Night Vision " " " John Selby

3126 Hangar - always water system (Night Vision hangar) - first

3132 Hangar - system (Night Vision) 2008 second

"Planet Safe" used for test (every 5 yr)
Vector Fire dud test

* can provide Airfield Map (hangar #s)

mm

Guard hangar - no deployment since 2008

6-5

site visit

FTBL-66

overgrown/vegetated w/ MWs
former fire training area (multiple areas)
doing FS now for closure, most recent
samples - one well had exceedance of benzene
soil removal occurred during utility
installation for NGA

sampled for PFAS once - detections
below 70 ppt - * get contractor report

contractor said used carbon tetrachloride
for fire training /

get history from existing reports
FTBL-68

wells present / traffic training needed
wetlands and overpass/highways present

*Kelsey has sewer & stormwater infrastructure
mapping - putting on CD
she emailed utility to ask if hangar

Jerry Sheehan, started in 2010
- not aware of spills
from car wash / maintenance etc
(non-AFFF)

fire hangar - high EX foam (not AFFF)
system

Kelsey put together folder of known spills

- ① Apr 2017 Davidson Army Airfield Firestation ^{C6 foam}
- ② Apr 2017 Bldg 1436 Fire Maintenance (plug
in sanitary sewer) 10gal

spill reports on CD

- ③ Nov 2017 - Bldg 1436 repairing JBMHH
fire truck - 10gal ^{on} outside bldg on
asphalt - [Fire Dept collected foam indoor spill ₁₄₃₆]

- ④ May 2018 - Lacoda hangar [outside disipated]

⑤, ⑥, ⑦ Apr 2019 - 3 incidents

Thurs. fire training area, accidental discharge
(sod cutter dug up) 10-20gal

Sat. car fire Lewis village hit transformer
non PCB mineral oil (foam response) 5gal
entered storm water system. Hepco
contacted to remove soils

Sun. foam reservoir leaked and discharged
about 20gal of product (not proportioned)

proretention area in trench drain - BMP & outlet had
foam in it. didn't see at outfall (min on rocks)
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 details)

hangars - drains outside buildings go to stormwater system. Interior 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

Kelsey - started in 2010
* can do database search of foam & provide copy of database

O&M might have fire suppression systems info

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

3 DW system - Ft Belvoir (37,000 population)
with American, two non community DW

systems - Ft Belvoir North
- NGA (10,000 population), Woodlawn (Defense
CEDA)
water for 3 systems ADF East (2,000
pop)
all from Fairfax County

Kelsey can ask if sewer integrity survey

Fire Station site visit 3242

accidental discharge Apr 2017
out front towards road, got to edge
of grass, not to storm drain

Fire Training Station

Thurs, Sat, Sun spills/release
K-site 5

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 USARMY TAAB (USA) <pemiton.e.gregory.civ@mail.mil < Caution-mailto:pemiton.e.gregory.civ@mail.mil > >

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

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Hello, Mr. Jett.

Could you please let me know the 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 +1 714 508 2670

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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 > > >

Sent: Monday, October 18, 2021 5:34 AM

To: 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 > > >; pemiton.e.gregory.civ@army.mil < Caution-Caution-

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Cc: john.t.redmond.civ@army.mil < Caution-mailto:john.t.redmond.civ@army.mil > < Caution-Caution-
mailto:john.t.redmond.civ@army.mil >
Subject: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3232

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mailto:jerry.w.jett.civ@mail.mil > . Learn why this is important < Caution-Caution-
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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-

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 > > >; 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 > > >; Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@mail.mil < Caution-Caution-mailto:pemiton.e.gregory.civ@mail.mil < 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-mailto:pemiton.e.gregory.civ@army.mil %3c 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

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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 %3c Caution-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-mailto:jerry.w.jett.civ@army.mil %3c 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-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-mailto:pemiton.e.gregory.civ@army.mil %3c 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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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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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 know the 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 +1 714 508 2670

Caution-www.arcadis.com < Caution-

[1](https://nam02.safelinks.protection.outlook.com/?url=http%3A%2F%2Fcaution-www.arcadis.com%2F&data=04%7C01%7CRebecca.Williams%40arcadis.com%7Cf8f24b7a25034ce0263608d8ed782780%7C7f90057d3ea046feb07ce0568627081b%7C0%7C0%7C637520447948789974%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C1000&sdata=%2BUAeyuAz5HXUwAMM9Y1EezwtdA%2FiMcg20y2KPbCLpok%3D&reserved=0 ></p></div><div data-bbox=)

Williams, Rebecca

From: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@army.mil>
Sent: Monday, May 23, 2022 3:57 AM
To: Williams, Rebecca; Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA)
Cc: Redmond, John T CIV USARMY MDW (USA); Hess, Afton; Gregory, Pemiton E CIV USARMY TAAB (USA); Gregory, Pemiton E CIV USARMY TAAB (USA)
Subject: RE: [URL Verdict: Neutral]RE: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3140

Please see below for your answers

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@army.mil

-----Original Message-----

From: Williams, Rebecca <Rebecca.Williams@arcadis.com>
Sent: Friday, May 20, 2022 6:55 PM
To: Jett, Jerry W Jr CIV USARMY ID-SUSTAINMENT (USA) <jerry.w.jett.civ@mail.mil>
Cc: Redmond, John T CIV USARMY MDW (USA) <john.t.redmond.civ@army.mil>; Hess, Afton <Afton.Hess@arcadis.com>; Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@army.mil>; Gregory, Pemiton E CIV USARMY TAAB (USA) <pemiton.e.gregory.civ@mail.mil>
Subject: [URL Verdict: Neutral]RE: [Non-DoD Source] RE: Fort Belvoir: June 2019 Preliminary Assessment interview follow up re Hangar 3140

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, Jerry.

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?
 - ORIGINAL 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.

320 Commerce Suite 200 | Irvine CA | 92602 | USA T +1 714 508 2670 | M +1 949 381 9379 Caution-

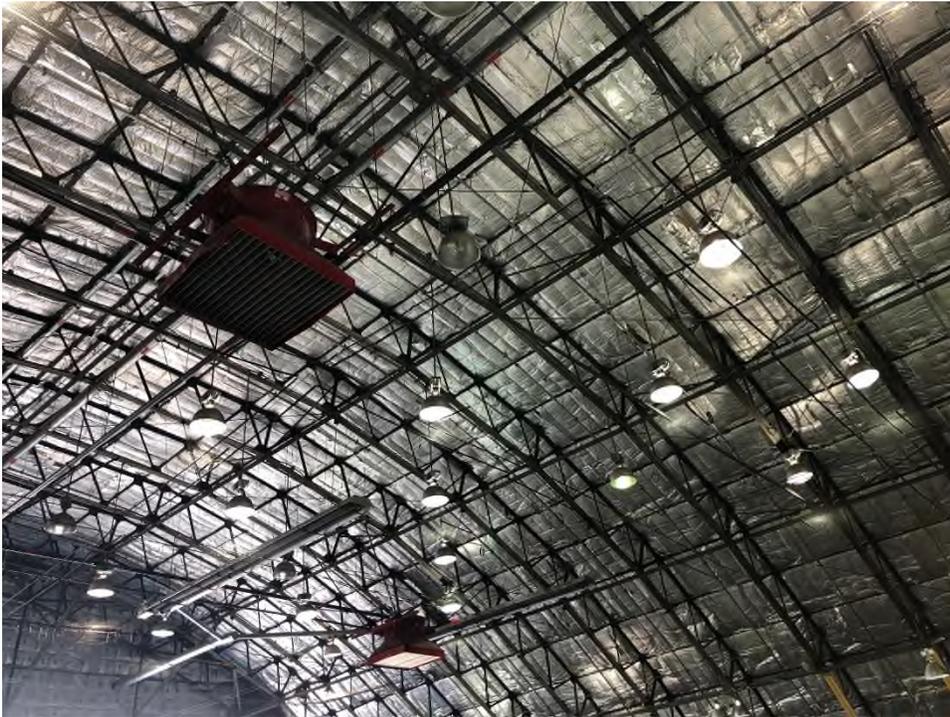
<https://nam02.safelinks.protection.outlook.com/?url=http%3A%2F%2Fwww.arcadis.com%2F&data=05%7C01%7CRbecca.Williams%40arcadis.com%7C1b7df511dff04c96b4f208da3caaf881%7C7f90057d3ea046feb07ce0568627081b%7C0%7C0%7C637889002288237614%7CUnknown%7CTWFpbGZsb3d8eyJWljoimc4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ikk1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=bkMti8DwV5fKuj1OBuBjF%2BhgEVRom%2B5TcYdUVfMMvw8%3D&reserved=0> < Caution-<https://nam02.safelinks.protection.outlook.com/?url=http%3A%2F%2Fcaution-www.arcadis.com%2F&data=05%7C01%7CRebecca.Williams%40arcadis.com%7C1b7df511dff04c96b4f208da3caaf881%7C7f90057d3ea046feb07ce0568627081b%7C0%7C0%7C637889002288237614%7CUnknown%7CTWFpbGZsb3d8eyJWljoimc4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Ikk1haWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=On%2F2uopRWn%2FZD8fJBSppNBqR76YmeVvw5V3wEl6%2FbdA%3D&reserved=0> >

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

**APPENDIX H – SITE RECONNAISSANCE PHOTO LOG
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 AFFF 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

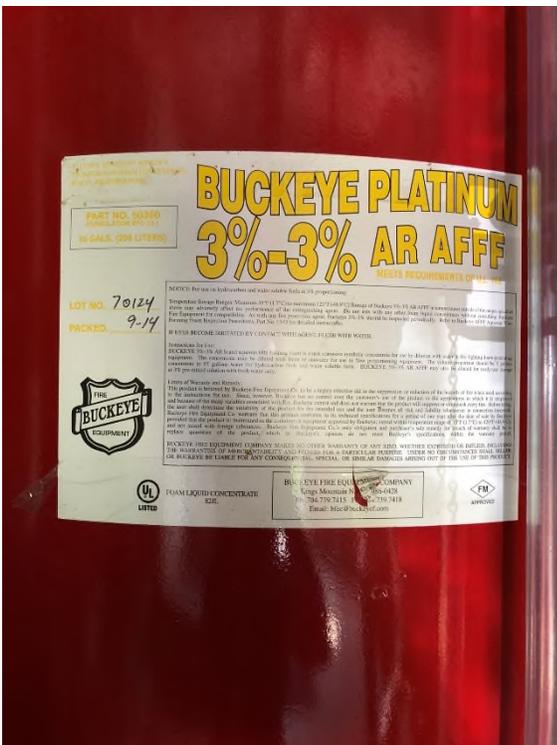
**APPENDIX H – SITE RECONNAISSANCE PHOTO LOG
 USAEC PFAS PRELIMINARY ASSESSMENT/SITE
 INSPECTION
 FORT BELVOIR, VIRGINIA**



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 fire-
 suppression system)

Date: 6/6/2019

APPENDIX I

Compiled Site Reconnaissance Logs



Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir **State:** Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: Building 1436 and 707
 Location Description: Fire Truck Maintenance Buildings
 Latitude/Longitude: 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:

When/Frequency: 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 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.

Other Notes: 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 (Ansilite AFFF 3% and Chemguard 3% AFFF). No leaks observed in storage area; all 55 gallon 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."

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
Migration Potential: 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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Building 1436 and 707 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 buildings.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

No surface water bodies were observed.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

Surface drainage outside of the buildings is unknown. Stormwater inlets were observed next to building 707; however, this building is still being renovated. Drainage inside building 1436 goes into a floor drain.

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 Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir State: Virginia

Date: 6-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: Building 1495 (Hazardous Materials)
 Location Description: Located off of Sharon Lane Road
 Latitude/Longitude: 38°42'7.14"N, 77° 9'14.56"W
 Field Personnel: Courtney Ingersoll, Lauren Henderson, 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: HazMat Room Suppression System

When/Frequency: AFFF suppression system located in building 1496; no known incidents or releases.

Product Released and Volume: N/A.

Other Notes: Buckeye Platinum 3%-3% AR AFFF

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: No secondary sources observed.

Migration Potential: N/A

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):

AFFF suppression system is located in a utility room with concrete floors. No apparent drains were observed in the room.

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

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

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Building 1495 Date: 6-Jun-19
 (Hazardous Materials)

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 the building.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

No surface water bodies were observed near the building.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, 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 Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir **State:** Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: 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 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:

When/Frequency: Unknown if PFAS containing waxes or other car wash material is or was used here.

Product Released and Volume: Unknown.

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: Unknown.

Migration Potential: Migration potential to stormwater or sewer systems via drains located in car wash bays.

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 consists of several self car washing bays, atop asphalt. No obvious cracks or staining observed.

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

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

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Car Wash Area 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 car wash.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

No surface water bodies were observed immediately adjacent to site.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

Surface drainage within car wash bays goes into drains.

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:

Unknown if PFAS was used here. Sign that listed brand names of car wash chemicals was recorded. Waxes were no included in list - list included mostly soaps (non-PFAS likely).

Health and Safety Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir State: Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: Three AFFF releases at DAAF Fire Station
 Location Description: DAAF Fire Station (infront of station and behind in FTA)
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)
 Latitude/Longitude:
 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:

When/Frequency: 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.
 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

Migration Potential: 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.

Other Notes: 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.

Appendix I
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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Three AFFF releases at DAAF Fire Station 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):

Groundwater monitoring wells were abandoned near the FTA in Old FTA area. Several wells filled with bentonite were observed in field adjacent to FTA.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

Pond and drainage ditch near FTA. What appeared to be a dry pond with culverts was observed in from the Fire Station next to #1. Ditch across the street from #1.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

Draining from FTA (#2 and #3), into French drain, nearby pond, drainage ditch and Accotink Creek. Drainage from in front of FTA (#1) unknown. Stormwater inlet was observed adjacent to spill area.

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:

These areas will likely make up 2 or 3 separate AOPIs. Grouped together for this log due to proximity.

Health and Safety Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir **State:** Virginia

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)

Field Personnel: Courtney Ingersoll, Afton Hess, Lauren Henderson, Carla DaParma, Katherine Mageland, and Jessica Travis

Site Contact/Title: John Redmond and Dale Walters - Airfield Division

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

Other Notes: 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. 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.

Migration Potential: 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 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.

Appendix I
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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Night Vision Hangar (3126/3132),
Lakota/O'Neil Hangar (3140), and National Guard Hangar (3121) Date: 4-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 observed near hangars.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

Drainage ditch adjacent to Lakota/O'Neil hangar.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

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

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

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:

Follow-up unlikely for these areas since Lakota/O'Neil did not contain PFAS in suppression system, and other hangars did not have recorded releases. Historically, all hangars had a water based suppression system prior to current suppression systems. Additionally, three other hangars were on site but we under renovation and not visited. These originally had water based suppression systems and it is unknown what the post-restoration suppression systems will be.

Health and Safety Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir **State:** Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: FTBL-66 and FTBL-68
 Location Description: 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, 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: FTBL 66: Former Fire Training areas (FTA) in the 1960s. Consisted of four different areas (M7, M18, AOPC4, and AOPC20)
 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]).

Product Released and Volume: 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 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.

Other Notes: 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:

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

Migration Potential: 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.

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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: _____ Date: 5-Jun-19

FTBL 66 and FTBL 68

On- or off-installation monitoring or drinking water wells (number and proximity to potential area of potential interest, note access and condition of wells):

Both sites contain many groundwater monitoring wells.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

Wetland and stream adjoin both sites.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

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.

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):

FTBL 66: Currently doing feasibility study and working way towards closure just not UUUE. RAFS site and will go RAO.
FTBL 68: Unknown.

Miscellaneous notes:

Health and Safety Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir **State:** Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: Lewis Village Car Fire
 Location Description: Lewis Village Neighborhood
 Latitude/Longitude: 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
 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 (Ansilite 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
 Migration Potential: 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 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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

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 (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

No surface water bodies were observed immediately adjacent to site. Dry pond located nearby.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, vegetation, other], blockages):

Stormwater inlet adjacent to site collected AFFF release, which drains into a dry pond nearby.

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:

HEPACO dug out soil "as deep as they could smell" around the transformer - they were focusing on oil and not AFFF.

Health and Safety Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir State: Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: Old FTA Behind the DAAF Fire Station (Fire Control Training Area)
 Location Description: Behind DAAF Fire Station
 Latitude/Longitude: 38°42'51.70"N, 77°10'32.15"W
 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:

When/Frequency: Former FTA; uncertain if AFFF was released here or how much was released here.

Product Released and Volume: Unknown.

Other Notes: Might have used animal protein foam.

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: Unknown.

Migration Potential: Potential for groundwater infiltration in the event of AFFF release onto open ground area.

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):

Open grassy area located behind fire station. No obvious staining evident.

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.

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Old FTA Behind the DAAF Fire Station (Fire Control Training Area) 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):

Groundwater monitoring wells were abandoned here. Several wells filled with bentonite were observed in field.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):

Unknown.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, 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 Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir State: Virginia

Date: 5-Jun-19
 Potential Area of Potential Interest (PAOPI) Name: 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 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: X-Ray

When/Frequency: Former hospital; unknow if PFAS was used in x-ray photo processing.
 Product Released and Volume: Unknown.
 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: Unknown.
 Migration Potential: Potential for groundwater infiltration if PFAS x-ray chemicals were released outside of former hospital.
 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):
 Open grassy area next to a neighborhood. No obvious staining observed.

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

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

Appendix I
Site Reconnaissance Log
Per- and Polyfluoroalkyl Substances Preliminary Assessment

Installation: Fort Belvoir PAOPI: Old Hospital 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):
Unknown - none observed.

Surface water bodies (proximity to and relative drainage direction and receptor, note ponding or standing water nearby):
 Unknown.

Surface drainage within or adjacent to (natural or manmade, flow direction, lining [stone, 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 Considerations

* Please note any health and safety concerns here (e.g., access, overhead/buried utilities, steep terrain, biological hazards).

APPENDIX J

Site Inspection Field Notes

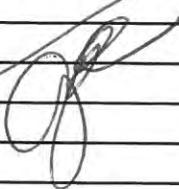


Daily Log

Project Fort Belvoir PFAS SI Project No. 30001992.3DL10 Page 1 of 1
 Site Location Fairfax County, Virginia Client USACE/USAEC/BRAC
 Prepared By Justin Coffey/Dakota Valle/Matt Blower Date 9/27/20

Date/Time	Notes
0630	J. COFFEY AND D. VALLE MOBE TO FORT BELVOIR.
0717	ARCADIS + JEFF GRANT ARRIVE @ NORTH POST FIRE STATION, SPEAK
	W/ FIRE STATION TO STAGE RIG DISCUSS SCOPE, MORNING HIS AND
	TAILGATE SAFETY BRIEF.
0740	CONDUCTED SITE HEALTH AND SAFETY BRIFFING, STAGE RIG.
0800	CALIBRATED HORIBA U-52 AND RFI (PID) GX-6000 *SEE CALIBRATION
	FORM *
<u>0915</u>	SAMPLED FTBL-NPFS-01-50-092720 FOR PFAS, TOC, PH, AND GS.
<u>0945</u>	SAMPLED FTBL-NPFS-02-50-092720 FOR PFAS ONLY
<u>1140</u>	SAMPLED FTBL-NPFS-01-6W-092720 FOR PFAS ONLY *SEE PURGE FORM
1223	MOBE TO BUILDING 1436 - TOW TRUCK UNLOADING FIRE TRUCK
<u>1340</u>	SAMPLED FTBL-B1436-01-50-092720 FOR PFAS, TOC, PH, AND GS.
<u>1355</u>	SAMPLED FTBL-B1436-02-50-092720 FOR PFAS ONLY.
<u>1600</u>	SAMPLED FTBL-B1436-01-6W-092720 FOR PFAS ONLY.
<u>1730</u>	SAMPLED FTBL-LVCF-01-50-092720 FOR PFAS, TOC, PH, AND GS.
<u>1822</u>	SAMPLED FTBL-LVCF-01-6W-092720 FOR PFAS ONLY.
1910	MOBE TO BUILDING 707 TO STAGE TRAILER / IDW.
1930	MOBE TO HOTEL IN SPRINGFIELD, VA.
2000	END OF FIELD DAY.

9/27/20



Daily Log



Project Fort Belvoir PFAS SI Project No. 30001992.3DL10 Page 1 of 1

Site Location Fairfax County, Virginia Client USACE/USAEC/BRAC

Prepared By Justin Coffey/Dakota Valle/Matt Blower Date 10/1/20

ref:
 Date: 23Sep20
 Mgt: 25.00 LBS
 SHIPPIING: 0.00
 SPECIAL: 0.00
 HANDLING: 0.00
 TOTAL: 0.00
 ref:
 Date: 17Sep20
 Mgt: 35.00 LBS
 SHIPPIING: 0.00
 SPECIAL: 0.00
 HANDLING: 0.00
 TOTAL: 0.00

Date/Time	Notes
0630	J. COFFEY AND D. VALLE MOVE FROM HOTEL TO DAAP.
0649	ARRIVE @ DAAP PICK UP A RADIO AND CLICKER AND SIGN IN AT BASE OPS.
0700	J. COFFEY (ARCADIS) CONDUCTS H2S TAILGATE W/ D. VALLE (ARCADIS) AND J. BRAWT (J.G. DRILLING).
0710	CALIBRATED PID (RKI) # 02468 AND 451 6920 # 17836 * SEE CALIBRATION FORM FOR ADDITIONAL DETAILS.
0855	SAMPLED FTBL-FB-01-100120 FOR PFAS @ HANWAR 3151 LOCATION
0900	SAMPLED FTBL-SB-01-100120 FOR PFAS (SOURCE BLANK) DRILLER WATER.
0900	SAMPLED FTBL-H3151-01-SO-100120 FOR PFAS, TOC, PH, GRAIN SITE.
0925	SAMPLED FTBL-H3151-01-GW-100120 FOR PFAS * SEE PURGE FORMS * WELL WENT DRY @ 0919 RECHARGED GRABBED SAMPLE.
1047	FINISH H3151 MOVE TO B3121 TO CONDUCT SAMPLING.
1048	SAMPLED FTBL-B3121-02-SO-100120 FOR PFAS ONLY.
1100	SAMPLED FTBL-B3121-02-GW-100120 FOR PFAS ONLY.
1230	SAMPLED FTBL-B3121-01-SO-100120 FOR PFAS ^{gbc} TOC, PH, AND GS.
1255	SAMPLED FTBL-B3121-01-GW-100120 FOR PFAS.
1430	SAMPLED FTBL-EB-01-100120 FOR PFAS (TUBING) *.
1435	SAMPLED FTBL-EB-02-100120 FOR PFAS (WATER LEVEL METER). *
1440	SAMPLED FTBL-EB-03-100120 FOR PFAS (HAND AUGER). *
1445	SAMPLED FTBL-EB-04-100120 FOR PFAS (DRILLING ROD/SHOE) *
1450	SAMPLED FTBL-EB-05-100120 FOR PFAS (SCREEN) *
1500	SAMPLED FTBL-FB-02-100120 FOR PFAS (FIELD BLANK) @ FBNA FIRE STATION.
1545	SAMPLED FTBL-FBNAFS-02-SO-100120 FOR PFAS.
1640	SAMPLED FTBL-FBNAFS-02-GW-100120 FOR PFAS.
1725	SAMPLED FTBL-FBNAFS-01-SO-100120 FOR PFAS, TOC, PH, GS.
1745	SAMPLED FTBL-FBNAFS-01-SO-100120 FOR PFAS.
1810	SAMPLED FTBL-FBNAFS-01-GW-100120 FOR PFAS ONLY.
1825	MOVE TO HOTEL
1940	SAMPLED FTBL-IDW-SO-100120 (SOIL IDW) FOR TCLP / PFAS AND FTBL-IDW-GW-100120 (WATER IDW) FOR PFAS / TCLP
2100	END OF DAY.

10/1/20

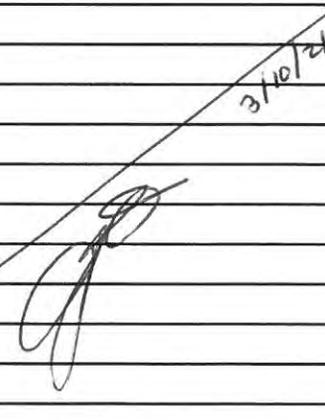
Sys: STANDARD OVERNIGHT TRCK: 1724 3700 8619
 Sys: PRIORITY OVERNIGHT Master: 1724 3700 7592 TRCK: 1724 3700 7542

Daily Log

Project FT BELVOIR PFAS SI Project No. 3000992.3DL10 Page 1 of 1

Site Location FORT BELVOIR / VA Client USACE

Prepared By Justin Coffey Date 3/10/21

Date/Time	Notes
0900	J. COFFEY BEGINS PREPING EQUIPMENT / PAPERWORK FOR SOIL SAMPLING @ FT BELVOIR B1495.
1018	HANDAUGER ARRIVES @ HOTEL - MOVE TO FT BELVOIR, B1495 TO BEGIN SAMPLING 4-SHALLOW PFAS SOIL SAMPLES.
(1130)	SAMPLED FTBL-B1495-01-SO-031021 FOR PFAS SOIL (1) 250mL HOPE
(1210)	SAMPLED FTBL-B1495-04-SO-031021 FOR PFAS SOIL.
(1305)	SAMPLED FTBL-B1495-02-SO-031021 FOR PFAS SOIL.
(1400)	SAMPLED FTBL-B1495-03-SO-031021 FOR PFAS SOIL.
1445	FINISHED STAGING DRUM CHECKED OUT W/ B1495 FOLKS.
1530	SHIPPED SAMPLE @ FED EX - NEXT DAY AIR 10:30.
1530	END OF DAY.
	

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	State Certified
Model Number GX-6000	Status Pass
Serial Number/ Lot Number 52H0102101-26RN	Temp °C 22.9
Location Virginia	Humidity % 59.7
Department	

Calibration Specifications

Group # 1	Range Acc % 0.0000
Group Name Isobutylene	Reading Acc % 3.0000
Stated Accy Pct of Reading	Plus/Minus 0.0

<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>End As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
100.0 / 100.0	PPM	100.0	PPM	97.9	100.0	0.00%	Pass

Test Instruments Used During the Calibration

(As Of Cal Entry Date)

<u>Test Standard ID</u>	<u>Description</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number / Lot Number</u>	<u>Last Cal Date / Opened Date</u>	<u>Next Cal Date / Expiration Date</u>
VA ISO 100 PPM - LBH-248-100-4	ISOBUTYLENE (100 PPM)	Gasco	31721	LBH-248-100-4		11/14/2021
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 Number 14F101427
Location Virginia
Department

State Certified
Status Pass
Temp °C 21
Humidity % 57.1

Calibration Specifications

Calibration Specifications							
Group # 1				Range Acc % 0.0000			
Group Name PH				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
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 # 2				Range Acc % 0.0000			
Group Name Conductivity				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.000			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
1.413 / 1.413	ms/cm	1.413	ms/cm	1.396	1.413	0.00%	Pass
Group # 3				Range Acc % 0.0000			
Group Name Redox (ORP)				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
240.00 / 240.00	mv	240.00	mv	243.60	240.00	0.00%	Pass
Group # 4				Range Acc % 0.0000			
Group Name Dissolved Oxygen Span				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.00			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
100.00 / 100.00	%	100.00	%	97.20	100.00	0.00%	Pass
Group # 5				Range Acc % 0.0000			
Group Name NTU				Reading Acc % 3.0000			
Stated Accy Pct of Reading				Plus/Minus 0.0			
<u>Nom In Val / In Val</u>	<u>In Type</u>	<u>Out Val</u>	<u>Out Type</u>	<u>Fnd As</u>	<u>Lft As</u>	<u>Dev%</u>	<u>Pass/Fail</u>
0.0 / 0.0	NTU	0.0	NTU	0.0	0.0	0.00%	Pass

Instrument Calibration Log

Project Name: Fort Belvoir PFAS
 Project Number: 36001992.3DU10
 Calibrating Personnel: Justin Coffey
 Time of Calibration: 0757
 Weather Conditions: Cloudy
 Barometric Pressure: _____ inches Hg x 25.4 = _____ mm Hg

Date: 09/27/20

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		
Isobutylene	MiniRae 3000	10ppm	10ppm	10ppm	0757	71°F

Notes: Horiba # 038032
Auto Cal lot # 96J380 exp Oct 20

Instrument Calibration Log

Project Name: FT BELVOIR PFAS SI
 Project Number: 30001992.3 DL10
 Calibrating Personnel: Justin Coffey
 Time of Calibration: 0730
 Weather Conditions: 66°F CLOUDY
 Barometric Pressure: 29.91" inches Hg x 25.4 = 759.71 mm Hg

Date: 9/28/20

CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	<u>4.05</u>	<u>4.00</u>	<u>4.00</u>	<u>0730</u>	<u>66°F</u>
Conductivity (mS/cm)	Horiba U-53	<u>4.37</u>	<u>4.49</u>	<u>4.49</u>		
Turbidity (NTU)	Horiba U-53	<u>2.0</u>	<u>0.0</u>	<u>0.0</u>		
DO (mg/L)	Horiba U-53	<u>10.26</u>	<u>9.03</u>	<u>9.04</u>		
DO%	Horiba U-53	<u>116.0</u>	<u>102.5</u>	<u>101.8</u>		
ORP (mV)	Horiba U-53	<u>334</u>	<u>-</u>	<u>340</u>		
Isobutylene	MiniRae 3000	<u>100</u>	<u>100</u>	<u>100</u>	↓	↓

Notes:

Instrument Calibration Log

Project Name: FT BELVOIR ARMY PFAS SI
 Project Number: 30001992.3DHD
 Calibrating Personnel: Justin Coffey
 Time of Calibration: 0849
 Weather Conditions: 68°F CLOUDY (PARTLY)
 Barometric Pressure: 29.87" inches Hg x 25.4 = 758.7 mm Hg

Date: 9/29/20

CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	<u>4.22</u>	<u>4.00</u>	<u>4.01</u>	<u>0855</u>	<u>68°F</u>
Conductivity (mS/cm)	Horiba U-53	<u>4.39</u>	<u>4.49</u>	<u>4.49</u>	↓	↓
Turbidity (NTU)	Horiba U-53	<u>0.4</u>	<u>0.0</u>	<u>0.0</u>	↓	↓
DO (mg/L)	Horiba U-53	<u>8.99</u>	<u>-</u>	<u>10.59</u>	↓	↓
DO%	Horiba U-53	<u>103.9</u>	<u>-</u>	<u>122.3</u>	↓	↓
ORP (mV)	Horiba U-53	<u>315</u>	<u>-</u>	<u>314</u>	↓	↓
Isobutylene	MiniRae 3000	<u>100</u>	<u>100</u>	<u>100</u>	↓	↓
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Notes: _____

Instrument Calibration Log

Project Name: Fort Belvoir PFKS SI

Date: 9/29/20

Project Number: _____

Calibrating Personnel: ~~Justin Coffey~~ ^{NB} Matt Blower

Time of Calibration: 0843

Weather Conditions: Cloudy, 69°F

Barometric Pressure: 29.98 inches Hg x 25.4 = 761.492 mm Hg

CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	<u>3.80</u>	<u>4.00</u>	<u>4.01</u>	_____	_____
Conductivity (mS/cm)	Horiba U-53	<u>4.48</u>	<u>4.5</u>	<u>4.49</u>	_____	_____
Turbidity (NTU)	Horiba U-53	<u>1.0</u>	<u>0.0</u>	<u>0.0</u>	_____	_____
DO (mg/L)	Horiba U-53	<u>7.51</u>	<u>9.3</u>	<u>9.27</u>	_____	_____
DO%	Horiba U-53	<u>-</u>	_____	<u>-</u>	_____	_____
ORP (mV)	Horiba U-53	<u>363</u>	<u>363</u>	<u>362</u>	_____	_____
Isobutylene	MiniRae 3000	<u>-</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Notes: _____

Instrument Calibration Log

Project Name: FT BELVOIR/ ARMY PFAS
 Project Number: 30001992.3DL10
 Calibrating Personnel: Justin Coffey
 Time of Calibration: 0704
 Weather Conditions: 60°F OVERCAST
 Barometric Pressure: 29.79" inches Hg x 25.4 = 756.67 mm Hg

Date: 9/30/20

CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	<u>4.00</u>	<u>4.00</u>	<u>4.00</u>	<u>60°F</u>	<u>0705</u>
Conductivity (mS/cm)	Horiba U-53	<u>4.51</u>	<u>4.49</u>	<u>4.50</u>		
Turbidity (NTU)	Horiba U-53	<u>3.3</u>	<u>0.0</u>	<u>0.0</u>		
DO (mg/L)	Horiba U-53	<u>12.21</u>	<u>-</u>	<u>11.08</u>		
DO%	Horiba U-53	<u>122.6</u>	<u>-</u>	<u>110.6</u>		
ORP (mV)	Horiba U-53	<u>295</u>	<u>-</u>	<u>294</u>		
Isobutylene	MiniRae 3000	<u>98.4</u>	<u>100</u>	<u>100</u>	↓	↓

Notes:

Instrument Calibration Log

Project Name: FT BELVOIR ARMY PFAS S1
 Project Number: 300019972 . 3DL10
 Calibrating Personnel: Justin Coffey
 Time of Calibration: 0710
 Weather Conditions: 60°F OVERCAST
 Barometric Pressure: 29.79 inches Hg x 25.4 = _____ mm Hg

Date: 10/1/20

CALIBRANT	INSTRUMENT	INITIAL READING	VALUE ENTERED	FINAL READING	TIME	TEMP
pH 4	Horiba U-53	<u>4.11</u>	<u>4.00</u>	<u>4.01</u>	<u>0710</u>	<u>60°F</u>
Conductivity (mS/cm)	Horiba U-53	<u>4.38</u>	<u>4.49</u>	<u>4.50</u>		
Turbidity (NTU)	Horiba U-53	<u>0.8</u>	<u>0.0</u>	<u>0.0</u>		
DO (mg/L)	Horiba U-53	<u>10.36</u>	<u>9.96</u> →			
DO%	Horiba U-53	<u>103.6</u>	<u>109.4</u> →			
ORP (mV)	Horiba U-53	<u>322</u>	<u>324</u> →			
Isobutylene	MiniRae 3000	<u>100</u>	<u>100</u>	<u>100</u>	↓	↓

Notes:

Field Boring Log

Client: USAEC	Field Location: building 1436	Boring ID: <u>FTBL-131436-01-50</u> Date: <u>09/27/20</u>	
Project No.: 30001992.3DL10		Latitude: <u>09 27 20</u>	Longitude: _____
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model: _____
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method: _____
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: _____
Driller: Jeff Grant		Depth to First Encountered Water: _____	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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
1300	Hand Auger 1 ft recovery	0-0.3	Topsoil - fine to medium sand with silt 30% subangular, poorly sorted, moist, loose, 7.5YR 7.5/3, high organics			
		0.3-1	medium to coarse sand 70% some silt 10% gravel 20% subangular, poorly sorted, moist, loose 7.5YR 4/3, gravel up to 7cm			
		1-2	Coarse sand and pebbles 30% some silt, angular, poorly sorted, moist, loose, 7.5YR 5/6, some gravel 5% up to 8cm			
		2-3	Fine sand 70% some silt 20% clay 10% subangular, well sorted, moist, loose/blocky, trace gravel up to 3cm			
		3-4	Fine to medium sand 90% some gravel 10% sub rounded, well sorted, moist, loose, 5YR 5/6 gravel up to 4cm			
		4-9	SAA			
		5-10	No recovery - hard/gravel			
		10-15	0-0.5 medium to coarse sand 80% some pebbles 20% subangular, poorly sorted, moist, loose, 7.5YR 5/8			
		25	0.5-1 Fine sand, subrounded, well sorted, moist, loose, 7.5YR 5/8			

DPT 1 ft rec.

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	Groundwater	r Sample	Sample IDs and Notes
	1.5' rec.	15-20	0-0.5 gravel 80% medium sand 20%, subangular, poorly sorted, quartz gravel, 7.5 YR 3/4 sand, no dry, loose,				
		30	0.5-1.5 Coarse sand 40% silt 30% pebbles 30% subangular, poorly sorted, moist, loose, mottled 7.5 YR 4/4 and 5 YR 3/4				
	1' rec.	20-25	0-0.6 medium to coarse sand 85% some pebbles 15%, subangular, poorly sorted, little moisture, loose, 7.5 YR 7/4				
		35	0.6-1 medium to coarse sand, trace pebbles, subangular, well sorted, moist, loose, 7.5 YR 8/8				
		25-30	Gray clay				
		30-35	Gray clay				
		35-40	Gray clay				
	1' rec	35-40	0-0.3 gray clay				
	40-45 35-40		0.3-1' Medium sand 70% silt 20% clay 10%, subangular, well sorted, loose, moist, mottled 2.5 Y 6/8 and 2.5 Y 7/1				
	1.5' rec,	40-45	0-0.5 Gray clay				
	40-45	45-50	0.5-1.5 Coarse sand; subangular, well sorted, very moist, loose, 7.5 YR 5/6				
		50	1 inch lense of coarse sand 7.5 YR 8/4 at 0.5-0.6'				
		45-50	gray clay intruding on hole - 2' recovery				
	3' rec.	47-50	0-0.6' Clay and fine sand 30%, subangular, well sorted, moist, dense, 10 YR 8/2, black minerals				

0.6-1.5' - medium sand, subangular, well sorted, saturated, 10 YR 7/1, black mineral grains throughout

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	Groundwater Sample	Sample IDs and Notes
1518		47-50 cont.	1.5-3 Fine Sand 65% silt and clay 45%, Subangular, well sorted, moist, very dense, 10XR 7/3			
		60	set screen 45-49'			
		65				
		70				
		75				
		80				
		85				

Field Boring Log

Client: USAEC	Field Location:	Boring ID: FTBL-131436-02-50	Date:	
Project No.: 30001992.3DL10	Building 1436	Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: BPT Hand auger	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
1340	Hand auger 1 foot recovery	0-0.3	Topsoil, Fine to medium sand 70% with silt 30% subangular, poorly sorted, loose, moist, 7.5XR S13, high organics			FTBL-131436-02-50-092720
	1 foot recovery	0.3-1	medium to coarse sand 70% some silt 10% 20% fine gravel and pebbles up to 3cm, angular subangular, poorly sorted, moist, loose, 7.5XR 14/3,			
		1-2	coarse sand and pebbles 60% some silt 10% angular, poorly sorted, moist loose, 7.5XR S14, trace gravel			
		10				
		15				
		20				
		25				

Field Boring Log

Client: USAEC	Field Location: North Post	Boring ID: FTBL-NPFS-01-50	Date: 09/27/20	
Project No.: 30001992.3DL10		Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
0830	Hand Auger	0-0.3	Topsoil, medium to fine sand 70% with silt 30%, subangular, minor coarse sand, angular, moist, loose, 7.5 YR 4/2, ^{poorly sorted} high organics, poorly sorted			
		0.3-1	Fine to coarse sand with silt and gravel, subangular, poorly sorted			
		5	gravel is subangular, moist, loose, mostly 7.5 YR 5/4 mottled with 10R 4/8			
		1-2	same as above	✓		FTBL-NPFS-01-50-09/27/20
		2-3	SAA - increasing silt and clay content			
		3-3.5	Fine sand 50% with silt and clay 40% some gravel 10% subangular, poorly sorted, moist, loose, 7.5 YR 5/3, mottled with 10R 5/4			
		10				
		3.5-4	SAA			
		4-5	Fine to medium sand 50% coarse sand 70%, silt 70%, gravel 30% subangular, poorly sorted, loose, 10YR 4/2, some moisture			
		15	gravel ranging from 1 cm to 0.2 feet			
	DPT	5-12	NO recovery - hard material - could not retrieve soil			
		12-15	1 ft. recovery - 0-0.3 - medium sand ^{50%} and gravel 50%, subangular, poorly sorted, mostly dry, very dense, mottled 10R 4/4 and 5YR 2.5/1 and 7.5 YR 4/4, gravel 0-0.5"			
		20				
		0.3-1'	Fine to medium sand 50% and pebbles 40% some gravel 10%, subangular, poorly sorted, low moisture, very loose, 2.5 YR 4/6 and 7.5 YR 6/8			
		25				

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	Groundwater	r Sample	Sample IDs and Notes
		15-20	0.5' recovery - SAA				
		20-25	1.3' recovery - coarse sand and gravel 40%, subangular, poorly sorted, moist, loose, 7.5 YR 5/6, gravel ranges from 1 cm to 3 cm				
		25-28.5	2' recovery - coarse sand 75% some gravel 25%, subangular, poorly sorted, moist, 7.5 YR 6/6, lense of fine to medium sand, well sorted, subangular, moist 10 YR 6/6				
		28.5-35	1.3' recovery - 0-0.3 - medium sand 30% coarse sand 30% and gravel 40%, subangular, poorly sorted, moist, loose, 10 YR 4/4,				
		35-40	0.3 - 1.0' coarse sand 75% and gravel 25%, subangular, poorly sorted, wet, 10 YR 5/6, loose 1.0-1.3 Fine and medium sand minor gravel pebbles subangular, loose, dry, 10 YR 8/8				
		40-45	2ft recovery - 0-1.0' coarse sand 60% and pebbles 20% silt 10%, angular, poorly sorted, very moist, loose, 10 YR 5/8				
		45-50	1.0' - 2.0' coarse sand 30% silt 20% gravel 50%, angular, poorly sorted, saturated, loose, 10 YR 5/6, gravel ranges from 1 cm to 6 cm.				
	Screen 38'-42'	50-55	end soil 100% Screened 38'-42'				

Field Boring Log

Client: USAEC	Field Location: building 1436	Boring ID: <u>F13L-131436-01-50</u> - Date: <u>09/27/20</u>	
Project No.: 30001992.3DL10		Latitude: <u>09 27 20</u> Longitude:	
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Ground Surface Elevation:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Drill Rig Model: Track Mounted Geoprobe
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Groundwater Sampling Method: Grab with SP-22
Driller: Jeff Grant		Depth to First Encountered Water:	Total Depth of Boring: 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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
1300	Hand Auger 1 ft recovery	0-0.3	Topsoil - fine to medium sand ^{0%} with silt 30% subangular, poorly sorted, moist, loose, 7.5 YR 7.5/3, high organics			
		0.3-1 5	medium to coarse sand 70% some silt 10% ^{gravel} 20% subangular, poorly sorted, moist, loose 7.5 YR 4/3, gravel up to 7cm			
		1-2	Coarse sand and pebbles 30% some silt, angular, poorly sorted, moist, loose, 7.5 YR 5/6, some gravel 5% up to 8cm			
		10				
		2-3	Fine sand 70% some silt 20% clay 10% subangular, well sorted, moist, loose/blocky, trace gravel up to 3cm			
		15				
		3-4	Fine to medium sand 90% some gravel 10% sub rounded, poor well sorted, moist, loose, 5 YR 1.5/6 gravel up to 4cm			
		4-9 20	SAA			
		5-10	No recovery - hard/gravel			
		10-15	0-0.5 - medium to coarse sand 80% some pebbles 20% subangular, poorly sorted, moist, loose, 7.5 YR 5/8			
		25	0.5-1 Fine sand, subrounded, well sorted, moist, loose, 7.5 YR 5/8			
	DPT 1 ft rec.					

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	Groundwater	r Sample	Sample IDs and Notes
	1.5' rec.	15-20	0-0.5 gravel 80% medium sand 20%, subangular, poorly sorted, quartz gravel, 7.5 YR 3/4 sand, too dry, loose,				
		30	0.5-1.5 Coarse sand 40% silt 30% pebbles 30% subangular, poorly sorted, moist, loose, mottled 7.5 YR 4/4 and 5 YR 3/4				
	1' rec.	20-25	0-0.6 medium to coarse sand 85% some pebbles 15%, subangular, poorly sorted, little moisture, loose, 7.5 YR 7/4				
		35	0.6-1 medium to coarse sand, trace pebbles, subangular, well sorted, moist, loose, 7.5 YR 5/8				
		25-30	Gray clay 7.5 YR 5/8				
		30-35	Gray clay				
		35-40					
		40	0-0.3 gray clay				
	1' rec	35-40	0.3-1' Medium sand 70% silt 20% clay 10%, subangular, well sorted, loose, moist, mottled 2.5 Y 6/8 and 2.5 Y 7/1				
		45	0-0.5 Gray clay				
	1.5' rec,	40-45	0.5-1.5 Coarse sand, subangular, well sorted, very moist, loose, 7.5 YR 5/6				
		50	1 inch lense of coarse sand 7.5 YR 8/4 at 0.5-0.6'				
		45-50	gray clay intruding on hole - 2' recovery				
		50-55	0-0.6' Clay and fine sand 30%, subangular, well sorted, moist, dense, 10 YR 8/2, black mineral				
	3/4 rec.	47-50	0.6-1.5' - medium sand, subangular, well sorted, saturated, 10 YR 7/1, black mineral grains				

0.6-1.5' - medium sand, subangular, well sorted, saturated, 10 YR 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	Groundwater	Sample IDs and Notes
1518		47-50 cont.	1.5-3 Fine Sand 65% silt and clay 45%, Subangular, well sorted, moist, very dense, 10XR 713			
		60	set screen 45-49'			

Field Boring Log						
Client: USAEC		Field Location: Building 1436		Boring ID: FTBL-B1436-02-50 Date:		
Project No.: 30001992.3DL10		Latitude:		Longitude: Ground Surface Elevation:		
Site: Fort Belvoir, Virginia		Drilling Method: <u>DPT Hand auger</u>		Drill Rig Model: Track Mounted Geoprobe		
Logged by: Dakota Valle		Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22		
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch		Total Depth of Boring: Reference Datum:		
Driller: 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	Groundwater Sample	Sample IDs and Notes
1340	Hand auger 1 foot recovery	0-0.3	Topsoil, Fine to medium sand ^{70%} with silt 30% subangular, poorly sorted, loose, moist, 7.5XR S13, high organics			FTBL-B1436-02-50-092720
	1 foot recovery	0.3-1	medium to coarse sand 70% some silt 10% 20% and gravel and pebbles up to 3cm, angular subangular, poorly sorted, moist, loose, 7.5XR 14/3,			
		1-2	coarse sand ^{60%} and pebbles 30% some silt 10%, angular, poorly sorted, moist loose, 7.5XR S16, trace gravel			
		10				
		15				
		20				
		25				

Field Boring Log

Client: USAEC	Field Location: North Post	Boring ID: FTBL-NPFS-01-50 Date: 09/27/20		
Project No.: 30001992.3DL10		Latitude:	Longitude:	
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Ground Surface Elevation:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Track Mounted Geoprobe
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Grab with SP-22
Driller: Jeff Grant		Depth to First Encountered Water:		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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
0830	Hand Auger	0-0.3	Topsoil, medium to fine sand 70% with silt 30%, subangular minor coarse sand, angular, moist, loose, 7.5 YR 4/2, high organics, poorly sorted			
		0.3-1	Fine to coarse sand with silt and gravel, subangular, poorly sorted			
		5	gravel is subangular, moist, loose, mostly 7.5 YR 5/4 mottled with 10R 4/9			
		1-2	same as above			
		2-3	SAA - increasing silt and clay content	✓		FTBL-NPFS-01-50-09/27/20
		3-3.5	Fine sand 50% with silt and clay 40% some gravel 10% subangular, poorly sorted, moist, loose, 7.5 YR 5/3, mottled with 10R 5/4			
		3.5-4	SAA			
		4-5	Fine to medium sand 50% coarse sand 20%, silt 20%, gravel 30% subangular, poorly sorted, loose, 10 YR 4/2, some moisture			
		15	gravel ranging from 1 cm to 0.2 feet			
		5-12	NO recovery - hard material - could not retrieve soil			
	DPT	12	1 ft. recovery - 0-0.3 - medium sand and gravel 50%, subangular, poorly sorted, mostly dry, very dense, mottled 10R 4/4 and 5YR 2.5/1 and 7.5 YR 4/4, gravel 0.05"			
		20				
		0.3-1'	Fine to medium sand 50% and pebbles 10% some gravel 10%, subangular, poorly sorted, low moisture, very loose, 2.5 YR 4/6 and 7.5 YR 6/8			
		25				

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	Groundwater Sample	Sample IDs and Notes
		15-20	0.5' recovery - SAA			
		20-25	1.3' recovery - coarse sand and gravel 40%, subangular, poorly sorted, moist, loose, 7.5 YR 5/6, gravel ranges from 1 cm to 3 cm			
		25-28.5	2' recovery - coarse sand 75% some gravel 25%, subangular, poorly sorted, moist, 7.5 YR 6/6, lense of fine to medium sand, well sorted, subangular, moist 10 YR 6/6			
		28.5-35	1.3' recovery - 0-0.3 - medium sand 30% coarse sand 30% and gravel 40%, subangular, poorly sorted, moist, loose, 10 YR 4/4,			
		35-40	0.3 - 1.0' coarse sand 75% and gravel 25%, subangular, poorly sorted, wet, 10 YR 5/6, loose 1.0-1.3 fine and medium sand minor gravel pebbles subangular, loose, dry, 10 YR 8/8			
		35-40	2 ft+ recovery - 0-1.0' coarse sand 60% and pebbles 30% silt 10%, angular, poorly sorted, very moist, loose, 10 YR 5/8			
		50	1.0' - 2.0' coarse sand 30% silt 20% gravel 50%, angular, poorly sorted, saturated, loose, 10 YR 5/6, gravel ranges from 1 cm to 6 cm.			
	Screen 38'-42'	55	end soil 100% Screened 38'-42'			

Field Boring Log						
Client: USAEC		Field Location: <i>North Post</i>	Boring ID: FTBL-NPFS-02-50		Date: 09/27/20	
Project No.: 30001992.3DL10			Latitude:	Longitude:	Ground Surface Elevation:	
Site: Fort Belvoir, Virginia			Drilling Method: DPT Hand Auger	Drill Rig Model:	Track Mounted Geoprobe	
Logged by: Dakota Valle			Soil Sampling Method: Grab	Groundwater Sampling Method:		Grab with SP-22
Drilling Co.: JG Drilling			Hole Diameter: 2.5-inch	Total Depth of Boring: 3 ft	Reference Datum:	
Driller: 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	Groundwater Sample	Sample IDs and Notes
0930	Hand Auger	0-0.3	Topsoil, Fine to medium sand 60% silt 30% coarse sand 10%, subangular, poorly sorted, moist, loose, 7.5 YR 4/4, high organics	✓		FTBL-NPFS-02-50 092720
		0.3-7	medium sand 30% silt 30% gravel 30% 0.075, coarse sand 10%, subangular, poorly sorted, moist, loose 7.5 YR 5/6,			
		2-3	Same as above.			
		10				
		15				
		20				
		25				

Field Boring Log

Client: USAEC	Field Location:	Boring ID: FTBL-LVCF-01-S0	Date: 9/27/20	
Project No.: 30001992.3DL10		Latitude:	Longitude:	
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Ground Surface Elevation:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Track Mounted Geoprobe
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Grab with SP-22
Driller: Jeff Grant		Depth to First Encountered Water:	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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1'	0-0.3 Topsoil, Fine sand 60% and silt 40%, subangular, poorly sorted, moist, loose, 7.5 YR 4/2 high organics			
		5	0.3-1.0 Fine to medium sand 30% and silt 20%, sub angular, poorly sorted, moist, loose, 7.5 YR 4/6 pebbles and gravel 4cm			
		1-5'	Fine sand 60% and silt 40%, subrounded, well sorted, moist, loose and blocky, 5 YR 5/6, trace pebbles			
	DPT 4.4 rec.	5-10	0-4.4 silt and fine sand 40%, subangular, well sorted, moist, loose, 7.5 YR 4/6 lenses of medium sand 1 inch thick with same properties and less silt, color change at 4' to 10 YR 6/6			
	4.6 rec.	10-15	0-1.0 silt and clay 20% fine sand 10%, moist, dense, mottled 10 YR 8/1, 5 YR 5/6			
		1-1.5	Returns to silt and fine sand above			
		1.5-4.6	Same silt and sand with higher clay content, 10 YR 5/6			
		25				

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	Groundwater Sample	Sample IDs and Notes
	4.4 Rec	0-3.6				
		15-20	Silt 50% fine sand 35% clay 15%, subangular, well sorted, moist wet, loose, lenses sand mottled			
		30	5 YR 2.5/1, 5 YR 7/1, 7.5 R 6/6, lenses of fine sand with less silt and clay			
		35	3.6-3.8 medium sand ^{30%} on gravel 70%, subangular, poorly sorted, 7.5 YR 2.5/1 and 7.5 YR 5/6 moist, dense			
		40	3.8-4.4 Coarse sand 60% and gravel 30% and silt 10%, subangular, poorly sorted, 7.5 YR 5/6			
	1.6 rec,	40-23	0-1.6 medium to coarse sand 60% and gravel 40%, subangular, poorly sorted, saturated, loose, 7.5 YR 5/8			
		45	end soil log well set at 19-23'			
		50				
		55				

Field Boring Log

Client: USAEC	Field Location: Building 707	Boring ID: FTBL-B 707-01-50 Date: 09/28/20		
Project No.: 30001992.3DL10		Latitude:	Longitude:	
Site: Fort Belvoir, Virginia		Ground Surface Elevation:		
Logged by: Dakota Valle		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Drilling Co.: JG Drilling		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Driller: Jeff Grant		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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
0730	Hand Auger	0-1	0-0.3 - Topsoil - Silt and fine sand 55% trace medium sand 5%; sub angular, poorly sorted, moist, loose, 7.5 YR 2.5/1, high root content/organics			
		1-2	0.3-1 - Fine to medium sand 60% and silt 30%, gravel 10% subangular, poorly sorted, moist, 10 YR 5/4			
		2-3	0-0.3 SAA 0.3-1 Medium to coarse sand 50% silt 30% pebbles 20%, subangular, poorly sorted, moist, loose, 7.5 YR 4/2			
		3-4	SAA - strong petroleum odor			
		4-5	0-0.3 - SAA 60% 0.3-1 - Fine sand and silt 30% pebbles 10%, subangular, poorly sorted, moist, loose, 10 YR 4/4, petroleum odor			
		5-10	0-1 silt 70% fine sand 20% clay 10%, subangular, poorly sorted, wet, mushy and sticky, 10 YR 5/4 Faint petroleum odor			
	Sft. Rec.	20	0-1.6 - Silt 65% medium sand 35% clay 10% subangular, poorly sorted, moist, dense, mottled 10 YR 6/1 and 10 YR 5/4			
		25	1.6-4.7 Clay 10 YR 6/1 and 10 YR 5/4 - moist dense 4.7-5' medium to coarse sand 75% some silt 20% and pebbles 5%; subangular, poorly sorted, dense, grey 10 YR 8/1			

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	Groundwater Sample	Sample IDs and Notes
	3.6 Rec.	10-15	0-1.8' Coarse to medium Sand 40% pebbles 40%, silt 20%, subangular, poorly sorted, moist, dense, Gley 1 g/N			
		30	1.8-2.7 medium Sand sub some silt 20%, subangular, well sorted, moist, dense, Gley 1 g/N			
		35	2.7-3.6' Coarse Sand, subangular, well sorted, wet, loose, 2.5Y 7/3			
	5' Rec.	15-20	0-5' Coarse Sand, subangular, well sorted, saturated, loose and soupy, mottled 7.5YR 8/1, 7.5YR 5/6			
		40				
		45				
		50				
		55				

Field Boring Log						
Client: USAEC		Field Location:	Boring ID: FTBL-05PFS-01-50		Date: 09/29/20	
Project No.: 30001992.3DL10			Latitude:	Longitude:		Ground Surface Elevation:
Site: Fort Belvoir, Virginia			Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe	
Logged by: Dakota Valle			Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22	
Drilling Co.: JG Drilling			Hole Diameter: 2.5-inch		Total Depth of Boring: 33.3' Reference Datum:	
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0.0-0.4 - Topsoil - Fine sand 75% and silt 25%, subangular, poorly sorted, some moisture, loose, 7.5 YR 4/3, high organics			
		5	0.4-1 Fine sand 60% and silt 40%, trace gravel, subangular, poorly sorted, moist, loose, 10YR 3/6.			
		1-2	0-0.2 SAA			
		10	0.2- Fine to medium sand 50% 99% silt 5% clay 10% gravel, subangular, poorly sorted, moist, blocky and loose, 10YR 3/6, gravel up to 2cm			
		2-3	SAA			
		3-4	0-0.5 SAA			
		15	0.5-1 silt 60% fine sand 30% clay 10%, subangular, poorly sorted, moist, blocky, low density, 10YR 6/4			
		4-5	0-1 Fine sand 90% and silt 20%, subangular, poorly sorted, moist, loose, 10YR 6/8			
	DPT 3.5' rec.	5-10	0-1.8 - Fine sand 75% and silt 25%, subangular, poorly sorted, moist, dense, mottled 10YR 5/8, 10YR 7/1 and 10YR 5/4			
		25	1.8-3.5 - Clay and silt, low plasticity, very dense, lensed 10YR 7/1, 10YR 5/6, and 10R 4/6; plugs of medium sand 10YR 5/8			

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	Groundwater Sample	Sample IDs and Notes
	4.3' rec.	10-15	0-2.8 SAA- coarsens to medium fine sand with depth.			
		15-20	2.8-4.3- Fine Sand 80% with silt 20%, subangular, well sorted, moist, loose, mottled 10YR 6/1, 10YR 5/6, and 10R 5/6			
	0.15' rec.	15-20	0-0.5 medium sand 60% with gravel 40% subangular, poorly sorted, moist, loose, 7.5 YR 5/8			
		35	Refusal and no recovery from 19'-24' → Coarse sand and gravel - very hard			
	3' rec.	26-35 25-30	0-0.4 Coarse sand and gravel, angular, poorly sorted, very wet, loose, 7.5 YR 6/8, gravel up to 3cm			
		40				
		45	0.4-3' silt and clay, low plasticity, dense, moist, mottled 7.5 YR 6/8, 7.5R 3/8, 7.5 YR 8/1			
		50				
		55				

sample 1645 1-2'

Field Boring Log						
Client: USAEC		Field Location:	Boring ID: FTBL-OSPFS-02-80 Date: 09/28/20			
Project No.: 30001992.3DL10			Latitude:	Longitude:		Ground Surface Elevation:
Site: Fort Belvoir, Virginia			Drilling Method: DPT	Drill Rig Model:		Track Mounted Geoprobe
Logged by: Dakota Valle			Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22	
Drilling Co.: JG Drilling			Hole Diameter: 2.5-inch	Total Depth of Boring: 2'		Reference Datum:
Driller: Jeff Grant		Depth to First Encountered Water:				
Time	Drill Notes	Depth (feet bgs)	Soil/Rock Description <small>(principal components and angularity; minor components and angularity; sorting; moisture content; consistency/density; color; additional comments)</small>	Soil Sample	Groundwater	Sample IDs and Notes
	Hand Auger	0-1	Topsoil- Fine Sand 70% and silt 30%, subangular poorly sorted, moist, loose, 7.5 YR 2.5/2, high organics,			
		1-2	Fine sand 40% silt 50% clay 10%, subangular, poorly sorted, moist loose and blocky, 7.5 YR 5/8			
		5				
		10				
		15				
		20				
		25				

Field Boring Log						
Client: USAEC		Field Location: FTBL-12		Boring ID: FTBL-DAAF-01-GW Date: 09/28/20		
Project No.: 30001992.3DL10		Latitude:		Longitude:		Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT		Drill Rig Model:		Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab		Groundwater Sampling Method:		Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch		Total Depth of Boring:		Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
		0-1	0-0.2' - Topsoil - Silt 50% fine sand 50%, subangular, poorly sorted, moist, loose, 7.5 YR 2.5/1, high organics 0.2-1 Silt 50% fine sand 50%, subangular, poorly sorted, moist, blocky, 7.5 YR 4/3 5			
		7-2	0-0.3 SAA - 10-15cm cobbles 0.3-1 Fine to medium sand 80% some silt 20%, subangular, well sorted, moist, loose, 7.5 YR 5/6 2-3 0-1 SAA 10			
		3-4	0-1 medium sand 85% some silt 15%, subangular, poorly sorted, very moist, loose, 7.5 YR 5/6 gravel coarsens down with introduction of gravel at 0.7' 15			
	3.4' rec.	4-7	No recovery - gravel 7-10 3-3.0' Clay, moist, slightly dense - playdough, 5 YR 5/6 until 1.7', then mottled with Gley 6/10 Gy, then becomes more dense at bottom 20			
	4.7' rec.	10-15	0-0.8 SAA - fine sand 25% subangular, well sorted, Gley 6/10 Gy, moist, dense, 0.8-4.7' Fine sand 85% silt 15%, well sorted, subangular, very moist, dense, Gley 6/10 Gy 25			
	5' rec	15-20	0-5 SAA - saturated, soupy, coarsens last 1' to fine and medium sand			

sample time
1334

Field Boring Log

Client: USAEC	Field Location: FTBL12	Boring ID: FTBL-DAAF-01-50 Date: 09/28/20		
Project No.: 30001992.3DL10		Latitude:	Longitude:	
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Ground Surface Elevation:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Track Mounted Geoprobe
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
1320	Hand Auger	0-0.2	0-0.2 Topsoil - fine sand 70% silt 30%, subangular, poorly sorted, moist, loose, 7.5 YR 2.5R high organics			
		0.2-1	0.2-1 Fine to medium sand 60% gravel 30% silt 10% subangular, poorly sorted, moist, loose, 7.5 YR 4.14, gravel up to 5cm			Sample 1334
		1-2	SAA			
		5				
		10				
		15				
		20				
		25				

1350 sample

Field Boring Log

Client: USAEC	Field Location: FTBL12	Boring ID: FTBL-DAAF-02-50		Date: 09/28/20
Project No.: 30001992.3DL10		Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
1345	Hand Auger	0-1	0-0.3 Topsoil- fine sand 70% silt 30%, subangular, poorly sorted, moist, loose, 7.5 vR 2.5/1, high organics			
		5	0.3-1 Fine to medium Sand 60% gravel 30% silt 10%, subangular, poorly sorted, loose 2.5 yr 4/4, gravel up to 5cm			
		1-2	0-1-5AA			1350 sample
		10				
		15				
		20				
		25				

sample 1600

Field Boring Log

Client: USAEC	Field Location:	Boring ID: FTBL-12-01-S0	Date: 9/28/20	
Project No.: 30001992.3DL10		Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring:	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.2 Top Soil - Fine to medium sand 70% some silt 30%, subangular, poorly sorted, wet, loose, 7.5 YR 4/2; high organics			Fire training just before boring - surface wet
		0.2-1	Medium sand 75% and some silt 25%			
		1-2	Subangular, poorly sorted, very moist, loose, 10 YR 6/4, wood chips			
		0-0.5	Medium sand 50% silt 50%, subangular, well sorted, saturated, 10 YR 5/3			
		0.5-1	Fine to medium sand 80% some silt 20%, subangular, well sorted, saturated, soupy and loose, 10 YR 6/3 mottled with 10 YR 8/1			sample 1600
		2-3	SAA			
		3-4	SAA			
		4-5	SAA			
	1.1' rec.	0-0.7	Fine to coarse sand 40% and gravel 60%, Angular, poorly sorted, wet moist, loose, 10 YR 4/1			
		0.7-1.1	Fine sand 80% silt 20%, Subangular, well sorted, dense, moist, 10 YR 4/1			
	1' rec.	0-0.6	Gravel, pebbles 10%, coarse sand 50%, angular, poorly sorted, saturated, 2.5 YR 4/8			

0.6-1.1 SAA color change to 2.5 YR 5/1

Field Boring Log						
Client: USAEC		Field Location:		Boring ID:		Date: 09/29/20
Project No.: 30001992.3DL10				Latitude: FTBL-12-02-50		Longitude: Ground Surface Elevation:
Site: Fort Belvoir, Virginia				Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe
Logged by: Dakota Valle				Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling				Hole Diameter: 2.5-inch		Total Depth of Boring: 19' Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	Loarse to very Coarse Sand 50% gravel 50%, Angular, poorly sorted, wet, loose, 10YR 4/2, gravel upto 3cm			Hand Auger could not penetrate gravel from 1'-2.5'
		2.5-3	Medium to coarse sand 60%, silt 30% gravel 10% sub angular, poorly sorted, moist, blocky and medium density, 10YR 5/3			
		3-4	0-0.8 SAA 0.8-1 medium sand 75% silt 15% gravel 10%, subangular, well sorted, moist, medium density, 10YR 6/6			
		4-5	0-0.4' SAA 0.4-1 Fine to medium sand 80%, silt 10%, gravel 10%, subangular, well sorted, moist, loose, mottled 10YR 8/1 and 10YR 6/8			
	DPT 3.7rec.	5-10	0-0.5 SAA 0.5-3.7' Fine to medium sand, 80%, silt 20%, subangular, well sorted, moist, dense, mottled 10YR 4/3, 10YR 8/1			Sample 0900
		20	3-4 3.7			
		25				

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	Groundwater	r Sample	Sample IDs and Notes
	1.9' rec.	10-15	0-0.9' Fine Sand 75% and silt 25%, subangular, well sorted, moist, dense, 10YR 3/2, trace pebbles				
		30	0.9-1.9 fine sand to coarse sand 60% gravel 40% subangular, poorly sorted, little moisture loose, 10YR 5/3				
	3.2' rec.	15-19	0-0.8' SAA, saturated and color changes to 10YR 4/6				
		35	0.8-3.2' Fine sand 60% and silt 40%, subangular, well sorted, moist, dense, Gley 1 S/10GY				
		40					
		45					
		50					
		55					

Field Boring Log						
Client: USAEC		Field Location:		Boring ID: FTBL-12-03-6W		Date: 9/28/20
Project No.: 30001992.3DL10				Latitude:		Ground Surface Elevation:
Site: Fort Belvoir, Virginia				Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe
Logged by: Dakota Valle				Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling				Hole Diameter: 2.5-inch		Total Depth of Boring: 20' Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	Fine to medium sand 75% silt + 25%, sub angular, poorly sorted, moist, loose and blocky, 10 YR 6/3			
		5				
		1-2	SAA with 5% gravel and color change to 2.5Y 7/3			
		2-3	SAA			
		10				
		3-4	SAA color change to Gley 1 7/10y mottled with 7.5YR 5/8			
		4-5	SAA			
		15				
	DPT 3.9' rec.	5-10	0-0.6 Fine to medium sand 90% silt + 10%, sub angular, well sorted, moist, loose, 5Y 7/1 Clay plug at 0.8-1.1' 7.5YR 4/3			
		20	2.1 - Silt + 75% fine sand 25% with sub angular, well sorted, moist, dense, Gley 1 5/5 G-12, trace pebbles			
	1.2' rec.	10-15	0-1.0 fine sand coarsens to pebbles w/ coarse sand; angular, poorly sorted, moist, Gley 1 5/5 G-12			
		25				

1.0-1.2 - Gravel and coarse sand 30%, poorly sorted, angular, saturated, Gley 1 4/5 G-7

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	Groundwater	Sample IDs and Notes
	3' rec.	15-20	Bot. Sil + 80% some fine sand, sub angular, well sorted, moist, dense, Gley 16 / 1064			
		30	well set 12-16			
		35				
		40				
		45				
		50				
		55				

sample 1135 @ 5'-10'

Field Boring Log

Client: USAEC	Field Location: Hangar 3145	Boring ID: FTBL-H3145-01-50 Date: 09/29/20	
Project No.: 30001992.3DL10		Latitude:	Longitude: Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model: Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: 15 Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
		0-1	0-0.1 - Topsoil - Fine sand 50% silt 50%, subangular, poorly sorted, moist, loose, 7.5 YR 2.5/1, high organics			
		0.1-1	Fine to medium fine sand 70% with silt 30%, subangular, poorly sorted, dense, mottled			
		5	7.5 YR 5/1 and 7.5 YR 5/8, mottled roots to 0.5'			
		1-2	SAA - Fine to medium sand with 10% gravel up to 3cm			
		2-3	SAA			
		3-4	Silt 50% and fine sand 50%, subangular, well sorted, moist, dense, mottled 7.5 YR 5/8 and 7.5 YR 5/1			
		4-5	SAA - thin color change to 10 R 5/6			
	4.7' rec.	5-10	0-4.7 fine sand 50% and silt 50%, subangular, well sorted, moist, dense, grey silt/grey coarse to very coarse sand plug at 0.4-0.5 7.5 YR 5/6			
	5' rec.	10-15	SAA - fine sandy silt			
		2.5-5'	clay - low plasticity moist dense grey silt/grey mottled with 7.5 YR 2.5/3			sample 1135
		25				

Field Boring Log				
Client: USAEC	Field Location: <i>Building 3121</i>	Boring ID: FTBL-B3121-03-50	Date: 09/29/20	
Project No.: 30001992.3DL10		Latitude:	Longitude:	
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Ground Surface Elevation:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Track Mounted Geoprobe
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: 23.5	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	<i>Hand Auger</i>	0-1	<i>0-0.5 - Fine to medium sand 65% and silt 35%, poorly sorted, subangular, moist, loose, 7.5 YR 5/2, roots and organics</i>			
		5	<i>0.5-1 - Fine to coarse sand 50% gravel, angular, poorly sorted, moist, loose, 7.5 YR 5/4</i>			<i>gravel preventing hand auger collection from 1-2.5</i>
		2.5-3	<i>0-0.3 - SAA</i>			
		10	<i>0.3-1 Medium sand - 60% silt 35% 5% pebbles, subangular, poorly sorted, moist, dense, 10YR 4/4</i>			
		3-4	<i>SAA increased gravel to 10%</i>			
		4-5	<i>SAA - increased silt to 40%</i>			<i>sample 1330</i>
	<i>DPT 2.4' rec.</i>	5-10	<i>2.4-0-2.4 - medium to coarse sand 60% silt 40%, subangular, poorly sorted, moist, dense, 7.5 YR 5/4</i>			
		15				
	<i>4.6' rec</i>	10-15	<i>Medium to coarse sand 75% silt 25%, subangular, poorly sorted, moist, dense, 10YR 4/6 mottled with 10YR 6/1</i>			
		20				
	<i>4.5' rec.</i>	15-20	<i>silt 50% clay 50% - medium plasticity, moist, mottled 10YR 4/6 and 10YR 6/1</i>			
	<i>3' rec.</i>	20-23.5	<i>medium sand 90% silt 10%, subangular, well sorted, wet, loose, mottled alternating</i>			
		25				

dominant colors between 7.5 YR 5/8 and 7.5 YR 8/1, plug of gravel and medium sand at 2.2'-2.4'

Sample 1200 i-3'

Field Boring Log						
Client: USAEC		Field Location: 1980 plane crash		Boring ID: FTBL-1980PC-01-50- Date: 09/30/20		
Project No.: 30001992.3DL10		Latitude: 44.5		Longitude: Ground Surface Elevation:		
Site: Fort Belvoir, Virginia		Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe		
Logged by: Dakota Valle		Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22		
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch		Total Depth of Boring: 44.5 Reference Datum:		
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.1 - Topsoil - ^{40%} Silty fine sand 60%, subangular, poorly sorted, moist, low density, 7.5% 2, 5/2, high organics			
		5	0.1-0.4 - Fine sand 70% and silt 30%, subangular, poorly sorted, moist, medium density, 10 YR 5/4, some organics			
		10	0.4-1 - Fine to medium sand 75% and silt 25%, subangular, poorly sorted, moist, medium density, mottled 10R 4/1, 10R 5/4,			
		1-2	SAA			
		2-3	SAA - 10% gravel up to 3cm			
		3-4	SAA			
		15				
		4-5	0-0.7 SAA 0.7-1 silt 50% fine sand 40% clay 10%, plastic, moist, medium density, 10YR 7/1			
	2.8' rec DPT	5-10	0-0.4' Silty 60% fine sand 40%, subangular, poorly sorted, plastic, very moist, low density, 10YR 5/4, bottom 0.1' medium coarse sand 10YR 4/2			
		20	0.4-2' Silt 60% fine to medium sand 30% clay 10%, subangular, poorly sorted, moist, medium-high density, mottled 10YR 7/1, 10YR 5/6			
		25				

14-23
 23-27
 27-30 30-34

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	Groundwater Sample	Sample IDs and Notes
	2.8' rec	5-10 Cont.	2'-2.8' - Fine to medium sand 70% silt 30%, Subangular, poorly sorted, moist low density loose, mottled 10YR 7/1 and 10YR 5/6			
	0.7' rec.	10-12 30	0-0.7' silt with trace coarse sand, plastic, low density 2.5 4/2			
	4.5' rec.	15-19 35	0-3.7 Fine to medium sand 60% silt 20% gravel 20%, Subangular, poorly sorted, little moisture, dense, 10YR 4/6 3.7-4.5 - Fine to medium sand 85% silt 15%, Subangular, well sorted, moist, dense, 10YR 5/8			
	4.9' rec.	14-23 40	0-1.6 SAA 1.6-4.9' - silt 70% clay 15% fine sand 15%, low plasticity, dense, little moisture, mottled 10YR 4/1 and 10YR 5/8 - increases sand at 2.5' to 30%			
	3.9' rec.	23-27 45	0-2.9 - Fine sand 70% and silt 30%, subangular well sorted, moist, low density, 10YR 8/1 mottled with 10YR 6/6 2.9-3.9 medium to coarse sand 50% and gravel 50% subangular, poorly sorted, little moisture, moist, dense, 10YR 6/6			
	3.2' rec.	27-30 50	0-0.4 SAA 0.4-1.3 - medium sand 80% silt 20%, subangular, well sorted, moist, medium density, 5YR 5/8 1.3-3.2 Fine to medium sand 80% silt 20%, Subangular, well sorted, moist, loose low density, 10YR 8/1			
	4.8' rec 3.1' rec	30-34 34-36 55	0-4.9' SAA 0-3.1 SAA - becomes very dense at bottom 2.8'			NO recovery on 36-44.5

very moist

3.1

Field Boring Log						
Client: USAEC		Field Location: 1980 Plane crash		Boring ID: FTBL-1980PC-02-50 Date: 09/30/20		
Project No.: 30001992.3DL10		Latitude: 09/30/20		Longitude: Ground Surface Elevation:		
Site: Fort Belvoir, Virginia		Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe		
Logged by: Dakota Valle		Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22		
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch		Total Depth of Boring: 47' Reference Datum:		
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.5 Fine to medium sand 80% some silt 20%, subangular, poorly sorted, moist, blocky, low density, 7.5 YR 4/6			
		5	0.5-1 Fine to medium sand 70% silt 30%, subangular, poorly sorted, moist, medium density, 7.5 YR 6/1, some organic material			
		1-2	0-1' medium to coarse sand 90% minor silt 10%, subangular, poorly sorted, moist, loose low density, 10 YR 6/4			
		2-3	0-1' SAA - increased coarse sand content, mottled 7.5 YR 5/8 and 10 YR 6/4			
		3-4	0-0.5 Fine to medium sand 70% silt 20% gravel 10%, subangular, poorly sorted, loose low density, moist, mottled 7.5 YR 5/8 and 10 YR 6/4			
		15	0.5-1 silty fine sand 30%, gravel 30%, medium plasticity, subangular poorly sorted, moist, medium density, 10 YR 7/1			
		4-5	SAA -			
		20				
	DPT S' rec.	5-10	0-0.5 Fine to medium sand 60% and silt 40%, subangular, poorly sorted, moist, dense, mottled 7.5 YR 7/1 and 2.5 YR 5/4			
		25	0.5-5' Clay with trace silt, low plasticity, dense, moist, mottled 10 YR 7/1 and 7.5 YR 4/2			

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	Groundwater Sample	Sample IDs and Notes
	3.5' rec.	10-15	0-0.4 silt ^{fine} Sandy 60% silt 40%, subangular, well sorted, moist low density, moderate medium plasticity, 7.5 YR 7/1			
		30	0.4-2' Medium to fine sand 90% silt 10%, subangular, well sorted, 7.5 YR 8/1, moist, loose			
			2-3.5' Fine to coarse sand 45% trace silt 5%, subangular, well sorted, moist, loose, 7.5 YR 8/1			
	4' rec.	15-20	0-4 Medium to coarse sand 90% some silt 10%, subangular, well sorted, loose, moist, 7.5 YR 8/1, ~1 inch clay plugs at 1'-1.1', 2'-2.1', 3.4-3.5'			
		40	7.5 YR 2.5/1			
	3.3' rec	20-25	0-2.7 - SAA - clay plugs intermittent ranging from 0.2' to 0.4'			
		45	2.7-3.3 Fine to medium sand 80% with silt 20%, subrounded, well sorted, moist, loose, 7.5 YR 8/1			
	4.2' rec	25-30	SAA - intermittent mottling from 7.5 YR 8/1 to 7.5 YR 6/6			
	4.8' rec	30-35	0-1.6 SAA - very moist in upper 1.4'			
	3.3' rec	35-40	0-1.6' SAA - becomes wet			
		50	1.6-3.3' Coarse sand to medium sand, subangular, well sorted, wet, loose, mottled 7.5 YR 5/6 and 7.5 YR 7/1			
	2.8' rec.	43.5-47	clay, low plasticity, very dense, 7.5 YR 5/1, moist			Hard layer could not be retrieved 40-43.5
		55				

Field Boring Log						
Client: USAEC		Field Location:		Boring ID: FTBL-143232-01GW Date: 09/30/20		
Project No.: 30001992.3DL10		Latitude:		Longitude:		
Site: Fort Belvoir, Virginia		Drilling Method: DPT		Drill Rig Model:		
Logged by: Dakota Valle		Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22		
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch		Total Depth of Boring: 15 Reference Datum:		
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand auger	0-1	0-0.2 - Topsoil - silt and fine to medium sand 70% ^{50%} subangular, poorly sorted, moist, loose low density, 1.5 YR 2.5/2, High organics			
		0.2-1	0.2-1 medium to fine sand 90% silt 20%, gravel 10% subangular, poorly sorted, moist, low density, 10 YR 7/6			
		1-2	0-1 - SAA			
		2-3	0-1 SAA			
		10				
		3-4	0-0.8 SAA 0.8-1 silt and fine sand 40% ^{60%} , subangular, poorly sorted moist, dense, 10 YR 5/4			5-9 9-15
		4-5	SAA			
	DPT 4.8' rec.	5-9	0-3" clay and silt, low plasticity, dense, moist mottled 10 YR 7/1 and 10 YR 5/6, intermittent medium sand and silt 10 YR 5/6			
		20	3'-4.8' - Fine Sand, angular, well sorted, wet loose - 10 YR 6/4			
		4.8' rec.	0-3.5 - Coarse Sand and Gravel, angular, poorly sorted, saturated & loose, 10 YR 6/4			
		25	3.5-4.8' silty 85% fine sand 15%, moderate plasticity, moist, dense, Gley 5/56-11			

Sample 1725
0-~~2~~2

Field Boring Log						
Client: USAEC		Field Location:		Boring ID: FTBL-FBNARS-01- 50		Date: 10/1/20
Project No.: 30001992.3DL10				Latitude:		Ground Surface Elevation:
Site: Fort Belvoir, Virginia				Drilling Method: DPT		Drill Rig Model: Track Mounted Geoprobe
Logged by: Dakota Valle				Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling				Hole Diameter: 2.5-inch		Total Depth of Boring: 20' Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0'-0.2' Fine Sand 60% silt 40%, subangular, poorly sorted, moist, medium density, 10YR 5/3			
		0.2-1	0.2-1 - Fine sand to very coarse sand, pebbles and gravel, subangular, poorly sorted, loose low density, 10YR 4/6			
	0.3' reco	1-2	0-0.3 SAA			gravel cannot be hand augered and recovered from 2-5'
	DPT 2.8 rec	5-10	0-2.8' Fine to very coarse sand, pebbles, and gravel, subangular, poorly sorted, moist, loose/low density, 10YR 5/8			
	1.5' rec.	10-15	0-1.5 SAA			
	2.2 rec.	15-20	0-0.8 SAA			
		15	0.8-2.2 - coarse sand, subangular, well sorted, loose low density, saturated, 10YR 5/8			
		20				
		25				

Sample 1745
0-2 sample

Field Boring Log

Client: USAEC	Field Location:	Boring ID: FTBL - FBNAFS-03-50		Date: 10/1/20
Project No.: 30001992.3DL10		Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: 1.5	Reference Datum:
Driller: 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	Groundwater	Sample IDs and Notes
					Sample	
	Hand Auger	0-1	0-0.2 Top soil - silty + 60% fine sand 40% subangular, poorly sorted, loose low density, moist, 2.5 YR 4/2, organics			
		0.2-1	fine to coarse sand, pebbles, and gravel, subangular, poorly sorted, loose low density, moist			
	0.5 sec.	0.5-1	SAA			
		5				
		10				
		15				
		20				
		25				

sample 3-5' 1545

FTBL - Field Boring Log						
Client: USAEC		Field Location: Fire Station		Boring ID: FBNAFS-02-50		Date: 10/01/20
Project No.: 30001992.3DL10				Latitude:		Longitude:
Site: Fort Belvoir, Virginia				Drilling Method: DPT		Drill Rig Model:
Logged by: Dakota Valle				Soil Sampling Method: Grab		Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling				Hole Diameter: 2.5-inch		Total Depth of Boring: 25' Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.6 - silt 60% fine sand 40%, subangular, poorly sorted, moist, medium density, 10YR 5/4 with organics and roots			
	6.3' rec.	0.6-1	0.6-1 fine to medium sand 60% and silt 30% gravel 10% subangular, poorly sorted, medium density, moist, 10YR 5/4			
		1-2	0-0.3' medium sand 65% silt 15% gravel and pebbles 20% subangular, poorly sorted, low density, moist, 10YR 5/6			0.3-1' unrecoverable due to rocks
		2-3	0-1' medium and coarse sand 60%, with silt 30%, gravel 10%			
		3-4	0-0.8' silt and fine sand 40%, subangular, poorly sorted, moist, blocky, medium density, 10YR 3/2, black coloring, wood fragments and gravel			
		4-5	0.8-1' medium to coarse sand 60% silt 20%, gravel 20% subangular, poorly sorted, moist, medium density 10YR 5/8			
	3.3' rec.	5-10	0-1' SAA 0-1.6' SAA			
		10-14.5	1.6'-3.3' - silt >5% fine sand 25%, subangular, well sorted, plastic, wet, loose low density, very moist			
	3.3' rec.	14.5-17.2	1.6'-3.3' - silt and medium to coarse sand 75% silt 25% trace gravel, subangular, well sorted, moist, low density 2.5Y 5/4			
		17.2-25	2.8'-3.3' - coarse sand and gravel 30%, subangular, poorly sorted, moist, low density, 2.5Y 4/3			

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	Groundwater Sample	Sample IDs and Notes
	4.8' rec.	15-20	0-0.9 SAA- color change to 10YR 5/8 0.9-4.8' medium sand 85% silt 15% trace gravel, very moist, loose low density, lensed 10YR 5/8, 10YR 8/1, 10R 6/4			
	4' rec.	20-25	0-4' SAA- 1.1-2.5 wet			
		30				
		35				
		40				
		45				
		50				
		55				

Sample 1230 1-3

Field Boring Log								
Client: USAEC		Field Location:		Boring ID: FTBL-133121-01-50		Date: 10/1/20		
Project No.: 30001992.3DL10		Building 3121		Latitude:		Ground Surface Elevation:		
Site: Fort Belvoir, Virginia				Drilling Method: DPT		Drill Rig Model:		Track Mounted Geoprobe
Logged by: Dakota Valle				Soil Sampling Method: Grab		Groundwater Sampling Method:		Grab with SP-22
Drilling Co.: JG Drilling				Hole Diameter: 2.5-inch		Total Depth of Boring:		Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes		
	Hand Auger	0-1	0-0.2 Topsoil - silt 60% fine to coarse sand 40% subangular, poorly sorted, moist, low density, 7.5YR 3/2, high organics					
		5	0.2-0.8 silt 60% and fine to medium sand 40% subangular, poorly sorted, moist, medium density, 7.5YR 5/2					
		10	0.8-1 Fine to medium sand 80% silt 15% gravel 5% subangular, poorly sorted, moist, dense, mottled 7.5YR 5/2 and 7.5YR 5/8					
		15	0-0.6 SAA 0.6-1 silt and medium sand 50% ^{50%} , subangular, poorly sorted, moist, blocky and dense, mottled 7.5YR 5/1 and 7.5YR 5/8					
		20	0-0.5 SAA 0.5-1 Fine sand 60% and silt 40%, subangular, poorly sorted, moist, medium density, 7.5YR 5/1 0-0.7 SAA - increased silt content w/ depth					
		25	0.7-1 SAA mottled 7.5YR 5/1 and 7.5YR 5/8 0-0.6 SAA 0.6-1 Fine sand 80% and silt 15% 5% gravel, subangular, poorly sorted, moist, low density, blocky, mottled 7.5YR 8/1 and 10YR 6/4					

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	Groundwater Sample	Sample IDs and Notes
	DPT 1.8' rec.	5-10	0-0.4' SAA 0.4' S 1.8' silt and fine sand grades to coarse sand and gravel, mostly fine sand from 0.5-1.4', moist, loose low density, 10 YR 6/4			
	1.9' rec.	10-15	0-0.4' - very coarse sand and pebbles, subangular, poorly sorted, wet, low density loose, 10 YR 6/4			
		35	0.4-1.9' Fine sand, subangular, well sorted, saturated, low density, loose, mottled 10 YR 5/8, 10 YR 8/1, 10 YR 6/4			
		40				
		45				
		50				
		55				

sample 1045 i-3'

Field Boring Log

Client: USAEC	Field Location: Building 3121	Boring ID: FTBL-B3121-02-50	Date: 10/1/20
Project No.: 30001992.3DL10		Latitude:	Longitude:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method: Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: 15
Driller: Jeff Grant		Depth to First Encountered Water:	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)	Soil Sample	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.3 Topsoil - silt 80% fine to medium sand 20%, plastic, very wet, loose, 7.5YR 2/1 subangular, poorly sorted			
		5	0.3-1 Fine to medium sand and silt 70%, subangular, poorly sorted, medium density, loose moist mottled 7.5YR 5/8, 7.5YR 7/1, 7.5YR 5/4			
		10	1-2 Fine to coarse sand 70% silt 30%, subangular, poorly sorted, moist, medium density, 7.5YR 5/6, trace gravel			
		15	2-3 0-0.2' - SAA 0.2'-1, Fine to coarse sand - 70% silt 20% gravel 10%, subangular, poorly sorted, moist, blocky and dense, 2.5Y 5/2			
		20	3-4 SAA - Increasing silt content with depth 4-5 0-0.5' SAA 0.5-1 silt 50% medium sand 50%, plastic, subangular, well sorted, low density, 2.5Y 5/3, very moist			
	DPT 0.5' rec	25	0-0.5 silt 75% fine sand 25%, plastic, subangular, well sorted, low density, wet, 2.5Y 5/2			
	3' rec	25	0-1.3 silt 80% and sand 20%, plastic, subangular, well sorted, low density, Gley 1S/107, wet very moist			
			1.3-3' - Fine to medium sand, subangular, well sorted, wet, low density loose, saturated Gley 1S/104			

sample 0900
1-3

Field Boring Log

Client: USAEC	Field Location: Hangar 3151	Boring ID: FTBL-H3151-01-50		Date: 10/1/20
Project No.: 30001992.3DL10		Latitude:	Longitude:	Ground Surface Elevation:
Site: Fort Belvoir, Virginia		Drilling Method: DPT	Drill Rig Model:	Track Mounted Geoprobe
Logged by: Dakota Valle		Soil Sampling Method: Grab	Groundwater Sampling Method:	Grab with SP-22
Drilling Co.: JG Drilling		Hole Diameter: 2.5-inch	Total Depth of Boring: 15'	Reference Datum:
Driller: 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	Groundwater Sample	Sample IDs and Notes
	Hand Auger	0-1	0-0.2 topsoil - Medium sand to fine sand 80% silt 10%, pebbles 6% Subangular, poorly sorted, moist, loose low density, 7.5 YR 2.5/2, organics			
		5	0.2-1' medium to coarse sand 60% silt 10% gravel 30% subangular, poorly sorted, moist, loose low density, 7.5 YR 6/8, gravel more prominent in 0.8-1' up to 5cm			
		1-2	no recovery - nar & gravel layer pushed through w/rig			
		2-3	0-1' Medium to fine sand 80% silt 20% Subangular, poorly sorted, loose low density, moist, mottled 7.5 YR 8/1, 7.5 YR 6/8			
		3-4	0-1' SAA			
		4-5	0-0.5' medium to fine sand 85% silt 15% subangular, well sorted, moist, loose low density, 6.5 Y 5/10GY			
		15	0.5-0.7 - wood chips			
		20	0.7-1' - medium to fine sand 75% silt 25% subangular, poorly sorted, moist, blocky medium density, 2.5 Y 6/2			
	DPT 2.6' rec.	5-10	0-0.2' clay with silt, low plasticity, dense, 2.5 Y 5/1 0.2'-2.6' fine sand ^{to medium} and silt 40%, subangular, poorly sorted, moist, medium density, mottled			
		25				

~~7.5 Y 5/1~~ 2.5 Y 5/1 and 7.5 YR 5/6,
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	Groundwater Sample	Sample IDs and Notes
	4.4' rec.	10-15	0-1.0' - Fine Sand; subangular, well sorted, wet, loose low density; Gley 6/5 GY			
		30	1.0'-4.4' silt 50% and fine sand 50%, plastic, subangular, well sorted, wet, Gley 1/1 until 2.7'; becomes IDXR 5/8 mottled with some Gley 1/1			
		35				
		40				
		45				
		50				
		55				

Field Boring Log

Client: <u>USACE</u>	Field Location: <u>3000 FFR 3 DUO</u>	Boring ID: <u>FTBL-B1495-01-S0</u>	Date: <u>3/10/2021</u>
Project No.: <u>CA-30053782-00000</u>		Latitude:	Longitude:
Site: <u>Fort Belvoir, Virginia</u>		Drilling Method: <u>HAND AUGER</u>	Drill Rig Model: <u>NA (HAND AUGER)</u>
Logged by: <u>Justin Coffey</u>		Soil Sampling Method: <u>GRAB/HALO</u>	Groundwater Sampling Method: <u>NA</u>
Drilling Co.: <u>NA Cascade</u>		Hole Diameter: <u>3"</u>	Total Depth of Boring: <u>2'</u> Reference Datum:
Driller: <u>NA</u>		Depth to First Encountered Water: <u>NA</u>	

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	Groundwater Sample	Sample IDs and Notes
1115	HAND AUGER 2' BGS	0.0 - 5	0.0-0.6 GRAVELY SAND (SAND 60% GRAVEL 40%) SUB-ROUNDED (COARSE TO MEDIUM SAND) (MEDIUM GRAVEL) POORLY SORTED, SATURATED, SOFT/LOOSE 7.5 YR 5/8 STRONG BROWN			
		5 - 10	0.6-1.2 SANDY CLAY (CLAY 60% SAND 40%) LOW PLASTICITY, WET, MEDIUM STIFF, 7.5 YR 5/8 STRONG BROWN MOTTLED W/ 7.5 YR 7/1 LIGHT GRAY.			FTBL-B1495-01-S0-031021 @ 1130
		10 - 15	1.2-2.0 SAND (70%) (GRAVEL 15%) SILTS (15%) SUBROUNDED MEDIUM TO FINE SAND WET, LOOSE, POORLY SORTED 7.5 YR 5/8 STRONG BROWN MOTTLED W/ 7.5 YR 7/1 LT. GRAY			
		15 - 20	2.0 END OF BORING			
		20 - 25				

Field Boring Log

Client: <u>USACE</u>	Field Location: <u>30001992.3DU10</u>	Boring ID: <u>PTBL-B1495-S002-50</u>	Date: <u>3/10/2021</u>
Project No. <u>44L30053782.00000</u>		Latitude:	Longitude:
Site: <u>Fort Belvoir, Virginia</u>		Drilling Method: <u>NA (HAND AUGER)</u>	Drill Rig Model: <u>NA (HAND AUGER)</u>
Logged by: <u>Justin Coffey</u>		Soil Sampling Method: <u>GRAB/HAND</u>	Groundwater Sampling Method: <u>NA</u>
Drilling Co.: <u>QRC Cascade NA</u>		Hole Diameter: <u>3-INCH</u>	Total Depth of Boring: <u>2'</u> Reference Datum:
Driller: <u>NA</u>		Depth to First Encountered Water: <u>NA</u>	

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	Groundwater Sample	Sample IDs and Notes
1245		0.0' - 0.4'	GRAVELLY SAND, SUB-ROUNDED COARSE SAND (20% GRAVEL), MOIST, LOTS OF ORGANIC MATERIAL, 7.5 YR BLACK LOOSE.			FIBL-B1495-02-50-031021 @1305
		0.4' - 2.0'	GRAVELLY SAND (30% GRAVEL) 70.5" - 70.75" GRAVEL COARSE-MEDIUM SAND SUB-ROUNDED, POORLY SORTED, MOIST, LOOSE 7.5 YR 5/8 STRONG BROWN			
		2'	BELOW GROUND SURFACE END OF BORING			
		5				
		10				
		15				
		20				
		25				

Field Boring Log

Client: <u>USACE</u>	Field Location: <u>30009912.3DL10</u>	Boring ID: <u>FTBL-81495-03-50</u>	Date: <u>3/10/2021</u>
Project No.: <u>DP 30053782-00000</u>		Latitude:	Longitude:
Site: <u>Fort Belvoir, Virginia</u>		Drilling Method: <u>NA (HAND AUGER)</u>	Drill Rig Model: <u>NA (HAND AUGER)</u>
Logged by: <u>Justin Coffey</u>		Soil Sampling Method: <u>GRAB/HAND</u>	Groundwater Sampling Method: <u>NA</u>
Drilling Co.: <u>GAC Cascade NA</u>		Hole Diameter: <u>3-1/2"</u>	Total Depth of Boring: <u>2'</u>
Driller: <u>NA</u>		Reference Datum:	
		Depth to First Encountered Water: <u>NA</u>	

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	Groundwater	Sample IDs and Notes
					Sample	
1330	HAND AUGERED 2' BGS	0.0' - 0.5'	(SAND(80%), GRAVEL(10%), SILT(10%)) SUB-ROUNDED, POORLY SORTED (COARSE TO MEDIUM GRAIN SAND, >0.10" GRAVEL, SOFT LOOSE, 7.5 YR 2.5/1 BLACK - LOTS OF ORGANIC MATERIAL (MOIST)			FTBL-81495-03-50-031021 @1400
		0.5' - 1.0'	(GRAVEL(50%) SAND(50%), SUB ROUNDED POORLY SORTED, SAND COARSE, MOIST SOFT LOOSE LARGE BITS OF GRAVEL >1" TO 3" GRAVEL; 7.5 YR 5/8 STRONG BROWN			
		1.0' - 1.4'	(CLAY(50%), SAND(30%), GRAVEL(20%), COARSE TO MEDIUM SAND, POORLY SORTED, MOIST SOFT, LOW PLASTICITY, 7.5 YR 5/8 STRONG BROWN.			
		1.4' - 2.0'	GRAVEL 50%, SAND 50% SUBROUNDED, POORLY SORTED, COARSE SAND, MOIST, LOOSE, SOFT, SAME COLOR AS ABOVE.			
			2" BGS END OF BORING			

Field Boring Log

Client: <u>USACE</u>	Field Location: <u>30009923DLID</u>	Boring ID: <u>FTBL-B1495-04-50</u>	Date: <u>3/10/2021</u>
Project No.: <u>CA-30053782-00000</u>		Latitude:	Longitude:
Site: <u>Fort Belvoir, Virginia</u>		Drilling Method: <u>NA (HAND AUGER)</u>	Drill Rig Model: <u>NA (HAND AUGER)</u>
Logged by: <u>Justin Coffey</u>		Soil Sampling Method: <u>GRAB/HAND</u>	Groundwater Sampling Method: <u>NA</u>
Drilling Co.: <u>Cascade WA</u>		Hole Diameter: <u>3-INCH</u>	Total Depth of Boring: <u>2'</u> Reference Datum:
Driller: <u>NA</u>		Depth to First Encountered Water: <u>NA</u>	

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	Groundwater	Sample IDs and Notes
1155	HAND AUGER 2' BCG	0.0 - 1.2	GRAVELLY SAND (50% SAND / 50% GRAVEL) SUB ANGULAR, SATURATED, SOFT / LOOSE 7.5 HR / 5/8 STRONG BROWN (COARSE)			
		1.2 - 1.6	SANDY CLAY (60% SAND / 40% CLAY) WET MEDIUM STIFF / LOW PLASTICITY, SAME COLOR AS ABOVE.			FTBL-B1495-04-50-031021 @1210
		1.6 - 2.0	GRAVELLY SAND (SAND 75%) GRAVEL (15%) SILT (10%) SUBROUNDED (COARSE TO FINE) SAND POORLY SORTED LOOSE			
		2 FT END OF BORING				

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-NPFS-01 Date 9/27/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 71°F PARTLY CLOUDY

Measuring Pt. TOC (GS) Screen Setting (ft-bmp) 38'-42' Casing Diameter (in.) 1" Well Material PVC
 Description (circle one) TOC (GS) Static Water Level (ft-bmp) 33.34' Water Column in Well 8.66' SS Other

Total Depth (ft-bmp) 42' Pump Intake (ft-bmp) 40' Purge Method: Peristaltic Gallons in Well 0.31

Calc. Gallons Purged 1.02 MP Elevation NM PDB Bladder Other Sample Method Grab

Gallons Purged 1.25 Replicate/Code No. FTBL-NPFS-01-GW-092720 Pump On/Off 1112/1142 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1114	0	0.00	33.34	25.66	0.119	0.96	5.03	197	OVER	BROWN	NONE
1119	5	0.25	NM	24.95	0.097	0.69	4.88	161	OVER	"	"
1124	10	0.50	NM	24.31	0.097	0.79	4.87	155	370	"	"
1129	15	0.75	NM	23.95	0.100	0.85	4.91	149	193	"	"
1134	20	1.00	NM	23.70	0.102	0.75	4.92	144	174		
1140	-SAMPLED FTBL-NPFS-01-GW-092720										

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: NORTH POST FIRE STATION Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-B707-01-BW Date 09/28/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather cloudy

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 14'-18' Casing Diameter (in.) 1" Well Material PVC
 (circle one) Static Water Level (ft-bmp) 13.89 SS
Other

Total Depth (ft-bmp) 18' Water Column in Well 4.11' Gallons in Well 6.16

Calc. Gallons Purged 0.49 Pump Intake (ft-bmp) 14' Purge Method: Grab
 PDB Bladder Other Peristaltic

Gallons Purged 3.0 MP Elevation NM Replicate/Code No. 0905 Sample Time: Label 0905 Pump On/Off 0835/0907

Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
0835	0	0	NM	19.88	0.269	0.31	4.47	168	0.01000	brown	
0840	5	0.5	NM	19.14	0.266	0.00	4.45	136	1000	light brown	
0845	10	0.0	NM	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	cloudy	
0855	20	0.0	NM	19.06	0.262	0.00	4.45	122	87.9	clear	
0900	25	2.5	NM	19.06	0.260	0.00	4.46	121	70.0	clear	
0905	30	3.0	NM	19.17	0.260	0.00	4.47	122	16.2	clear	
Sample 0905											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: Building 707 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-DAAF-01-04

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather _____

Measuring Pt. Screen Well Material PVC
Description TOC / GS Setting (ft-bmp) 14'-18' Casing Diameter (in.) 1 SS
(circle one) Static Water 4.65 Other _____

Total Depth (ft-bmp) 20' below Level (ft-bmp) 4.65 Water Column in Well 9.45' Gallons in Well 0.38

Calc. Gallons Purged 1.14 Pump Intake (ft-bmp) 14' Purge Method: PDB _____ Sample Method Grab
Bladder _____ Other _____ Peristaltic

Gallons Purged 1.25 MP Elevation NM Pump On/Off 1305

Sample Time: Label 1335 Replicate/Code No. FTBL-DAAF-01-04-092820 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1312	0.00	0.00	NM	26.22	0.180	0.31	6.07	29	OVER	LT GRAY	NONE
1317	5	0.25	NM	24.53	0.183	0.21	6.23	-12	376	"	"
1322	10	0.50	NM	23.13	0.181	0.19	6.25	-14	364	"	"
1327	15	0.75	NM	22.96	0.177	0.12	6.26	-14	219	"	"
1332	20	1.00	NM	22.99	0.177	0.12	6.24	-14	211	"	"
1335	- SAMPLED FTBL-DAAF-01-04-092820										
<i>JAC</i> 9/28/20											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: DAAF FIRE STATION Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FIBL-12-02-6W Date 9/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 68°F WINDY

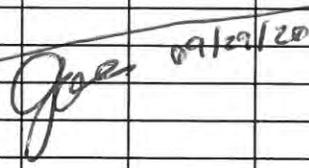
Measuring Pt. TOC / GS Screen 14'-18' Casing 1" Well Material SS
 Description (circle one) TOC / GS Setting (ft-bmp) 14'-18' Diameter (in.) 1" SS PVC Other

Total Depth (ft-bmp) 18' Static Water Level (ft-bmp) 13.04' Water Column in Well 4.96' Gallons in Well 0.20

Calc. Gallons Purged 0.60 Pump Intake (ft-bmp) 12.14' Purge Method: Grab
 PDB Bladder Other Peristaltic

Gallons Purged 1.25 MP Elevation NM Sample Pump On/Off 0919/0947

Sample Time: Label 0945 Replicate/Code No. FIBL-12-02-6W-092920 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°F)	Cond. (µmhos/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
0922	0	0.00	NM	21.76	0.399	0.93	6.63	-47	OVER	DK. GRAY	NOPE
0927	5	0.25	NM	21.60	0.398	0.00	6.68	-89	"	"	"
0932	10	0.50	NM	21.47	0.399	0.00	6.61	-99	"	"	"
0937	15	0.75	NM	21.15	0.400	0.00	6.72	-102	"	"	"
0942	20	1.00	NM	22.11	0.390	0.00	6.72	-105	"	"	"
0945	SAMPLED FIBL-12-02-6W-092920										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: FIBL-12 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-12-03-6W Date 9/28/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 75°F PARTLY CLOUDY

Measuring Pt. TOC / GS Screen 12'-16' Casing 4.521" Well Material SS
Description (circle one) TOC / GS Setting (ft-bmp) 12'-16' Diameter (in.) 4.521" SS
 Other

Total Depth (ft-bmp) 16' Static Water Level (ft-bmp) 9.52' Water Column in Well 6.48' Gallons in Well 0.26

Calc. Gallons Purged 0.78 Pump Intake (ft-bmp) 14' Purge Method: Grab
Gallons Purged 1.25 MP Elevation NM PDB Bladder _____ Sample Methoc Grab

Sample Time: Label 1850 Replicate/Code No. FTBL-12-03-092820 Other Peristaltic Pump On/Off 182 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1826	0	0	NM	24.88	0.204	0.09	6.28	31	PUER	GRAY	NOLE
1831	5	0.25	NM	23.99	0.205	0.00	6.11	-18	"	"	"
1836	10	0.50	NM	23.51	0.206	0.00	6.12	-24	"	"	"
1841	15	0.75	NM	22.74	0.208	0.00	6.10	-26	"	"	"
1846	20	1.00	NM	22.63	0.206	0.00	6.10	-26	"	"	"
1850	-SAMPLED		FTBL-12-03-6W								
<p><i>Joe</i> 9/28/20</p>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None
<u>*ms/ms*</u>			

Well Information

Well Location: <u>FTBL-12</u>	Well Locked at Arrival: <u>Yes / No</u>
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: <u>Yes / No</u>
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: <u> </u>

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FIBL-H3145-01-GW Date 9/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 73°F: CLOUDY

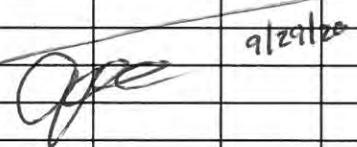
Measuring Pt. TOC / GS Screen Setting (ft-bmp) 5'-9" Casing Diameter (in.) 1" Well Material PVC SS Other

Total Depth (ft-bmp) 10' Static Water Level (ft-bmp) 5.71' Water Column in Well 3.29' Gallons in Well 0.13

Calc. Gallons Purged 0.39 Pump Intake (ft-bmp) 6' Purge Method: PDB Bladder Other Peristaltic Sample Method Grab

Gallons Purged 1.25 MP Elevation NM Pump On/Off 1158 / 1227

Sample Time: Label 1225 Replicate/Code No. FIBL-H3145-01-GW-092920 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°F)	Cond. (µmhos/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1200	0	0.00	NM	26.03	0.247	0.54	7.02	2	OVER	BROWN	NONE
1205	5	0.25	NM	25.81	0.244	0.32	7.00	-1	"	"	"
1210	10	0.50	NM	25.17	0.245	0.28	7.00	-3	624	"	"
1215	15	0.75	NM	24.84	0.248	0.41	7.00	-5	433	"	"
1220	20	0.95	NM	24.74	0.247	0.63	7.02	-9	679	CLEAR	"
1225	- SAMPLED FIBL-H3145-01-GW-092920										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: HANGAR 3145 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FIBL-H3151-01-GW Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 68°F Sunny

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 10'-14' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

Total Depth (ft-bmp) 14' Static Water Level (ft-bmp) 11.04' Water Column in Well 2.96' Gallons in Well 0.12

Calc. Gallons Purged 0.36 Pump Intake (ft-bmp) 12' ↓ Purge Method: PDB Bladder Other Peristaltic Sample Method Grab

Gallons Purged ~0.50 MP Elevation NM Pump On/Off 0914 / 0927

Sample Time: Label 0925 Replicate/Code No. FIBL-H3151-01-GW-100120 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
0917	0	0.00	NM	21.50	0.091	5.86	4.95	142.4	249.2	Brown	None
0925	- SAMPLED FIBL-H3151-01-GW-100120										
<div style="position: absolute; top: 50px; left: 50%; transform: translate(-50%, -50%); opacity: 0.5;"> <p>10/1/20</p> <p>J. Coffey</p> </div>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: HANGAR 3151 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well:

NOTES: SAMPLED FIBL-FB-01-100120 (FIELD BLANK)

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

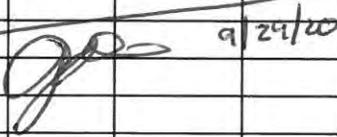
Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FIB-OSPFS-01-GW Date 9/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather _____

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 19'-23' Casing Diameter (in.) 1" Well Material SS
 Description (circle one) TOC / GS Static Water Level (ft-bmp) 21.33' Water Column in Well 2.77 Gallons in Well 0.11
 Total Depth (ft-bmp) 23' Pump Intake (ft-bmp) 21 Purge Method: Peristaltic
 Calc. Gallons Purged 0.33 MP Elevation NM PDB Bladder _____ Other Peristaltic Sample Method Grab
 Gallons Purged 1.25 Pump On/Off 1728/1757

Sample Time: Label _____ Replicate/Code No. _____ Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1730	0	0.00	NM	25.63	0.210	4.84	5.01	161	273		
1735	5	0.75	NM	24.07	0.216	2.80	4.95	156	198		
1740	10	0.50	NM	22.91	0.212	2.33	4.88	148	143		
1745	15	0.75	NM	22.38	0.225	2.26	4.90	139	101		
1750	20	1.00	NM	22.15	0.226	2.05	4.95	135	105		
1755	- SAMPLED FIBL-OSPFS-01-GW-092920										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-B3121-01-GW Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 65°F Sunny

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 10'-14' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

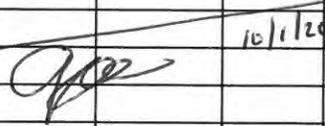
Total Depth (ft-bmp) 14' Static Water Level (ft-bmp) 8.74' Water Column in Well 5.26 Gallons in Well 0.21

Calc. Gallons Purged 0.63 Pump Intake (ft-bmp) 10' Purge Method: PDB

Gallons Purged 1.25 MP Elevation NM Other Bladder _____ Sample Method Grab

Sample Time: Label _____ Replicate/Code No. FTBL-B3121-01-GW Other Peristaltic _____ Pump On/Off 1228 / 1257

Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1230	0	0.00	NM	24.78	0.116	4.78	5.19	110.5	276.4	BROWN	NONE
1235	5	0.25	NM	23.50	0.114	2.56	4.97	113.5	426.3	"	"
1240	10	0.50	NM	23.32	0.114	2.30	4.95	114.1	782.1	"	"
1245	15	0.75	NM	23.15	0.113	1.93	4.93	113.1	190.2	CLEARING	"
1250	20	1.00	NM	22.96	0.113	1.68	4.95	110.2	200.4	"	"
1255	- SAMPLED FTBL-B3121-01-GW-100120										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: <u>BUILDING 3121</u>	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-B3121-02-GW Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 62°F SUNNY

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 10'-14' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

Total Depth (ft-bmp) 14' Static Water Level (ft-bmp) 7.74' Water Column in Well 6.26 Gallons in Well 0.28 GALLONS

Calc. Gallons Purged 0.96 Pump Intake (ft-bmp) 11' Purge Method: Peristaltic Sample Method Grab

Gallons Purged 1.25 MP Elevation NM PDB Bladder Other Peristaltic Pump On/Off 1050/1105

Sample Time: Label _____ Replicate/Code No. FTBL-B3121-02-GW-100120 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1052	0	0.25	NM	24.32	0.561	4.34	6.03	6.1	284.5	BROWN	None
1053	- WELL WENT DRY AFTER PURGING ~ 0.50 GALLONS -										
1100	- SAMPLED FTBL-B3121-02-GW-100120										

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FIBL-B3121-03-GW Date 9/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 74°F Sunny

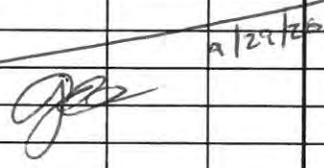
Measuring Pt. TOC / GS Screen Setting (ft-bmp) 17.5-21.5 Casing Diameter (in.) 1" Well Material PVC
 (circle one) SS
Other

Total Depth (ft-bmp) 21.5' Static Water Level (ft-bmp) 18.50' Water Column in Well 3' Gallons in Well 0.12 GAL

Calc. Gallons Purged 0.36 Pump Intake (ft-bmp) 19' Purge Method: Peristaltic Sample Method Grab

Gallons Purged 1.25 MP Elevation NM PDB Bladder Other Pump On/Off 1417/1447

Sample Time: Label 1445 Replicate/Code No. FIBL-B3121-03-GW-09-29-20 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°F)	Cond. (µmhos/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1419											
1424	0	0.00	NM	22.80	0.243	0.68	6.56	-1	OVER	BROWN	NONE
1424	5	0.25	NM	23.14	0.248	0.36	6.59	-12	302	CLEAR	"
1429	10	0.50	NM	23.22	0.251	0.00	6.68	-36	254	"	"
1434	15	0.75	NM	23.24	0.251	0.00	6.69	15	214	"	"
1439	20	1.00	NM	22.93	0.250	0.00	6.73	19	198	"	"
1446	- SAMPLED FIBL-B3121-03-GW-09-29-20										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID F1BL-1980PC-02-GW Date 9/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather _____

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 34'-38' Casing Diameter (in.) 1" Well Material SS
 (circle one) Static Water Level (ft-bmp) 33.81' Water Column in Well 4.89' Gallons in Well 0.19
 Other _____

Total Depth (ft-bmp) 38' Calc. Gallons Purged 0.57 Pump Intake (ft-bmp) 34' Purge Method: Peristaltic
 PDB Bladder _____ Other _____

Gallons Purged 1.25 MP Elevation NM Sample Method Grab
 Pump On/Off 1210

Sample Time: Label 1 Replicate/Code No. F1BL-1980PC-02-GW-093020 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1210	0	0.00	NM	25.25	0.052	3.28	5.44	151	OVER	BROWN	NOISE
1225	5	0.25	NM	22.80	0.033	2.43	5.59	116	"	"	"
1228	10	0.50	NM	21.69	0.031	2.96	5.59	115	"	"	"
1235	15	0.75	NM	20.98	0.030	3.19	5.56	116	"	"	"
1238	20	1.00	NM	20.85	0.030	3.92	5.55	117	"	"	"
1245	- SAMPLED F1BL-1980PC-02-GW-093020										
<i>[Signature]</i> 9/30/20											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-MW-1R Date 9/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 70°F Sunny

Measuring Pt. TOC / GS Screen NM Casing 2" Well Material PVC
 Description TOC / GS Setting (ft-bmp) NM Diameter (in.) 2" SS
 (circle one) Other

Total Depth (ft-bmp) NM 20' Static Water Level (ft-bmp) 3.23' Water Column in Well NM Gallons in Well NM

Calc. Gallons Purged Pump Intake (ft-bmp) 15' Purge Method: PDB Sample Method Grab
 Gallons Purged MP Elevation NM Bladder Other Peristaltic Pump On/Off 1623/1652

Sample Time: Label Replicate/Code No. FTBL-MW-1R Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1625	0	0.25	NM	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	"	"
1635	10	0.75	NM	25.43	0.294	0.73	5.42	-1	36	"	"
1640	15	1.00	NM	24.22	0.298	0.68	5.44	-13	28	"	"
1645	20	1.25	NM	24.13	0.304	0.63	5.46	22	12	"	"
1650	<u>-SAMPLED FTBL-MW-1R-093020</u>										
<u>9/30/20</u>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: <u>HANGAR 3232</u>	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: <u> </u>

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-H3232-01-GW Date 9/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 65°F Sunny

Measuring Pt. TOC / GS Screen Setting (ft-bmp) 10'-14' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

Total Depth (ft-bmp) 14' Static Water Level (ft-bmp) 9.73' Water Column in Well 4.27' Gallons in Well 0.16

Calc. Gallons Purged 0.48 Pump Intake (ft-bmp) 10' Purge Method: Other Peristaltic Sample Method Grab

Gallons Purged 1.25 MP Elevation NM PDB Bladder Other Peristaltic Pump On/Off 1753/1824

Sample Time: Label _____ Replicate/Code No. FTBL-H3232-01-GW-093020 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
17:55	0	0.00	NM	20.74	0.048	6.47	5.48	145.7	146.3	brown	NONE
18:00	5	0.25	NM	20.56	0.045	4.58	4.98	124.6	146.1	"	"
18:05	10	0.50	NM	20.41	0.045	5.08	5.00	98.9	1459.6	"	"
18:10	15	0.75	NM	20.25	0.045	5.05	2.70	86.9	1457.7	"	"
18:15	20	1.00	NM	20.18	0.044	5.04	2.48	84.9	1457.1	"	"
18:20	SAMPLED FTBL-H3232-01-GW-093020										
 9/30/20											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FBBL-FBNAPS-01-GW Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 68°F overcast

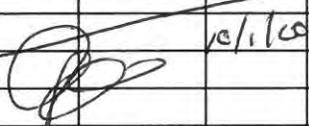
Measuring Pt. TOC / GS Screen Setting (ft-bmp) 15'-19' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

Total Depth (ft-bmp) 19' Static Water Level (ft-bmp) 17.50' Water Column in Well 2.50 Gallons in Well 0.10

Calc. Gallons Purged 0.30 Pump Intake (ft-bmp) 18' Purge Method: Grab
 PDB
 Bladder
 Other
 Peristaltic

Gallons Purged 1.30 MP Elevation NM Pump On/Off 1743/1812

Sample Time: Label _____ Replicate/Code No. F Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1745	0	0.00	NM	22.43	0.083	6.21	4.61	173.4	1476.2	BROWN	NONE
1750	5	0.25	NM	20.71	0.076	5.27	4.62	162.9	1463.6	"	"
1755	10	0.50	NM	20.37	0.072	3.88	4.61	140.2	1459.0	"	"
1800	15	0.75	NM	20.15	0.071	3.58	4.66	134.4	1456.7	"	"
1805	20	1.00	NM	19.78	0.070	3.31	4.72	130.0	466.3	CLEAR	"
1810	→ SAMPLED FBBL-FBNAPS-01-GW-100120										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: <u>FBNA FIRE STATION</u>	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-FBNAFS-02-GW Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather 65°F overcast

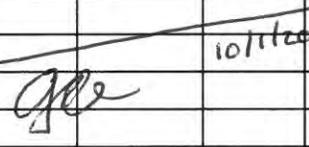
Measuring Pt. TOC / GS Screen Setting (ft-bmp) 20'-24' Casing Diameter (in.) 1" Well Material PVC
 SS
 Other

Total Depth (ft-bmp) 24' Static Water Level (ft-bmp) 20.11' Water Column in Well 3.89' Gallons in Well 0.16

Calc. Gallons Purged 0.48 Pump Intake (ft-bmp) 21' Purge Method: PDB Bladder Sample Method Grab

Gallons Purged 1.25 MP Elevation NM Other Peristaltic Pump On/Off 1413/1442

Sample Time: Label _____ Replicate/Code No. _____ Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
16:15	0	0.00	NM	20.00	0.241	5.14	4.75	166.0	1451.8	BROWN	NONE
16:20	5	0.25	NM	19.24	0.242	4.03	4.61	166.0	510.2	"	"
16:25	10	0.50	NM	19.37	0.241	3.32	4.61	163.1	805.6	CLEARING	"
16:30	15	0.75	NM	19.27	0.244	3.19	4.62	161.1	456.3	"	"
16:35	20	1.00	NM	19.22	0.246	2.88	4.67	155.5	186.6	"	"
16:40	FTBL-FBNAFS-02-GW-100120										
											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____	Well Locked at Arrival: Yes / No
Condition of Well: <u>Good Condition</u>	Well Locked at Departure: Yes / No
Well Completion: <u>Flush Mount / Stick Up</u>	Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-M07-MV02 Date 10/1/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Partly cloudy, 68°f

Measuring Pt. TOC / GS Screen Setting (ft-bmp) Casing Diameter (in.) 2.0" Well Material PVC SS Other

Total Depth (ft-bmp) 27.80' Static Water Level (ft-bmp) 11.05' Water Column in Well 16.75' Gallons in Well 2.68 gal

Calc. Gallons Purged 1.33 Pump Intake (ft-bmp) MP Elevation NM Purge Method: PDB Bladder Other Peristaltic Sample Method: Grab

Gallons Purged 1.45 MP Elevation NM Other Peristaltic Pump On/Off 1040/1100

Sample Time: Label 1102 Replicate/ Code No. Flow rate = 250mL/min Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1040	0	0	11.05'			NM					
1045	5	0.33	11.30'	16.33	0.086	0.00	5.37	144	46.5	Clear	None
1050	10	0.66	11.40'	16.05	0.085	0.00	5.30	141	87.3	Clear	None
1055	15	1.00	11.49'	15.87	0.085	0.00	5.27	139	17.3	Clear	None
1100	20	1.33	11.50'	15.90	0.085	0.00	5.26	138	11.5	Clear	None
1104	Pump off. Sample collected @ 11:02.										

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: See updated QAPP Figure 8 / Field Change Form Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-PSA2009-NW42 Date 09/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Sunny, 70°F

Measuring Pt. TOC / GS Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2.0" Well Material PVC SS Other

Total Depth (ft-bmp) 29.90' Static Water Level (ft-bmp) 21.41' Water Column in Well 8.41' Gallons in Well 1.35 gal

Calc. Gallons Purged 1.33 Pump Intake (ft-bmp) _____ Purge Method: PDB Bladder _____ Sample Method Grab

Gallons Purged 1.40 MP Elevation _____ NM Other Peristaltic Pump On/Off 1345/1409

Sample Time: Label 14:07 Replicate/Code No. Flow Rate = 250mL/min Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1345	0	0	21.41'								
1350	5	0.33	21.95'	20.01	0.084	18.38	4.82	292	50.5	Clear	None
1355	10	0.66	21.95'	19.46	0.082	2.38	4.71	316	29.7	Clear	None
1400	15	1.00	21.98'	19.36	0.082	1.81	4.66	329	19.3	Clear	None
1405	20	1.33	22.02'	19.25	0.081	1.56	4.62	336	10.8	Clear	None
1409	Pump off.	0.08	Sample collected @ 14:07.								

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-FATS-LTM-1103 Date 09/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Sunny, 75°F

Measuring Pt. TOC / GS Screen Setting (ft-bmp) Static Water Casing Diameter (in.) 2.0" Well Material PVC SS Other

Total Depth (ft-bmp) 19.25' Level (ft-bmp) 15.49' Water Column in Well 3.76' Gallons in Well 0.60 gal

Calc. Gallons Purged 1.8 Pump Intake (ft-bmp) MP Elevation NM Purge Method: PDB Bladder Other Peristaltic Sample Method Grab

Sample Time: Label 1103 Replicate/Code No. Flow Rate = 280 mL/min. Pump On/Off 1051/1103 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1051	0	0	15.49'								
1056	5	.36	17.15'	20.09	1.92	286	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
1106	15	1.08	17.78'	19.91	1.92	0.68	4.58	323	0.0	Clear	None
1101	20	1.44	17.95'	19.82	1.93	0.42	4.63	326	0.0	Clear	None
1103	Pump off. Sample collected @ 1103										

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: See GAPP Addendum Figure 8. Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES: Well located along Fairfax County Parkway entrance ramp,

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTBL-M26-LTM-06 Date 09/30/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Sunny, 65°F

Measuring Pt. TOC / GS Screen Static Water Casing 2.0" Well Material PVC
 Description TOC / GS Setting (ft-bmp) 3.66' Diameter (in.) 2.0" SS
 (circle one) Other

Total Depth (ft-bmp) 22.75' Level (ft-bmp) 3.66' Water Column in Well 19.07' Gallons in Well 3.05 gal

Calc. Gallons Purged 1.33 Pump Intake (ft-bmp) MP Elevation NM Purge Method: PDB Bladder Other Peristaltic
 Sample Method: Grab

Sample Time: Label 0907 Replicate/Code No. 0645 / 0909 Pump On/Off 0645 / 0909
 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
0845	0	0	3.68'								
0850	5	0.33	4.36	16.36	0.165	0.00	5.95	55	54.7	Yellow	None
0855	10	0.66	4.37	16.31	0.163	0.00	6.00	48	29.9	Clear	None
0900	15	1.00	4.37	16.13	0.164	0.00	6.03	42	66.9	Clear	None
0905	20	1.33	4.37	16.09	0.163	0.00	6.02	41	62.3	Clear	None
0907	Sample taken. Pump off @ 0909										
<i>[Signature]</i>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: See QAPP Addendum Figure 8 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID FTB-118-MW31 Date 09/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Cloudy, 69°F

Measuring Pt. TOC / GS Screen Setting (ft-bmp) Static Water Level (ft-bmp) 3.91' Casing Diameter (in.) 2.0" Well Material PVC SS Other

Total Depth (ft-bmp) 15.20' Water Column in Well 11.29' Gallons in Well 1.80 gal

Calc. Gallons Purged 1.23 Pump Intake (ft-bmp) MP Elevation NM Purge Method: PDB Bladder Other Peristaltic Sample Method Grab

Gallons Purged 1.30 Sample Time: Label 1612 Replicate/Code No. 1612 Pump On/Off 1550 / 1614 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C)	Cond. (µmhos/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
1550	0	0	3.91								
1555	5	0.33	4.01	19.92	0.001	11.20	9.05	90	255	Clear	None
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	20	1.23	4.16	19.01	0.000	8.17	8.55	78	241	Clear	None
1612	- Sample collected. Pump off at 1614										
<i>J. Coffey</i>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: See GAPP Addendum Figure 8 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / (Stick Up) Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	<u>2" = 0.16</u>	3" = 0.37	4" = 0.65	

Groundwater Sample Log

Project No. 30001992.3DL10 Well ID AOPC30-MW02 Date 09/29/20

Project Name/Location Army PFAS Program SI - Fort Belvoir, Virginia Weather Sunny, 78°F

Measuring Pt. TOC / GS Screen Setting (ft-bmp) _____ Casing Diameter (in.) 2.0" Well Material PVC SS Other _____

Total Depth (ft-bmp) 23.66' Static Water Level (ft-bmp) 5.13' Water Column in Well 18.47' Gallons in Well 2.95 gal

Calc. Gallons Purged 1.66 Pump Intake (ft-bmp) _____ Purge Method: PDB _____ Bladder _____ Other _____ Peristaltic Sample Method Grab

Gallons Purged 1.62 MP Elevation _____ NM _____ Pump On/Off 13:40/14:04

Sample Time: Label 14:02 Replicate/Code No. _____ Other Peristaltic Pump On/Off 13:40/14:04 Sampled by J. Coffey/M. Blower

Time	Minutes Elapsed	Gallons Purged	Depth to Water (ft) TOC	Temp. (°C) (°F)	Cond. (µmhos) (mS/cm)	Dissolved Oxygen (mg/L)	pH	ORP (mV)	Turbidity (NTU)	Appearance	
										Color	Odor
13:40	0	0	23.66/3'	24.12	0.000	9.10	4.37	382	431	Clear	None
13:45	5	0.53	5.75'	23.38	0.000	8.00	4.21	371	422	Clear	None
13:50	10	0.66	5.93'	23.49	0.002	8.04	4.09	351	499	Clear	None
13:55	15	1.00	6.01'	23.08	0.002	7.39	4.07	317	473	Clear	None
14:00	20	1.33	6.09'	22.77	0.002	6.66	4.09	225	431	Clear	None
14:02	Sample taken. Pump off @ 14:04										
<i>M. Blower</i>											

Constituents Sampled	Container	Number	Preservative
PFAS 18 Compounds (see lab report for details)	250ml HDPE	2	None

Well Information

Well Location: See GAPP Addendum Figure #8 Well Locked at Arrival: Yes / No

Condition of Well: Good Condition Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NOTES:

Well Casing Volumes

Gallons/Foot	1" = 0.04	1.5" = 0.09	2.5" = 0.26	3.5" = 0.50	6" = 1.47
	1.25" = 0.06	2" = 0.16	3" = 0.37	4" = 0.65	



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Number **111742**

Client ARCADIS			Report to Contact AFTON HESS / JUSTIN COFFEY / PFAS EMAIL				Telephone No. / E-mail 111742.HESS@ARCADIS.COM JUSTIN.COFFEY@ARCADIS.COM				Quote No.																									
Address 9954 MAYLAND DR. SUITE 2400			Sampler's Signature 				Analysis (Attach list if more space is needed)				Page 1 of 4																									
City RICHMOND		State VA	Zip Code 23233		X Printed Name JUSTIN COFFEY		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:10%;">PFAS (18 COMPOUNDS)</td> <td style="width:10%;">TOC</td> <td style="width:10%;">PH</td> <td style="width:10%;">GRAIN SIZE</td> <td style="width:10%;"></td> </tr> <tr> <td style="text-align:center;">X</td> <td style="text-align:center;">X</td> <td style="text-align:center;">X</td> <td style="text-align:center;">X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>				PFAS (18 COMPOUNDS)	TOC	PH	GRAIN SIZE									X	X	X	X									Lot # Bar Code (lab use only)	
PFAS (18 COMPOUNDS)	TOC	PH	GRAIN SIZE																																	
X	X	X	X																																	
Project Name FORT BELVOIR / ARMY PFAS SI PROGRAM			Project No. 30001992.3DL10		P.O. No.		Matrix		No of Containers by Preservative Type				Remarks / Cooler I.D.																							
Sample ID / Description (Containers for each sample may be combined on one line.)			Collection Date(s)	Collection Time (Military)	G-Grab C-Composite	Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl			NaOH	5035 Kit	Field Filtered																			

Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G-Grab C-Composite	Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered	Remarks / Cooler I.D.
FTBL-NPFS-01-50-092720	09/27/20	0915	G	X			4							
FTBL-NPFS-02-50-092720	09/27/20	0945	G	X			1							
FTBL-NPFS-01-GW-092720	09/27/20	1140	G	X			2							
FTBL-B1436-01-50-092720	09/27/20	1340	G	X			4							
FTBL-B1436-02-50-092720	09/27/20	1355	G	X			1							
FTBL-B1436-01-GW-092720	09/27/20	1600	G	X			2							
FTBL-LVCF-01-50-092720	09/27/20	1730	G	X			4							
FTBL-LVCF-01-GW-092720	09/27/20	1822	G	X			2							
FTBL-B707-01-GW-092820	09/28/20	0905	G	X			2							
FTBL-DAAF-01-GW-092820	09/28/20	1335	G	X			6							*NS/MSD*

Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)			Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab				Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown					QC Requirements (Specify)		
---	--	--	---	--	--	--	--	--	--	--	--	----------------------------------	--	--

1. Relinquished by 	Date 10/1/20	Time 1715	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
 Received on ice (Circle) Yes No Ice Pack Receipt Temp. _____ °C
 Temp Blank Y N



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 www.pacelabs.com

Number 111743

Client ARCADIS		Report to Contact AFTON HESS / JUSTIN COFFEY / PFAS EMAIL			Telephone No. / E-mail SEE PAGE 1			Quote No.	
Address 9954 MAYLAND DR. SUITE 2400		Sampler's Signature <i>[Signature]</i>			Analysis (Attach list if more space is needed)			Page 2 of 4	
City RICHMOND	State VA	Zip Code 23233	X Printed Name JUSTIN COFFEY			PFAS (18 COMPOUNDS) TOC PH GRAIN SIZE			Lot # Bar Code (lab use only)
Project Name FT BELVOIR / ARMY PFAS SI PROGRAM									

Project No. 30001992.3DL10	P.O. No.	Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G-Grab C-Composite	Matrix			No of Containers by Preservative Type							Remarks / Cooler I.D.			
						Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered				
		FTBL-DAAF-01-50-092820	09/15/20	1334	G	X			4										
		DUP-1-092820	09/28/20	—	G	X			1										
		FTBL-DAAF-02-50-092820	09/28/20	1350	G	X			3										*N/S/MSD*
		FTBL-12-01-50-092820	09/25/20	1600	G	X			4										
		FTBL-12-01-GW-092820	09/28/20	1655	G	X			2										
		DUP-1-092820	09/25/20	—	G	X			2										
		FTBL-12-03-GW-092820	09/28/20	1850	G	X			1										*ms/msd*
		FTBL-12-02-50-092920	09/29/20	0900	G	X			1										
		FTBL-12-02-GW-092920	09/29/20	0945	G	X			2										
		FTBL-H3145-01-50-092920	09/30/20	1135	G	X			4										

Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown			QC Requirements (Specify)	
1. Relinquished by <i>[Signature]</i> (Matt Blower)	Date 09/30/20	Time 17:15	1. Received by	Date	Time			
2. Relinquished by	Date	Time	2. Received by	Date	Time			
3. Relinquished by	Date	Time	3. Received by	Date	Time			
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time			

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
 Received on ice (Circle) Yes No Ice Pack Receipt Temp. _____ °C Temp Blank Y N



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Number 111744

Client ARCADIS		Report to Contact AFTON HESS / J COFFEY / PFAS SI		Telephone No. / E-mail SEE PAGE 1		Quote No.	
Address 9954 MAYLAND DR. SUITE 2400		Sampler's Signature 		Analysis (Attach list if more space is needed)		Page 3 of 4	
City RICHMOND	State VA	Zip Code 23233		X		Lot # Bar Code (lab use only)	
Project Name FORT BELVOIR / ARMY PFAS SI PROGRAM		Printed Name JUSTIN COFFEY					

Project No. 300019972.3DL10	P.O. No.	Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G-Grab C-Composite	Matrix			No of Containers by Preservative Type							PFAS (18 compounds)	TOC	PH	GRAIN SIZE	Remarks / Cooler I.D.
						Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered					
		FTBL-H3145-01-GW-092920	09/29/20	1225	G	X			2											
		FTBL-B3121-03-SO-092920	09/29/20	1330	G	X			1											
		FTBL-B3121-03-GW-092920	09/29/20	1445	G	X			2											
		FTBL-OSPFS-01-SO-092920	09/29/20	1615	G	X			4					X	X	X				
		FTBL-OSPFS-02-SO-092920	09/29/20	1645	G	X			1					X						
		FTBL-OSPFS-01-GW-092920	09/29/20	1755	G	X			2					X						
		DUP-3-092920	09/29/20	—	G	X			2					X						
		FTBL-1980PC-02-SO-093020	09/30/20	0900	G	X			1					X						
		FTBL-1980PC-01-SO-093020	09/30/20	1200	G	X			4					X	X	X				
		FTBL-1980PC-02-GW-093020	09/30/20	1235	G	X			2					X						

Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown				QC Requirements (Specify)				
1. Relinquished by (Matt Blower)	Date 10/1/20	Time 1715	1. Received by				Date	Time				
2. Relinquished by	Date	Time	2. Received by				Date	Time				
3. Relinquished by	Date	Time	3. Received by				Date	Time				
4. Relinquished by	Date	Time	4. Laboratory received by				Date	Time				

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
 Received on ice (Circle) Yes No Ice Pack Receipt Temp. _____ °C
 Temp Blank Y N



Client: ARCADIS Report to Contact: ARIN HESS / JUSTIN COFFEY / PFAS EMAIL Telephone No. / E-mail: SEE PAGE 1 Quote No. _____

Address: 9954 MANLAND DR. SUITE 2400 Sampler's Signature: [Signature] Analysis (Attach list if more space is needed): _____ Page 4 of 4

City: RICHMOND State: VA Zip Code: 23733 X: _____ Printed Name: JUSTIN COFFEY

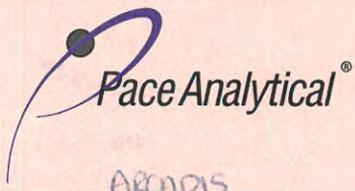
Project Name: FORT BELVOIR / ARMY PFAS SI PROGRAM Project No. _____ P.O. No. _____

Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G-Grab C-Composite	Matrix			No of Containers by Preservative Type								Remarks / Cooler I.D.		
				Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kf	Field Filtered				
FTBL-1980PC-01-GW-093020	09/30/20	1500	G X				2										
FTBL-MW-1R-093020	09/30/20	1650	G X				2										
FTBL-H3232-01-GW-093020	09/30/20	1820	G X				2										
FTBL-66-68-01-SW-290920	09/29/20	1015	G X				6										*MS/MSD*
FTBL-A0PC20-MW02-290920	09/29/20	1402	G X				2										
FTBL-M18-MW31-290920	09/29/20	1612	G X				2										
FT Dup-2-290920	09/29/20	—	G X				2										
FTBL-M26-LTM-06-300920	09/30/20	0907	G X				2										
FTBL-FATTS-LTM-MW08-300920	09/30/20	1103	G X				2										
FTBL-PSA2009-MW42-300920	09/30/20	1407	G X				2										

Turn Around Time Required (Prior lab approval required for expedited TAT.) Standard Rush (Specify) _____ Sample Disposal: Return to Client Disposal by Lab Possible Hazard Identification: Non-Hazard Flammable Skin Irritant Poison Unknown QC Requirements (Specify) _____

1. Relinquished by: <u>[Signature] (Matt Blower)</u>	Date: <u>10/1/20</u>	Time: <u>1715</u>	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made. LAB USE ONLY Received on ice (Circle) Yes No Ice Pack Receipt Temp. _____ °C Temp Blank Y N



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Number **111747**

ARCNDIS

Client 9954 MAYLAND DR SUITE 2400		Report to Contact SEE PAGE 1		Telephone No. / E-mail SEE PAGE 1		Quote No.	
Address ↓		Sampler's Signature 		Analysis (Attach list if more space is needed)		Page <u>2</u> of <u>2</u>	
City RICHMOND	State VA	Zip Code 23233		X		Lot # Bar Code (lab use only)	
Project Name FT BELVOIR ARMY PFAS PROGRAM		Printed Name JUSTIN COFFEY					

Project No. 30001992.3DL10	P.O. No.	Matrix	No of Containers by Preservative Type										Remarks / Cooler I.D.				
			G-Grab C-Composite	Aqueous	Solid	Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit		Field Filled			
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)															
FTBL-EB-02-100120	10/1/20	1435	6	X					2								
FTBL-EB-03-100120	10/1/20	1440	6	X					2								
FTBL-EB-04-100120	10/1/20	1445	6	X					2								
FTBL-EB-05-100120	10/1/20	1450	6	X					2								
FTBL-FB-02-100120	10/1/20	1500	6	X					2								
FTBL-FBNAFS-02-100120	10/1/20		6	X					1								
FTBL-FBNAFS-02-60-100120	10/1/20		6	X					2								
FTBL-FBNAFS-01-50-100120	10/1/20		6	X					4					X	X	X	
FTBL-FBNAFS-01-60-100120	10/1/20		6	X					2								
FTBL-FBNAFS-03-50-100120	10/1/20		6	X					1								

Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown				QC Requirements (Specify)	
	1. Relinquished by	Date 10/2/20	Time 1400	1. Received by		Date	Time	
2. Relinquished by	Date	Time	2. Received by		Date	Time		
3. Relinquished by	Date	Time	3. Received by		Date	Time		
4. Relinquished by	Date	Time	4. Laboratory received by		Date	Time		

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY

Received on ice (Circle) Yes No Ice Pack

Receipt Temp. _____ °C

Temp Blank Y N



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

Number 111746

Client ARCADIS		Report to Contact AFION HESS / JUSTIN COFFEY / ARMY PFAS		Telephone No. / E-mail JUSTIN.COFFEY@ARCADIS.COM AFION.HESS@ARCADIS.COM		Quote No.	
Address 9954 MAYLAND DR SUITE 2400		Sampler's Signature 		Analysis (Attach list if more space is needed)		Page 1 of 2	
City RICHMOND	State VA	Zip Code 23233		X		Lot # Bar Code (lab use only)	
Project Name FT BELVIDER / ARMY PFAS PROGRAM		Printed Name JUSTIN COFFEY					

Project No. 30001992 - 3DL10	P.O. No.	Matrix	No of Containers by Preservative Type	Analysis											Remarks / Cooler I.D.										
				G-Grab C-Composite	Aqueous	Solid	Non-Aqueous	U/Pres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered		PFAS (18 Compounds)	TOC	PH	GRAIN SIZE						
FTBL-FB-01-100120	10/1/20	0855	6	X					2																
FTBL-SA-01-100120	10/1/20	0900	6	X					2																
FTBL-M07-MW02	10/1/20	1102	6	X					2																
FTBL-H3151-01-S0-100120	10/1/20	0900	6	X					4						X	X	X								
FTBL-H3151-01-GW-100120	10/1/20	0925	6	X					2						X										
FTBL-B3121-02-S0-100120	10/1/20	1045	6		X				1						X										
FTBL-B3121-02-GW-100120	10/1/20	1100	6	X					2						X										
FTBL-B3121-01-S0-100120	10/1/20	1230	6		X				4						X	X	X								
FTBL-B3121-01-GW-100120	10/1/20	1255	6	X					2						X										
FTBL-EB-01-100120	10/1/20	1430	6	X					2						X										

Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)	Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab	Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown	QC Requirements (Specify)
--	--	---	---------------------------

1. Relinquished by	Date 10/2/20	Time 1400	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
 Received on ice (Circle) Yes No Ice Pack Receipt Temp. _____ °C
 Temp Blank Y N

Document Control Number: TGM - 3000199Z.3DL10.27/09/2020
 TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name: <u>FORT BELVOIR PFAS SI</u>		Project Location: <u>FORT BELVOIR, VA</u>	
Date: <u>9/27/20</u>	Time: <u>0740</u>	Conducted by: <u>JUSTIN COFFEY</u>	Signature/Title: <u>[Signature] / ENVIRONMENT SCIENTIST</u>
Client: <u>USACE</u>		Client Contact: <u>CHRIS MADIKUS</u>	Subcontractor companies: <u>JG DRILLING</u>

TRACKING the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

- | | | |
|-----------------------|----------------------|---------|
| 1 <u>HAND AUGER</u> | 3 <u>GW SAMPLING</u> | 5 _____ |
| 2 <u>DPT DRILLING</u> | 4 _____ | 6 _____ |

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations If there are none, write "None" here: NONE

If yes, describe them here: _____

How will they be controlled? _____

Pework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #	Doc #
<input checked="" type="checkbox"/> Not applicable	Doc # _____	<input type="checkbox"/> Working at Height
<input type="checkbox"/> Energy Isolation (LOTO)	Doc # _____	<input type="checkbox"/> Confined Space
<input type="checkbox"/> Mechanical Lifting Ops	Doc # _____	<input type="checkbox"/> Excavation/Trenching
		<input type="checkbox"/> Hot Work
		<input type="checkbox"/> Overhead & Buried Utilities
		<input type="checkbox"/> Other permit

Discuss following questions (for some review previous day's post activities). **Check if yes :**

<input type="checkbox"/> Incidents from day before to review?	<input checked="" type="checkbox"/> Lessons learned from the day before?	<input checked="" type="checkbox"/> Topics from Corp H&S to cover?
<input type="checkbox"/> Any corrective actions from yesterday?	<input type="checkbox"/> Will any work deviate from plan?	<input checked="" type="checkbox"/> Any Stop Work Interventions yesterday?
<input checked="" type="checkbox"/> JSAs or procedures are available?	<input checked="" type="checkbox"/> Field teams to "dirty" JSAs, as needed?	<input checked="" type="checkbox"/> If deviations, notify PM & client
<input checked="" type="checkbox"/> Staff has appropriate PPE?	<input checked="" type="checkbox"/> Staff knows Emergency Plan (EAP)?	<input checked="" type="checkbox"/> All equipment checked & OK?
		<input checked="" type="checkbox"/> Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<input checked="" type="checkbox"/> Gravity (i.e., ladder, scaffold, trips) (L M H)	<input checked="" type="checkbox"/> Motion (i.e., traffic, moving water) (L M H)	<input type="checkbox"/> Mechanical (i.e., augers, motors) (L M H)
<input checked="" type="checkbox"/> Electrical (i.e., utilities, lightning) (L M H)	<input checked="" type="checkbox"/> Pressure (i.e. gas cylinders, wells) (L M H)	<input checked="" type="checkbox"/> Environment (i.e., heat, cold, ice) (L M H)
<input checked="" type="checkbox"/> Chemical (i.e., fuel, acid, paint) (L M H)	<input type="checkbox"/> Biological (i.e., ticks, poison ivy) (L M H)	<input checked="" type="checkbox"/> Radiation (i.e., alpha, <u>sun</u> , laser) (L M H)
<input checked="" type="checkbox"/> Sound (i.e., machinery, generators) (L M H)	<input checked="" type="checkbox"/> Personal (i.e. alone, night, not fit) (L M H)	<input checked="" type="checkbox"/> Driving (i.e. car, ATV, boat, dozer) (L <u>M</u> H)

Document Control Number: TGM - 30001992.3DL10 - 28/09/2020
 TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxx - dd/mm/year



TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name: FT BELVOIR : ARMY PFAS SI		Project Location: FORT BELVOIR, VA	
Date: 9/28/20	Time: 0715	Conducted by: JUSTIN COFFEY	Signature/Title: ENVIRONMENTAL SCIENTIST
Client: USACE		Client Contact: CHRIS MANIKAS	Subcontractor companies: JG DRILLING

TRACKING the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 <u>HAND AUGER</u>	3 <u>GW SAMPLING</u>	5 _____
2 <u>DPT DRILLING</u>	4 <u>DECON</u>	6 _____

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Pework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #
<input checked="" type="checkbox"/> Not applicable	Doc # _____	<input type="checkbox"/> Working at Height	_____
<input type="checkbox"/> Energy Isolation (LOTO)	_____	<input type="checkbox"/> Excavation/Trenching	_____
<input type="checkbox"/> Mechanical Lifting Ops	_____	<input type="checkbox"/> Overhead & Buried Utilities	_____
		<input type="checkbox"/> Confined Space	_____
		<input type="checkbox"/> Hot Work	_____
		<input type="checkbox"/> Other permit	_____

Discuss following questions (for some review previous day's post activities). **Check if yes :**

<input type="checkbox"/> Incidents from day before to review?	<input checked="" type="checkbox"/> Lessons learned from the day before?	<input type="checkbox"/> Topics from Corp H&S to cover?
<input type="checkbox"/> Any corrective actions from yesterday?	<input type="checkbox"/> Will any work deviate from plan?	<input type="checkbox"/> Any Stop Work Interventions yesterday?
<input checked="" type="checkbox"/> JSAs or procedures are available?	<input checked="" type="checkbox"/> Field teams to "dirty" JSAs, as needed?	<input checked="" type="checkbox"/> If deviations, notify PM & client
<input checked="" type="checkbox"/> Staff has appropriate PPE?	<input checked="" type="checkbox"/> Staff knows Emergency Plan (EAP)?	<input checked="" type="checkbox"/> All equipment checked & OK?
		<input checked="" type="checkbox"/> Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<input checked="" type="checkbox"/> Gravity (i.e., ladder, scaffold, <u>trips</u>) (L M H)	<input checked="" type="checkbox"/> Motion (i.e., traffic, moving water) (L M H)	<input checked="" type="checkbox"/> Mechanical (i.e., augers, motors) (L M H)
<input checked="" type="checkbox"/> Electrical (i.e., utilities, <u>lightning</u>) (L M H)	<input type="checkbox"/> Pressure (i.e. gas cylinders, wells) (L M H)	<input checked="" type="checkbox"/> Environment (i.e., heat, cold, ice) (L M H)
<input checked="" type="checkbox"/> Chemical (i.e., fuel, acid, paint) (L M H)	<input type="checkbox"/> Biological (i.e., ticks, poison ivy) (L M H)	<input checked="" type="checkbox"/> Radiation (i.e., alpha, sun, laser) (L M H)
<input checked="" type="checkbox"/> Sound (i.e., machinery, generators) (L M H)	<input checked="" type="checkbox"/> Personal (i.e. alone, night, not fit) (L M H)	<input checked="" type="checkbox"/> Driving (i.e. car, ATV, boat, dozer) (L M H)

Document Control Number: TGM - 30001992.3DUO-29/09/2020
 TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name: FT BELVOIR ARMY PFAS		Project Location: FT BELVOIR	
Date: 9/29/20	Time: 0815	Conducted by: JUSTIN COFFEY	Signature/Title: <i>[Signature]</i> / ENV. SCIENTIST
Client: USACE		Client Contact: CHRIS MANIKUS	Subcontractor companies: JC DRILLING

TRACKING the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

- | | | |
|-----------------------|----------------------|---------|
| 1 <u>HAND AUGER</u> | 3 <u>GW SAMPLING</u> | 5 _____ |
| 2 <u>DPT DRILLING</u> | 4 _____ | 6 _____ |

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations If there are none, write "None" here: NONE

If yes, describe them here: _____

How will they be controlled? _____

Pework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #	Doc #
<input checked="" type="checkbox"/> Not applicable	Doc # _____	<input type="checkbox"/> Working at Height
<input type="checkbox"/> Energy Isolation (LOTO)	Doc # _____	<input type="checkbox"/> Confined Space
<input type="checkbox"/> Mechanical Lifting Ops	Doc # _____	<input type="checkbox"/> Excavation/Trenching
		<input type="checkbox"/> Hot Work
		<input type="checkbox"/> Overhead & Buried Utilities
		<input type="checkbox"/> Other permit

Discuss following questions (for some review previous day's post activities). **Check if yes :**

<input type="checkbox"/> Incidents from day before to review?	<input checked="" type="checkbox"/> Lessons learned from the day before?	<input type="checkbox"/> Topics from Corp H&S to cover?
<input checked="" type="checkbox"/> Any corrective actions from yesterday?	<input type="checkbox"/> Will any work deviate from plan?	<input type="checkbox"/> Any Stop Work Interventions yesterday?
<input checked="" type="checkbox"/> JSAs or procedures are available?	<input checked="" type="checkbox"/> Field teams to "dirty" JSAs, as needed?	<input checked="" type="checkbox"/> If deviations, notify PM & client
<input checked="" type="checkbox"/> Staff has appropriate PPE?	<input checked="" type="checkbox"/> Staff knows Emergency Plan (EAP)?	<input checked="" type="checkbox"/> All equipment checked & OK?
		<input checked="" type="checkbox"/> Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<input checked="" type="checkbox"/> Gravity (i.e., ladder, scaffold, trips) (L M H)	<input checked="" type="checkbox"/> Motion (i.e., traffic, moving water) (L M H)	<input checked="" type="checkbox"/> Mechanical (i.e., augers, motors) (L M H)
<input checked="" type="checkbox"/> Electrical (i.e., utilities, lightning) (L M H)	<input checked="" type="checkbox"/> Pressure (i.e. gas cylinders, wells) (L M H)	<input type="checkbox"/> Environment (i.e., heat, cold, ice) (L M H)
<input checked="" type="checkbox"/> Chemical (i.e., fuel, acid, paint) (L M H)	<input checked="" type="checkbox"/> Biological (i.e., ticks, poison ivy) (L M H)	<input checked="" type="checkbox"/> Radiation (i.e., alpha, sun, laser) (L M H)
<input checked="" type="checkbox"/> Sound (i.e., machinery, generators) (L M H)	<input checked="" type="checkbox"/> Personal (i.e. alone, night, not fit) (L M H)	<input checked="" type="checkbox"/> Driving (i.e. car, ATV, boat, dozer) (L M H)

Document Control Number: TGM - 30001992.3DL10-30/09/2020
 TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name: <u>PT. BELVOIR ARMY PFAS 51</u>		Project Location: <u>PT BELVOIR, VA</u>	
Date: <u>9/30/20</u>	Time: <u>0715</u>	Conducted by: <u>JUSTIN COFFEY</u>	Signature/Title: <u>[Signature] / ENV. SCIENTIST</u>
Client: <u>USACE</u>		Client Contact: <u>CHRIS MANIUKUS</u>	Subcontractor companies: <u>JE DRILLING</u>

TRACKING the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

- | | | |
|------------------|----------------------------|-----------------------|
| 1 <u>MOBE</u> | 3 <u>HANDRAUER</u> | 5 <u>GIW SAMPLING</u> |
| 2 <u>GAUGING</u> | 4 <u>DPI SOIL SAMPLING</u> | 6 _____ |

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations If there are none, write "None" here: NONE

If yes, describe them here: _____

How will they be controlled? _____

Pework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #	Doc #
<input checked="" type="checkbox"/> Not applicable	Doc #	<input type="checkbox"/> Working at Height
<input type="checkbox"/> Energy Isolation (LOTO)	_____	<input type="checkbox"/> Confined Space
<input type="checkbox"/> Mechanical Lifting Ops	_____	<input type="checkbox"/> Excavation/Trenching
		<input type="checkbox"/> Hot Work
		<input type="checkbox"/> Overhead & Buried Utilities
		<input type="checkbox"/> Other permit

Discuss following questions (for some review previous day's post activities). **Check if yes :**

<input checked="" type="checkbox"/> Incidents from day before to review?	<input type="checkbox"/> Lessons learned from the day before?	<input type="checkbox"/> Topics from Corp H&S to cover?
<input type="checkbox"/> Any corrective actions from yesterday?	<input type="checkbox"/> Will any work deviate from plan?	<input type="checkbox"/> Any Stop Work Interventions yesterday?
<input type="checkbox"/> JSAs or procedures are available?	<input checked="" type="checkbox"/> Field teams to "dirty" JSAs, as needed?	<input checked="" type="checkbox"/> If deviations, notify PM & client
<input checked="" type="checkbox"/> Staff has appropriate PPE?	<input checked="" type="checkbox"/> Staff knows Emergency Plan (EAP)?	<input checked="" type="checkbox"/> All equipment checked & OK?
		<input type="checkbox"/> Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<input checked="" type="checkbox"/> Gravity (i.e., ladder, scaffold, trips) (L M H)	<input checked="" type="checkbox"/> Motion (i.e., traffic, moving water) (L M H)	<input type="checkbox"/> Mechanical (i.e., augers, motors) (L M H)
<input checked="" type="checkbox"/> Electrical (i.e., utilities, lightning) (L M H)	<input checked="" type="checkbox"/> Pressure (i.e. gas cylinders, wells) (L M H)	<input checked="" type="checkbox"/> Environment (i.e., heat, cold, ice) (L <u>M</u> H)
<input checked="" type="checkbox"/> Chemical (i.e., fuel, acid, paint) (L M H)	<input checked="" type="checkbox"/> Biological (i.e., ticks, poison ivy) (L M H)	<input checked="" type="checkbox"/> Radiation (i.e., alpha, <u>sun</u> , laser) (L M H)
<input checked="" type="checkbox"/> Sound (i.e., machinery, generators) (L M H)	<input checked="" type="checkbox"/> Personal (i.e. alone, night, not fit) (L M H)	<input checked="" type="checkbox"/> Driving (i.e. car, ATV, boat, dozer) (L <u>M</u> H)

HOSES

Document Control Number: TGM - 20001992-3DL10-01/10/2020
 TGM + project number plus date as follows: xxxxxxxx.xxxx.xxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name: FT BELVOIR ARMY PRAS SI		Project Location: FT BELVOIR, VA	
Date: 10/1/20	Time: 0700	Conducted by: JUSTIN COPPEY	Signature/Title: <i>[Signature]</i> - ENV SCIENTIST
Client: USACE		Client Contact: CHRIS MANIKAS	Subcontractor companies: JE DRILLING

TRACKING the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

- | | | |
|---------------------|-----------------------|---------------------|
| 1 <u>MOBILIZE</u> | 3 <u>DPT DRILLING</u> | 5 <u>DEMobilize</u> |
| 2 <u>HAND AUGER</u> | 4 <u>GLW SAMPLING</u> | 6 _____ |

Other Hazardous Activities - Check the box if there are any other Arcadis, Client or other party activities that may pose hazards to Arcadis operations

If there are none, write "None" here: NONE

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #	Doc #
<input checked="" type="checkbox"/> Not applicable	Doc # _____	<input type="checkbox"/> Working at Height
<input type="checkbox"/> Energy Isolation (LOTO)	Doc # _____	<input type="checkbox"/> Excavation/Trenching
<input type="checkbox"/> Mechanical Lifting Ops	Doc # _____	<input type="checkbox"/> Overhead & Buried Utilities
		<input type="checkbox"/> Confined Space
		<input type="checkbox"/> Hot Work
		<input type="checkbox"/> Other permit

Discuss following questions (for some review previous day's post activities). **Check if yes :**

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> Incidents from day before to review? | <input checked="" type="checkbox"/> Lessons learned from the day before? | <input checked="" type="checkbox"/> Topics from Corp H&S to cover? |
| <input checked="" type="checkbox"/> Any corrective actions from yesterday? | <input type="checkbox"/> Will any work deviate from plan? | <input checked="" type="checkbox"/> Any Stop Work Interventions yesterday? |
| <input checked="" type="checkbox"/> JSAs or procedures are available? | <input checked="" type="checkbox"/> Field teams to "dirty" JSAs, as needed? | <input checked="" type="checkbox"/> If deviations, notify PM & client |
| <input checked="" type="checkbox"/> Staff has appropriate PPE? | <input checked="" type="checkbox"/> Staff knows Emergency Plan (EAP)? | <input checked="" type="checkbox"/> All equipment checked & OK? |
| | | <input checked="" type="checkbox"/> Staff knows gathering points? |

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

<input checked="" type="checkbox"/> Gravity (i.e., ladder, scaffold, trips) (L M H)	<input checked="" type="checkbox"/> Motion (i.e., traffic, moving water) (L M H)	<input type="checkbox"/> Mechanical (i.e., augers, motors) (L M H)
<input checked="" type="checkbox"/> Electrical (i.e., utilities, lightning) (L M H)	<input type="checkbox"/> Pressure (i.e. gas cylinders, wells) (L M H)	<input checked="" type="checkbox"/> Environment (i.e., heat, cold, ice) (L M H)
<input checked="" type="checkbox"/> Chemical (i.e., fuel, acid, paint) (L M H)	<input checked="" type="checkbox"/> Biological (i.e., ticks, poison ivy) (L M H)	<input checked="" type="checkbox"/> Radiation (i.e., alpha, sun, laser) (L M H)
<input checked="" type="checkbox"/> Sound (i.e., machinery, generators) (L M H)	<input checked="" type="checkbox"/> Personal (i.e. alone, night, not fit) (L M H)	<input checked="" type="checkbox"/> Driving (i.e. car, ATV, boat, dozer) (L M H)

Arcadis Utility and Structures Checklist

THIS FORM MUST BE ENTIRELY COMPLETED PRIOR TO BEGINNING ANY INTRUSIVE WORK

Project Name: Fort Belvoir Start Date: 9/2/20
 Project #: 30001992.3DL10 End Date: 9/2/20

Utility markings valid for 15 days. Initiate clearance renewal 5 days prior to expiration for ongoing work

PRE-FIELD WORK REQUIREMENTS

DigSafe 811 notified 48-72 hrs. in advance of work? DigSafe Ticket #: _____
 Ticket Expiration Date: _____ State Utility Laws: www.commongroundalliance.com/map
 Ticket(s) Attached(Y/N)? List utility owners notified via DigSafe 811 & response status:

** no ticket as of 9/2/20 (DML)*

List add'l. utilities requiring notification not included in DigSafe811 Notice:

Review task details w/ private utility location subcontractor. ID work areas, clearance equipment needed, depth of clearance needed, types of features, utilities, anticipated/known/unknown. Verify DigSafe 811 markings to confirm public utility clearance.

Private Utility Locator Name, if used: GPRLS Colin Garnett AUS onsite meeting (Y/N)?

FIELD WORK REQUIREMENTS

This portion of the checklist must be completed on site. AUS staff must have a minimum of one year of field experience in identifying utilities to complete the checklist. Field staff will review the completed checklist with PM or designee prior to beginning intrusive work.

Heavy equipment/mechanized intrusive work w/in the Arcadis Tolerance Zone (utility or structure present within 30-in. of point of work) REQUIRES pre-approval by Corporate H&S prior to working at all such locations. STOP WORK if the Arcadis Tolerance Zone work has not been approved.

List work type & locations for utility location and clearance as applicable to this checklist:

*→ utilities locate for bpt + soil sampling via hand auger.
 P- The PEAS SI Event. Mark locations with ~20' radius scan via GPR + Radio detection. Designate safe area with white paint + stake/flag*

no call 9/2 (DML)

3 Reliable Lines of Evidence are REQUIRED for EACH INTRUSIVE LOCATION prior to starting any subsurface intrusive work. Check corresponding boxes below to document utility clearance efforts.

OneCall/DigSafe 811 Public Utility Locate (required by State law for subsurface work)
811 is only reliable as a Line of Evidence when working in/adjacent to a public ROW or easement.

Marking type: Paint Pin Flags/Stakes Other: _____ None

Client provided maps/drawings (Y/N)? Maps/drawings not provided (Y/N)? *→ GPRLS hand sketch to be provided via Colin Garnett*

Client Clearance (Y/N)? Name(s)/Affiliation(s): _____

Interviews (Y/N)? Name(s)/Affiliation(s): _____

Specific subsurface feature types and depths provided by person interviewed (Y/N)?

Details provided:

Site Inspected (Y/N)? (document on Pg. 2.) Photo Document Marked Utilities & Structures *→ photos + GPS point in collector APP (ARLADIS)*

Public records/Client Dwgs/As-Builts (Y/N)? Type: *aerial images*

List private locator tools used: Radio Freq. Detection Electromagnetic GPR

Metal Detector Acoustic Pipe Locator Downhole sonde Other: _____

Soft Dig Methods used (Y/N)? Hand auger Probing Hand tools (shovel/rake)

Air knife Hydro Knife Potholing/Vacuum extraction

Other soft dig tools used (Y/N)? If Yes, list here: *Dummy PEAS SI hand Auger 0-5'*

For soil sample (0-2') + utility clearance 2-5'

Arcadis Utility and Structures Checklist

ALL BOXES BELOW MUST BE COMPLETED BEFORE PROCEEDING

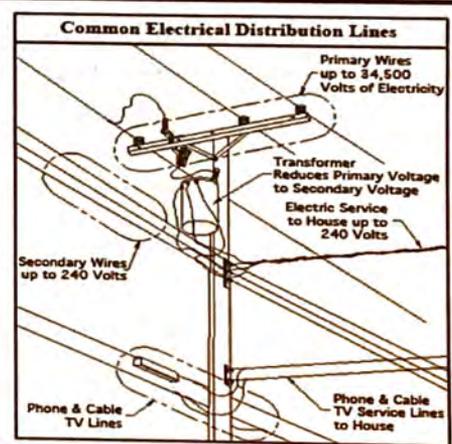
Site inspection also requires investigating vicinity outside of the work area for structures and utilities.

Noting "YES" requires add'l. investigation. Utilities must be field marked prior to intrusive work.

PW FTBL
guidelines
work-area
will be
marked
with white
paint/
flagging

Is the utility present (Y/N)?	Utility Color Code	Is the utility present (Y/N)?	Utility Color Code
<input type="checkbox"/>	No Color	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	White	<input type="checkbox"/>	Green
<input type="checkbox"/>	White	<input type="checkbox"/>	Green
<input type="checkbox"/>	Yellow	<input type="checkbox"/>	Green
<input type="checkbox"/>	Yellow	ABOVEGROUND Features Present?	
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Blue
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Blue
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Various
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Pink
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Green	<input type="checkbox"/>	
<input type="checkbox"/>	Green	<input type="checkbox"/>	
<input type="checkbox"/>	Green	<input type="checkbox"/>	
<input type="checkbox"/>	Green	<input type="checkbox"/>	
<input type="checkbox"/>		Signs of other utilities/ground disturbance	
<input type="checkbox"/>		<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/>	

- 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 may run in or directly under asphalt/concrete
 9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing.
 10. Use spotter for heavy equipment near aboveground utilities?



Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? If no, STOP WORK call PM
 PM or Designee Name: _____

Name and Signature of person completing the checklist: Dale Lynch
 Date of checklist review / update: _____

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

Arcadis Utility and Structures Checklist

THIS FORM MUST BE ENTIRELY COMPLETED PRIOR TO BEGINNING ANY INTRUSIVE WORK

Project Name: Baltimore Piston Ring Start Date: 9/28/2020
 Project #: 30061181 End Date: 9/28/2020

Utility markings valid for 15 days. Initiate clearance renewal 5 days prior to expiration for ongoing work

PRE-FIELD WORK REQUIREMENTS

DigSafe 811 notified 48-72 hrs. in advance of work? DigSafe Ticket #: 20650812
 Ticket Expiration Date: 10/9/2020 State Utility Laws: www.commongroundalliance.com/map
 Ticket(s) Attached(Y/N)? List utility owners notified via DigSafe 811 & response status:

List add'l. utilities requiring notification not included in DigSafe811 Notice: None

Review task details w/ private utility location subcontractor. ID work areas, clearance equipment needed, depth of clearance needed, types of features, utilities, anticipated/known/unknown. Verify DigSafe 811 markings to confirm public utility clearance.

Private Utility Locator Name, if used: Alex Williams (443)-404-6307 / SoftDig AUS onsite meeting (Y/N)?

FIELD WORK REQUIREMENTS

This portion of the checklist must be completed on site. AUS staff must have a minimum of one year of field experience in identifying utilities to complete the checklist. Field staff will review the completed checklist with PM or designee prior to beginning intrusive work.

Heavy equipment/mechanized intrusive work w/in the Arcadis Tolerance Zone (utility or structure present within 30-in. of point of work) REQUIRES pre-approval by Corporate H&S prior to working at all such locations. STOP WORK if the Arcadis Tolerance Zone work has not been approved.

List work type & locations for utility location and clearance as applicable to this checklist:

SG/SB - 41, 57, 47, 59, 60, 58, 61

Conduct utilities locate for DPT multi-media sample (soil gas, soil, and groundwater) at Baltimore Piston Ring Factory in Baltimore MD. Per Arcadis Utility Location and Clearance guidelines SB / SG sampling points must not proceed with subsurface work involving utilities located within 30 inches of a line marking (PINK) as measured radially by Soft Dig. Soft Dig to clear and mark 10x10 radius zone around each proposed sampling location.

3 Reliable Lines of Evidence are REQUIRED for EACH INTRUSIVE LOCATION prior to starting any subsurface intrusive work. Check corresponding boxes below to document utility clearance efforts.

OneCall/DigSafe 811 Public Utility Locate (required by State law for subsurface work)
811 is only reliable as a Line of Evidence when working in/adjacent to a public ROW or easement.

Marking type: Paint Pin Flags/Stakes Other: _____ None

Client provided maps/drawings (Y/N)? Maps/drawings not provided (Y/N)?

Client Clearance (Y/N)? Name(s)/Affiliation(s): _____

Interviews (Y/N)? Name(s)/Affiliation(s): _____

Specific subsurface feature types and depths provided by person interviewed (Y/N)?

Details provided:

Site Inspected (Y/N)? (document on Pg. 2.) Photo Document Marked Utilities & Structures

Public records/Client Dwgs/As-Builts (Y/N)? Type: _____

List private locator tools used: Radio Freq. Detection Electromagnetic GPR

Metal Detector Acoustic Pipe Locator Downhole sonde Other: _____

Soft Dig Methods used (Y/N)? Hand auger Probing Hand tools (shovel/rake)

Air knife Hydro Knife Potholing/Vacuum extraction

Other soft dig tools used (Y/N)? If Yes, list here: _____

Arcadis Utility and Structures Checklist

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 add'l. investigation. Utilities must be field marked prior to intrusive work.

Is the utility present (Y/N)?	Utility Color Code	Is the utility present (Y/N)?	Utility Color Code
<input type="checkbox"/>	No Color	<input type="checkbox"/>	Evidence of stormwater network? Green
<input checked="" type="checkbox"/>	White	<input type="checkbox"/>	Curb drains/catch basins/manholes? Green
<input type="checkbox"/>	White	<input type="checkbox"/>	Stormwater culverts, outfalls? Green
<input type="checkbox"/>	Yellow	ABOVEGROUND Features Present?	
<input type="checkbox"/>	Yellow	<input type="checkbox"/>	Transportation tunnels/structures/markers present?
<input type="checkbox"/>	Red	<input type="checkbox"/>	Overhead electrical lines? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	< 50 kV w/in 10 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>50-200 kV w/in 15 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>200-350 kV w/in 20 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>350-500 kV w/in 25 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>500-750 kV w/in 35 ft of work area? Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	>750-1000 kV w/in 45 ft of work area? Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground fire suppression? Blue
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground communications? Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground chases/racks/trays? Orange
<input type="checkbox"/>	Blue	<input checked="" type="checkbox"/>	Private/Remediation system lines? Various
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Unclassed utilities/anomalies? Pink
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Warning signs/stakes/markers present?
<input type="checkbox"/>	Orange	<input type="checkbox"/>	Heavy Equipment: Mark travel route for overhead, next to route, and/or under route (e.g. crush risk) utilities.
<input type="checkbox"/>	Orange	Signs of other utilities/ground disturbance	
<input type="checkbox"/>	Orange	<input checked="" type="checkbox"/>	Signs of asphalt or concrete disturbance/repair?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Any ground subsidence or change in vegetation?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Unknown manholes or valve covers in work area?
<input type="checkbox"/>	Green		

5/7/5/8
Points
marked in
white print

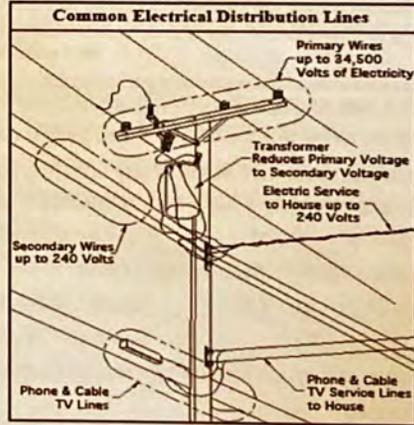
→ All utilities
marked in
pink due to
historical
irregularities
&
addition

→ Multiple
signs of
concrete
disturbance
&
repairs
(site by)
marked these
locations in
pink when
close to
5/7/5/8 point

*no historical
rebar in
sub-slab
site maps
@ 5/7/5/8
points

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 may run in or directly under asphalt/concrete
9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing.
10. Use spotter for heavy equipment near aboveground utilities?



Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? If no, STOP WORK call PM
PM or Designee Name: _____

Name and Signature of person completing the checklist: John P. John Dale Lynch

Date of checklist review / update: _____

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

Arcadis Utility and Structures Checklist

THIS FORM MUST BE ENTIRELY COMPLETED PRIOR TO BEGINNING ANY INTRUSIVE WORK			
Project Name: <u>Baltimore Piston Ring</u>		Start Date: <u>9/28/2020</u>	
Project #: <u>30061181</u>		End Date: <u>9/28/2020</u>	
<i>Utility markings valid for 15 days. Initiate clearance renewal 5 days prior to expiration for ongoing work</i>			
PRE-FIELD WORK REQUIREMENTS			
DigSafe 811 notified 48-72 hrs. in advance of work? <input checked="" type="checkbox"/>		DigSafe Ticket #: <u>20650812</u>	
Ticket Expiration Date: <u>10/9/2020</u>		State Utility Laws: www.commongroundalliance.com/map	
Ticket(s) Attached(Y/N)? <input checked="" type="checkbox"/>		List utility owners notified via DigSafe 811 & response status:	
List add'l. utilities requiring notification not included in DigSafe811 Notice: None			
<i>Review task details w/ private utility location subcontractor. ID work areas, clearance equipment needed, depth of clearance needed, types of features, utilities, anticipated/known/unknown. Verify DigSafe 811 markings to confirm public utility clearance.</i>			
Private Utility Locator Name, if used: <u>Alex Williams (443)-404-6307 / SoftDig</u>		AUS onsite meeting (Y/N)? <input checked="" type="checkbox"/>	
FIELD WORK REQUIREMENTS			
<i>This portion of the checklist must be completed on site. AUS staff must have a minimum of one year of field experience in identifying utilities to complete the checklist. Field staff will review the completed checklist with PM or designee prior to beginning intrusive work.</i>			
<i>Heavy equipment/mechanized intrusive work w/in the Arcadis Tolerance Zone (utility or structure present within 30-in. of point of work) REQUIRES pre-approval by Corporate H&S prior to working at all such locations. STOP WORK if the Arcadis Tolerance Zone work has not been approved.</i>			
List work type & locations for utility location and clearance as applicable to this checklist: <u>SB SG - 4A, 4Z, 43, 46, 45</u>			
<small>Conduct utilities locate for DPT multi-media sample (soil gas, soil, and groundwater) at Baltimore Piston Ring Factory in Baltimore MD. Per Arcadis Utility Location and Clearance guidelines SB / SG sampling points must not proceed with subsurface work involving utilities located within 30 inches of a line marking (PINK) as measured radially by Soft Dig. Soft Dig to clear and mark 10x10 radius zone around each proposed sampling location.</small>			
<i>3 Reliable Lines of Evidence are REQUIRED for EACH INTRUSIVE LOCATION prior to starting any subsurface intrusive work. Check corresponding boxes below to document utility clearance efforts.</i>			
<input checked="" type="checkbox"/> OneCall/DigSafe 811 Public Utility Locate (required by State law for subsurface work) <i>811 is only reliable as a Line of Evidence when working in/adjacent to a public ROW or easement.</i>			
Marking type: <input checked="" type="checkbox"/> Paint <input type="checkbox"/> Pin Flags/Stakes <input type="checkbox"/> Other: _____ <input type="checkbox"/> None			
<input checked="" type="checkbox"/> Client provided maps/drawings (Y/N)? <input type="checkbox"/> Maps/drawings not provided (Y/N)?			
<input type="checkbox"/> Client Clearance (Y/N)?		Name(s)/Affiliation(s): _____	
<input type="checkbox"/> Interviews (Y/N)?		Name(s)/Affiliation(s): _____	
<input type="checkbox"/> Specific subsurface feature types and depths provided by person interviewed (Y/N)?			
Details provided: _____			
<input checked="" type="checkbox"/> Site Inspected (Y/N)? (document on Pg. 2.) Photo Document Marked Utilities & Structures			
<input checked="" type="checkbox"/> Public records/Client Dwg/As-Builts (Y/N)? Type: _____			
List private locator tools used: <input type="checkbox"/> Radio Freq. Detection <input checked="" type="checkbox"/> Electromagnetic <input checked="" type="checkbox"/> GPR			
<input type="checkbox"/> Metal Detector <input type="checkbox"/> Acoustic Pipe Locator <input type="checkbox"/> Downhole sonde Other: _____			
<input checked="" type="checkbox"/> Soft Dig Methods used (Y/N)?		<input checked="" type="checkbox"/> Hand auger <input type="checkbox"/> Probing <input type="checkbox"/> Hand tools (shovel/rake)	
<input type="checkbox"/> Air knife <input type="checkbox"/> Hydro Knife		<input type="checkbox"/> Potholing/Vacuum extraction	
<input type="checkbox"/> Other soft dig tools used (Y/N)? If Yes, list here: _____			

Arcadis Utility and Structures Checklist

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 add'l. investigation. Utilities must be field marked prior to intrusive work.

SB/SS locations marked out in white paint

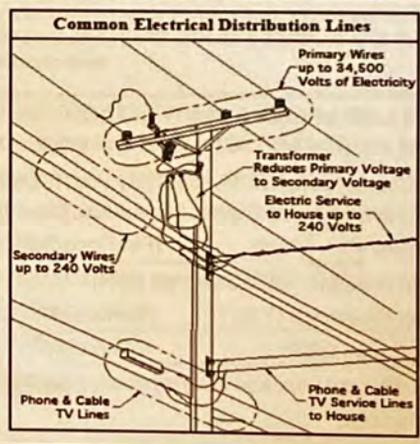
Is the utility present (Y/N)?	Utility Color Code	Is the utility present (Y/N)?	Utility Color Code
<input type="checkbox"/>	No Color	<input type="checkbox"/>	Evidence of stormwater network? Green
<input checked="" type="checkbox"/>	White	<input type="checkbox"/>	Curb drains/catch basins/manholes? Green
<input type="checkbox"/>	White	<input type="checkbox"/>	Stormwater culverts, outfalls? Green
<input type="checkbox"/>	Yellow	ABOVEGROUND Features Present?	
<input type="checkbox"/>	Yellow	<input type="checkbox"/>	Transportation tunnels/structures/markers present?
<input type="checkbox"/>	Red	<input type="checkbox"/>	Overhead electrical lines? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	< 50 kV w/in 10 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>50-200 kV w/in 15 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>200-350 kV w/in 20 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>350-500 kV w/in 25 ft of work area? Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	>500-750 kV w/in 35 ft of work area? Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	>750-1000 kV w/in 45 ft of work area? Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground fire suppression? Blue
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground communications? Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Aboveground chases/racks/trays? Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Private/Remediation system lines? Various
<input type="checkbox"/>	Blue	<input checked="" type="checkbox"/>	Unclassed utilities/anomalies? Pink
<input type="checkbox"/>	Orange	<input type="checkbox"/>	Warning signs/stakes/markers present?
<input type="checkbox"/>	Orange	<input type="checkbox"/>	Heavy Equipment: Mark travel route for overhead, next to route, and/or under route (e.g. crush risk) utilities.
<input type="checkbox"/>	Orange	Signs of other utilities/ground disturbance	
<input type="checkbox"/>	Green	<input checked="" type="checkbox"/>	Signs of asphalt or concrete disturbance/repair?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Any ground subsidence or change in vegetation?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Unknown manholes or valve covers in work area?
<input type="checkbox"/>	Green		

→ All utilities marked out in pink paint due to historic irregularities & modifications of BPR factory

→ ALSO marked in pink paint when within 30" of SB/SS point

** SB/SS points can be moved in a down gradient direction to account for DPT mast only within 10x10 safety cleared area*

- 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 may run in or directly under asphalt/concrete
 9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing.
 10. Use spotter for heavy equipment near aboveground utilities?



Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? If no, STOP WORK call PM
 PM or Designee Name: _____
 Name and Signature of person completing the checklist: Dale M Lynch
 Date of checklist review / update: _____

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

Arcadis Utility and Structures Checklist

THIS FORM MUST BE ENTIRELY COMPLETED PRIOR TO BEGINNING ANY INTRUSIVE WORK			
Project Name:	Baltimore Piston Ring	Start Date:	9/28/2020
Project #:	30061181	End Date:	9/28/2020
<i>Utility markings valid for 15 days. Initiate clearance renewal 5 days prior to expiration for ongoing work</i>			
PRE-FIELD WORK REQUIREMENTS			
DigSafe 811 notified 48-72 hrs. in advance of work?	<input checked="" type="checkbox"/>	DigSafe Ticket #:	20650812
Ticket Expiration Date:	10/9/2020	State Utility Laws: www.commongroundalliance.com/map	
Ticket(s) Attached(Y/N)?	<input checked="" type="checkbox"/>	List utility owners notified via DigSafe 811 & response status:	
List add'l. utilities requiring notification not included in DigSafe811 Notice:			
None			
<i>Review task details w/ private utility location subcontractor. ID work areas, clearance equipment needed, depth of clearance needed, types of features, utilities, anticipated/known/unknown. Verify DigSafe 811 markings to confirm public utility clearance.</i>			
Private Utility Locator Name, if used:	Alex Williams (443)-404-6307 / SoftDig	AUS onsite meeting (Y/N)?	<input checked="" type="checkbox"/>
FIELD WORK REQUIREMENTS			
<i>This portion of the checklist must be completed on site. AUS staff must have a minimum of one year of field experience in identifying utilities to complete the checklist. Field staff will review the completed checklist with PM or designee prior to beginning intrusive work.</i>			
<i>Heavy equipment/mechanized intrusive work w/in the Arcadis Tolerance Zone (utility or structure present within 30-in. of point of work) REQUIRES pre-approval by Corporate H&S prior to working at all such locations. STOP WORK if the Arcadis Tolerance Zone work has not been approved.</i>			
List work type & locations for utility location and clearance as applicable to this checklist:			
SG-62, 63, 64, 65			
Conduct utilities locate for DPT multi-media sample (soil gas, soil, and groundwater) at Baltimore Piston Ring Factory in Baltimore MD. Per Arcadis Utility Location and Clearance guidelines SB / SG sampling points must not proceed with subsurface work involving utilities located within 30 inches of a line marking (PINK) as measured radially by Soft Dig. Soft Dig to clear and mark 10x10 radius zone around each proposed sampling location.			
<i>3 Reliable Lines of Evidence are REQUIRED for EACH INTRUSIVE LOCATION prior to starting any subsurface intrusive work. Check corresponding boxes below to document utility clearance efforts.</i>			
<input checked="" type="checkbox"/>	OneCall/DigSafe 811 Public Utility Locate (required by State law for subsurface work) <i>811 is only reliable as a Line of Evidence when working in/adjacent to a public ROW or easement.</i>		
Marking type:	<input checked="" type="checkbox"/> Paint	<input type="checkbox"/> Pin Flags/Stakes	<input type="checkbox"/> Other: _____ <input type="checkbox"/> None
<input checked="" type="checkbox"/>	Client provided maps/drawings (Y/N)?		
<input type="checkbox"/>	Maps/drawings not provided (Y/N)?		
<input type="checkbox"/>	Client Clearance (Y/N)? Name(s)/Affiliation(s): _____		
<input type="checkbox"/>	Interviews (Y/N)? Name(s)/Affiliation(s): _____		
<input type="checkbox"/>	Specific subsurface feature types and depths provided by person interviewed (Y/N)?		
Details provided:			
<input checked="" type="checkbox"/>	Site Inspected (Y/N)? (document on Pg. 2.) Photo Document Marked Utilities & Structures		
<input checked="" type="checkbox"/>	Public records/Client Dwgs/As-Builts (Y/N)? Type: _____		
List private locator tools used:	<input type="checkbox"/> Radio Freq. Detection	<input checked="" type="checkbox"/> Electromagnetic	<input checked="" type="checkbox"/> GPR
	<input type="checkbox"/> Metal Detector	<input type="checkbox"/> Acoustic Pipe Locator	<input type="checkbox"/> Downhole sonde Other: _____
<input checked="" type="checkbox"/>	Soft Dig Methods used (Y/N)?		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Hand auger	<input type="checkbox"/> Probing	<input type="checkbox"/> Hand tools (shovel/rake)
<input type="checkbox"/>	<input type="checkbox"/> Air knife	<input type="checkbox"/> Hydro Knife	<input type="checkbox"/> Potholing/Vacuum extraction
<input type="checkbox"/>	Other soft dig tools used (Y/N)? If Yes, list here: _____		

Arcadis Utility and Structures Checklist

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 add'l. investigation. Utilities must be field marked prior to intrusive work.

Is the utility present (Y/N)?	Utility Color Code	Is the utility present (Y/N)?	Utility Color Code
<input checked="" type="checkbox"/>	No Color	<input type="checkbox"/>	Green
<input type="checkbox"/>	White	<input type="checkbox"/>	Green
<input type="checkbox"/>	White	<input type="checkbox"/>	Green
<input type="checkbox"/>	Yellow	ABOVEGROUND Features Present?	
<input type="checkbox"/>	Yellow	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Red	<input type="checkbox"/>	Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Red
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Blue
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Orange
<input type="checkbox"/>	Blue	<input type="checkbox"/>	Various
<input type="checkbox"/>	Blue	<input checked="" type="checkbox"/>	Pink
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Orange	<input type="checkbox"/>	
<input type="checkbox"/>	Green	Signs of other utilities/ground disturbance	
<input type="checkbox"/>	Green	<input type="checkbox"/>	Signs of asphalt or concrete disturbance/repair?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Any ground subsidence or change in vegetation?
<input type="checkbox"/>	Green	<input type="checkbox"/>	Unknown manholes or valve covers in work area?

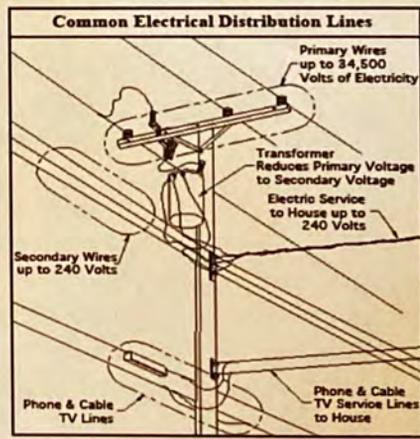
55 locations marked out in white

→ All utilities marked out in pink due to historic irregularities + additions

Possible electrical & sewer near 55 points, will be offset 730" away from utility

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 may run in or directly under asphalt/concrete
9. Heavy equipment may damage shallow utilities. Especially during clearing and grubbing.
10. Use spotter for heavy equipment near aboveground utilities?



Utilities & Structures Checklist reviewed by the PM or Designee (Y/N)? If no, STOP WORK call PM
 PM or Designee Name: _____

Name and Signature of person completing the checklist: Dele Lynch Oct 21 2018

Date of checklist review / update: _____

ALL SUSPECT UTILITY STRIKES REQUIRE CORPORATE H&S NOTIFICATION WITHIN 24 hrs. OF 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.

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

Field Change Report No. FCR-FTBL-01

Installation Name: Fort Belvoir, Virginia Event Date: 29 September 2020

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

Applicable Document: QAPP Addendum: Worksheet #18 and associate figure(s)

Prepared By: Justin Coffey

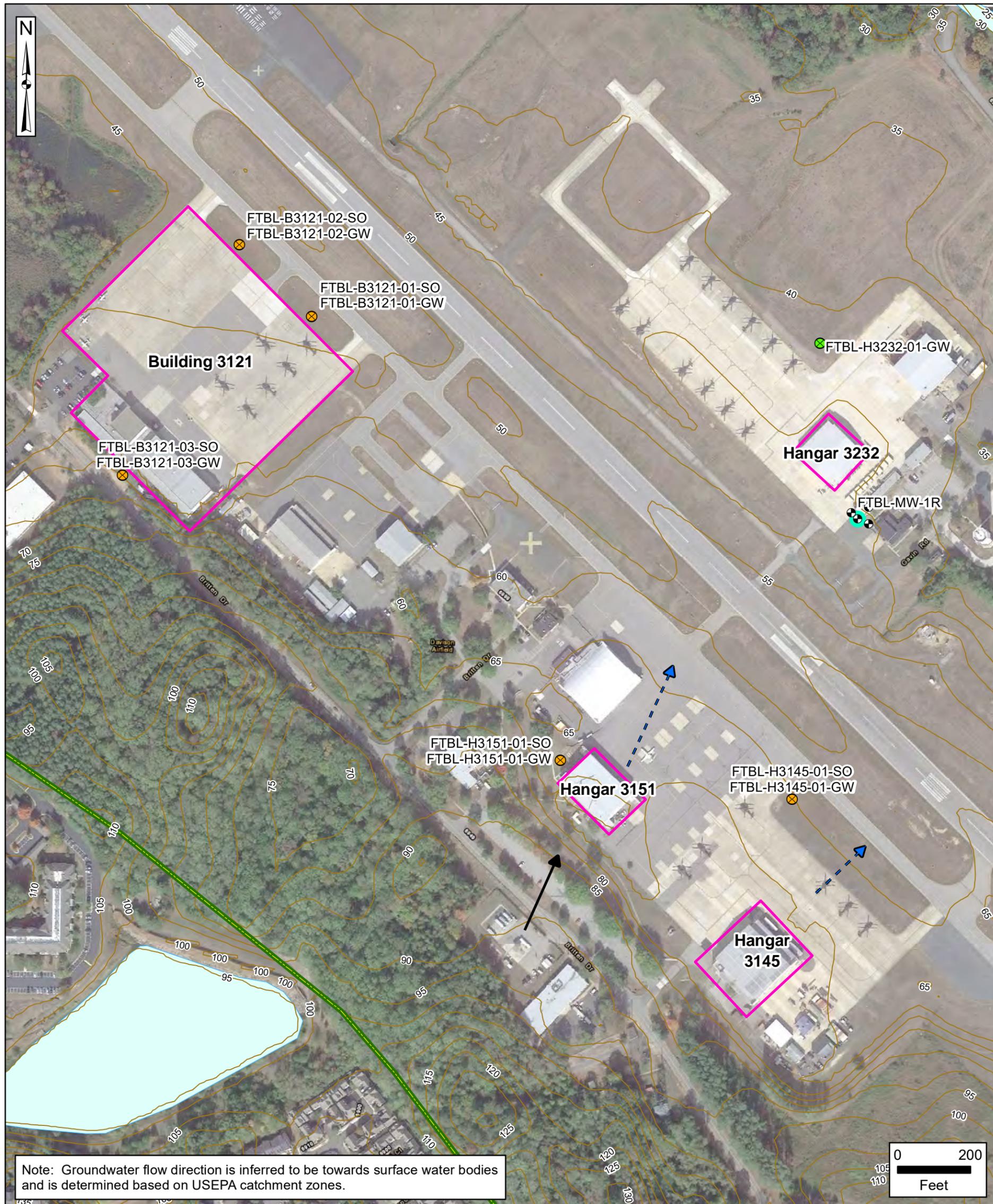
DESCRIPTION
A new area of potential interest (AOPI) and three additional borings with co-located surface soil samples and groundwater samples were added at Building 3121 at Davidson Army Airfield. FTBL-B3121-01-SO/FTBL-B3121-01-GW is located approximately 500 feet northwest of Building 3121, FTBL-B3121-02-SO/FTBL-B3121-02-GW 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

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

Field Change Report No. FCR-FTBL-02

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: Worksheet #18 and associate figure(s)

Prepared By: Rebecca Williams

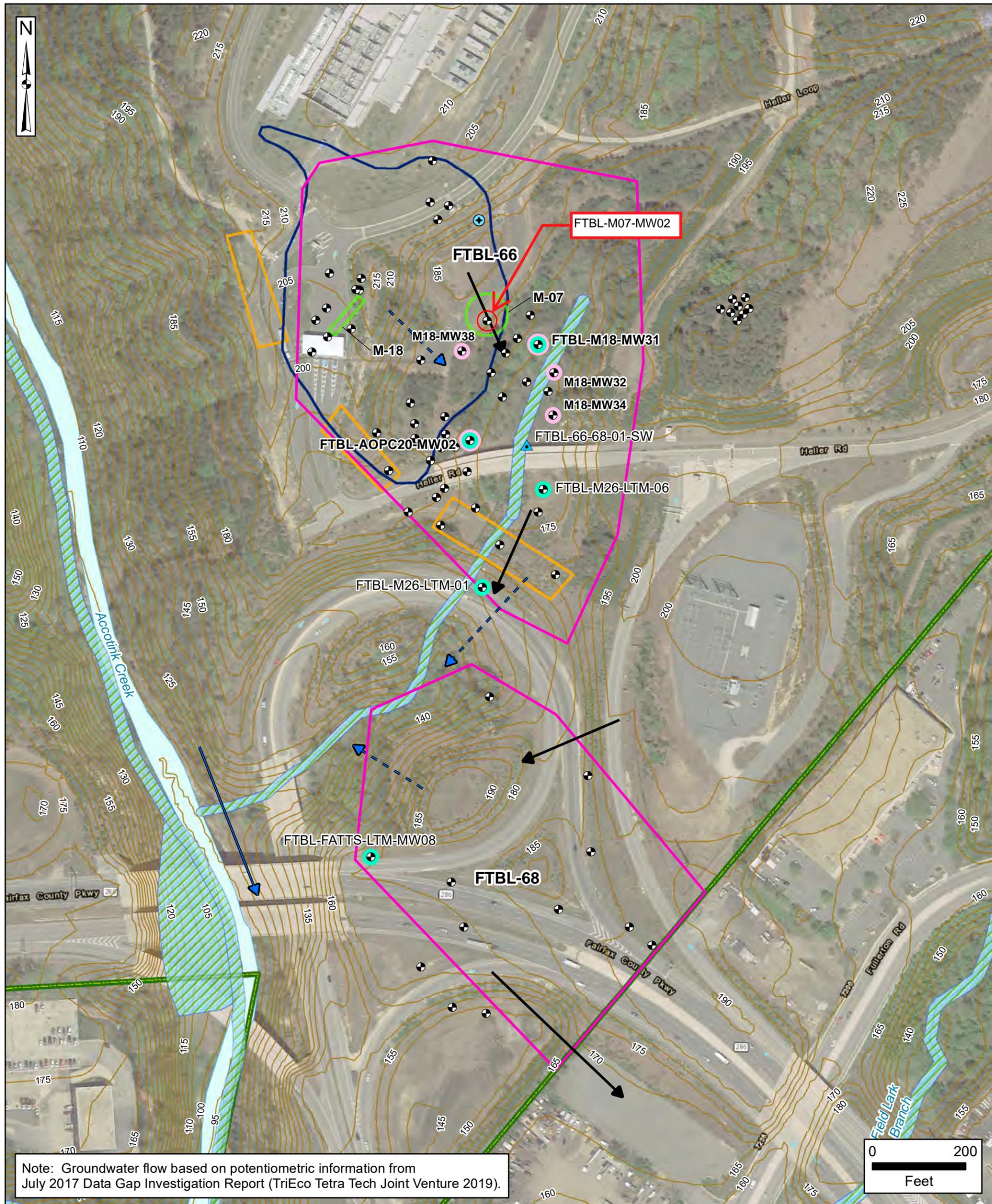
DESCRIPTION
Arcadis sampled monitoring well M07-MW02 instead of monitoring well M26-LTM-01 as planned on 01 October 2020. Monitoring well M07-MW02 is located within area of potential interest FTBL-66 and is approximately 575 feet north of the originally scoped well.
REASON FOR CHANGE
Monitoring well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



Note: Groundwater flow based on potentiometric information from July 2017 Data Gap Investigation Report (TriEco Tetra Tech Joint Venture 2019).

- | | | |
|--------------------------------------|------------------------------------|--|
| Installation Boundary | Elevation Contour (feet) | Proposed Surface Water Sampling Location |
| Area of Potential Interest (AOP1) | Shallow Groundwater Flow Direction | Proposed Groundwater Sampling Location - Existing Well |
| SWMU Area | Surface Runoff Flow Direction | |
| IRP Site (Former Fire Training Area) | Surface Water Flow Direction | |
| Potential Location of Overpass Fire | FBNA Potable Well | |
| River/Stream (Perennial) | Monitoring Well | |
| Stream (Intermittent) | Well with Previous PFAS Detection | |
| Wetland | | |

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

Field Change Report No. FCR-FTBL-03

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

Prepared By: Rebecca Williams

DESCRIPTION
<p>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.</p> <p>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.)</p>
REASON FOR CHANGE
<p>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.</p>

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

Prepared By: Rebecca Williams

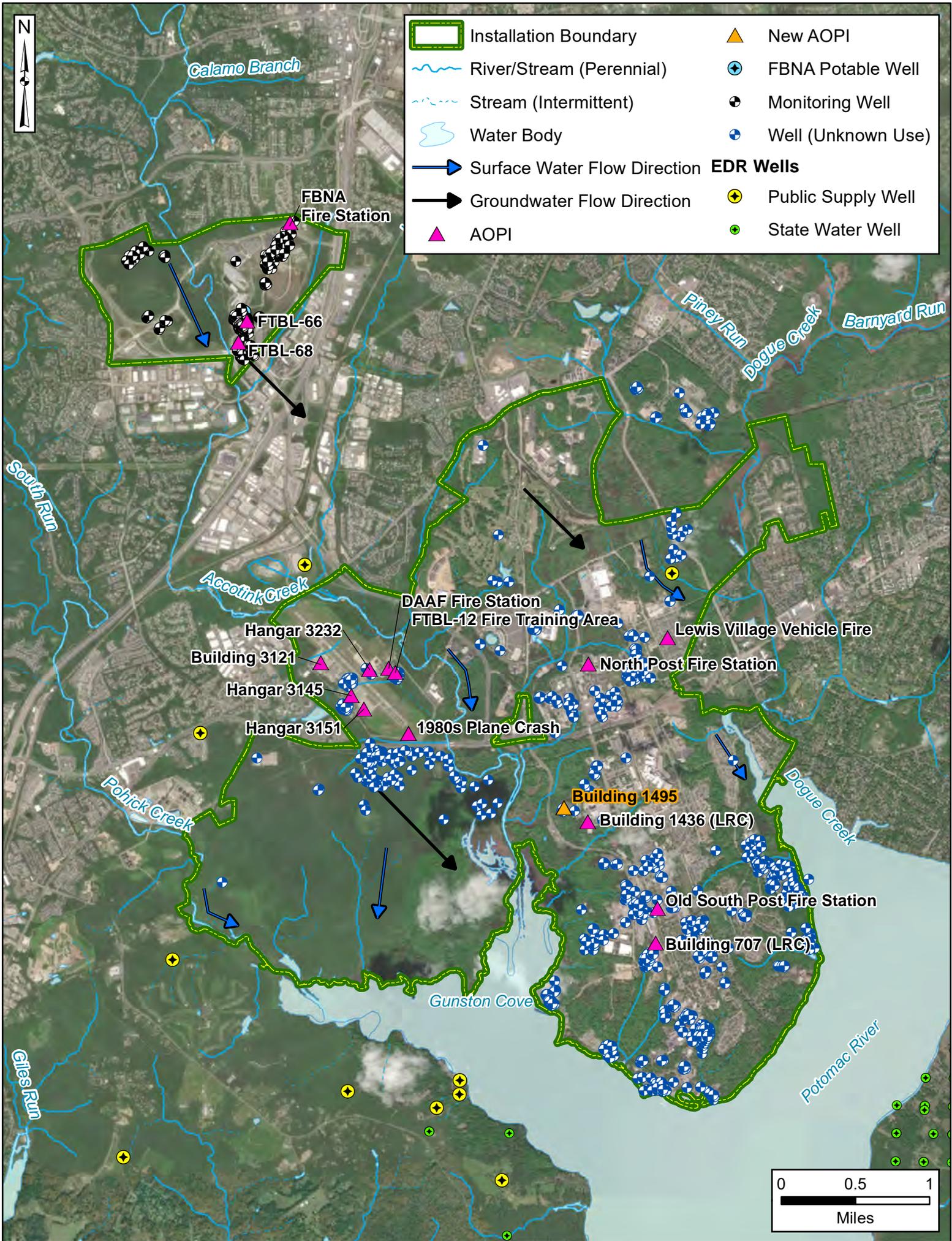
IMPACT ON PRESENT AND COMPLETED WORK

(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.





-  Installation Boundary
-  AOPI
-  Stormwater Line
-  Soil Sampling Location



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

Field Change Report No. FCR-FTBL-04

Installation Name: Fort Belvoir, Virginia Event Date: 11 March 2021

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

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

Prepared By: Rebecca 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.
REMARKS
No remarks or final comments.

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

Field Change Report No. FCR-FTBL-05

Installation Name: Fort Belvoir, Virginia Event Date: 11 March 2021

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

Applicable Document: QAPP Addendum: Worksheets #17 and 18

Prepared By: Rebecca 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 non-native 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.

**Field Change Report
U.S. Army Environmental Command
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
<p>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.</p> <p>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.)</p> <p>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.</p>
REASON FOR CHANGE
<p>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.</p>
IMPACT ON PRESENT AND COMPLETED WORK
<p>(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)</p> <p>A field duplicate sample and equipment blank sample(s) inadvertently were not collected; this does not affect the data quality objectives.</p>
REMARKS
<p>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.</p>

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

Field Change Report No. FCR-FTBL-07

Installation Name: Fort Belvoir, Virginia Event Date: 24 March 2021

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

Applicable Document: QAPP Addendum: Worksheets #17 and 18

Prepared By: Rebecca Williams

DESCRIPTION
<p>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.</p> <p>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.</p>
REASON FOR CHANGE
<p>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.</p>
IMPACT ON PRESENT AND COMPLETED WORK
<p>(Note: If impact is major or critical and/or corrective action is necessary, use Non-Conformance Report, additional documentation is required)</p> <p>No anticipated impact on the overall scope of project work.</p>
REMARKS
<p>No remarks or final comments.</p>

APPENDIX M

Data Usability Summary Report



USACE Baltimore PFAS PA/SI
Fort Belvoir, Virginia

DATA USABILITY SUMMARY REPORT

2020-2021 Sampling Events

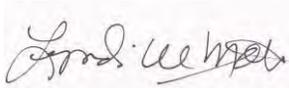
June 14, 2021
Revised December 13, 2021

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

Prepared by:

Arcadis U.S., Inc.
10205 Westheimer Road
Suite 800
Houston
Texas 77042
Tel 713 953 4800

Our Ref.:

Contract W912DR-13-D-0019
Arcadis Project: 30001992.3DL10

Date: June 14, 2021

Revised December 13, 2021

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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	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

DATA USABILITY SUMMARY REPORT

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.

DATA USABILITY SUMMARY REPORT

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 reformed the extractable internal standards for the diluted analysis. This reformation 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



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-100120	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
	Perfluorooctane sulfonic acid	J+	
FTBL-B1436-01-GW-092720	8:2 FTS N-EtFOSAA N-MeFOSAA Perfluorodecanoic acid Perfluorododecanoic acid Perfluorotridecanoic acid Perfluoroundecanoic acid	UJ	EIS %R less than 50%.
	Perfluorononanoic acid	J+	
	Perfluorotetradecanoic acid	R	EIS %R less than 20%.
	Perfluorobutanoic 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 reformation
FTBL-12-01-GW-092820	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
	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 reformation
DUP-1-GW-092820	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
	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 reformation

Sample Locations	Compound	Qualifier	Reason
FTBL-OSPFS-01-GW-092920 DUP-3-092920	Perfluorotetradecanoic acid	UJ	EIS %R less than 50%.
	6:2 FTS Perfluorohexane sulfonic acid Perfluorooctane sulfonic acid	DJ	Secondary dilution. The isotope dilution was negated due to dilution and reformation
FTBL-1980PC-02-GW-093020	6:2 FTS 8:2 FTS N-EtFOSAA N-MeFOSAA Perfluorodecanoic acid Perfluorododecanoic acid Perfluorotetradecanoic 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
	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
FTBL-1980PC-01-GW-093020	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
	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid Perfluorohexane sulfonic acid Perfluorobutanoic acid Perfluorodecanoic acid Perfluoroheptanoic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluorooctanoic 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 reformation

Sample Locations	Compound	Qualifier	Reason
FTBL-DAAF-01-GW-092820	8:2 FTS	J+	MSD %R; high bias
	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
FTBL-12-03-GW-092820	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
	6:2 FTS 8:2 FTS Perfluorobutane sulfonic acid Perfluorobutanoic acid Perfluorodecanoic acid Perfluoroheptanoic acid Perfluorohexane sulfonic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluorooctane sulfonic acid Perfluorooctanoic 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 Perfluoroheptanoic acid Perfluorohexane sulfonic acid Perfluorohexanoic acid Perfluorononanoic acid Perfluorooctane sulfonic acid Perfluorooctanoic acid Perfluoropentanoic acid	DJ	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	pH	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	pH	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.

DATA VALIDATION REPORTS



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

DATA REVIEW REPORT

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

DATA REVIEW REPORT

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

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.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

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.

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

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 537 DoD QSM 5.3	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
	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, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

DATA REVIEW REPORT

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%
FTBL-B1436-01-GW-092720	13C2_8:2FTS	8:2 FTS	< 50% but > 20%
	13C2_PFDoA	PFDoA	< 50% but > 20%
		PFTeDA	
	13C2_PFTeDA	PFTeDA	< 20%
	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%

DATA REVIEW REPORT

Sample ID	EIS	Associated Compounds	EIS %R
FTBL-1980PC-02-GW-093020	13C2_6:2FTS	6:2FTS	< 50% but > 20%
	13C2_8:2FTS	8:2FTS	< 50% but > 20%
	13C2_PFD _o A	PFD _o A	< 50% but > 20%
		PFT _r DA	
	13C2_PFT _e DA	PFT _e DA	< 50% but > 20%
	13C3_PFH _x S	PFH _x S	< 50% but > 20%
	13C6_PFDA	PFDA	< 50% but > 20%
	13C7_PFU _d A	PFU _d A	< 50% but > 20%
	13C8_PFOS	PFOS	< 50% but > 20%
	d5-EtFOSAA	EtFOSAA	< 50% but > 20%
d3-MeFOSAA	MeFOSAA	< 50% but > 20%	
FTBL-1980PC-01-GW-093020	13C2_PFD _o A	PFD _o A	< 50% but > 20%
		PFT _r DA	
	13C2_PFT _e DA	PFT _e DA	< 50% but > 20%
	13C8_PFOS	PFOS	< 50% but > 20%
	d5-EtFOSAA	EtFOSAA	< 50% but > 20%
d3-MeFOSAA	MeFOSAA	< 50% but > 20%	
FTBL-MW-1R-093020	13C2_6:2 FTS	6:2 FTS	> 150%
	13C2_8:2 FTS	8:2 FTS	> 150%
	13C3_PFB _S	PFBS	> 150%
FTBL-H3232-01-GW-093020	13C2_PFT _e DA	PFT _e DA	< 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
> 150%	Non-detect	No Action
	Detect	J-
< 50% but > 20%	Non-detect	UJ
	Detect	J+
< 20%	Non-detect	X
	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

DATA REVIEW REPORT

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
FTBL-DAAF-01-GW-092820	8:2 FTS	AC	> UL
	6:2 FTS	SR>4X	SR>4X
	PFHxS	SR>4X	SR>4X
	PFHpA	SR>4X	SR>4X
	PFHxA	SR>4X	SR>4X
	PFNA	SR>4X	SR>4X
	PFPeA	SR>4X	SR>4X
	PFOS	SR>4X	SR>4X
FTBL-DAAF-02-SO-092820	8:2 FTS	AC	< LL but > 10%
	PFHxS	SR>4X	SR>4X
	PFHpA	AC	< LL but > 10%
	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
> the upper control limit (UL)	Non-detect	No Action
	Detect	J+
< the lower control limit (LL) but > 10%	Non-detect	UJ

DATA REVIEW REPORT

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

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
> 30%	Non-detect	UJ
	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.

DATA REVIEW REPORT

Sample ID/Duplicate ID	Compounds	Sample Result (mg/kg, ng/l)	Duplicate Result (mg/kg, ng/l)	RPD
FTBL-DAAF-01-SO-092820 / DUP-1-092820	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%
	PFHxA	0.016	0.021	27.0%
	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%
FTBL-12-01-GW-092820 / DUP-1-GW-092820	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
	PFHpA	1700	1700	0.0%
	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%
FTBL-OSPFS-01-GW-092920 / DUP-3-092920	8:2 FTS	59	60	1.7%
	6:2 FTS	980	1000	2.0%
	PFBS	91	94	3.2%
	PFHxS	680	600	12.5%
	PFBA	160	150	6.4%
	PFHpA	140	130	7.4%
	PFHxA	450	410	9.3%
PFNA	24	26	8.0%	

DATA REVIEW REPORT

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%
FTBL-66-68-01-SW-092920 / DUP-2-092920	PFBS	5.7	4.5	AC
	PFHxS	8.1	8.0	AC
	PFBA	11	9.5	AC
	PFHpA	6.9	5.5	AC
	PFHxA	12	9.3	AC
	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.

DATA REVIEW REPORT

Sample ID	Compounds	Original Analysis	Diluted Analysis	Reported Analysis
FTBL-B1436-01-GW-092720	Perfluorohexanesulfonic acid (PFHxS)	--	1100	1100 DJ
	Perfluoro-n-butanoic acid (PFBA)	--	1200	1200 DJ
	Perfluoro-n-hexanoic acid (PFHxA)	--	3000	3000 DJ
	Perfluoro-n-octanoic acid (PFOA)	--	270	270 DJ
	Perfluoro-n-pentanoic acid (PFPeA)	--	5500	5500 DJ
	Perfluorooctanesulfonic acid (PFOS)	--	1400	1400 DJ
FTBL-DAAF-01-GW-092820	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	--	970	970 DJ
	Perfluorohexanesulfonic acid (PFHxS)	--	1900	1900DJ
	Perfluoro-n-pentanoic acid (PFPeA)	--	1300	1300 DJ
	Perfluorooctanesulfonic acid (PFOS)	--	2500	2500 DJ
FTBL-12-01-GW-092820	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
	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	
DUP-1-GW-092820	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	--	10000	10000 DJ
	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

DATA REVIEW REPORT

Sample ID	Compounds	Original Analysis	Diluted Analysis	Reported Analysis
	Perfluoro-n-pentanoic acid (PFPeA)	--	5700	5700 DJ
	Perfluorooctanesulfonic acid (PFOS)	--	5900	5900 DJ
FTBL-12-03-GW-092820	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
	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
FTBL-12-02-GW-092920	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
	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

DATA REVIEW REPORT

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-12-02-GW-092920, FTBL-H3145-01-GW-092920, FTBL-OSPFS-01-GW-092920, DUP-3-092920, FTBL-1980PC-02-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

DATA REVIEW REPORT

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 REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PFAS

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Field blanks	X				X
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	
Field Duplicate (RPD)		X	X		
Extracted Internal Standard %R		X	X		
Dilution Factor		X		X	
Moisture Content		X		X	
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	
D. Ion Ratio %D		X		X	

DATA REVIEW REPORT

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
E. Transcription/calculations acceptable		X		X	
F. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

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	Within 24 hours of receipt at laboratory
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	
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.

Criteria	Qualification
	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.

DATA REVIEW REPORT

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 ± 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 REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW846 9045D/9060A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Stage 2 Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
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)	X				X
Field Duplicate (RPD)	X				X
Dilution Factor		X		X	
Moisture Content		X		X	
Stage 3/4 Validation pH only					
Initial calibration		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculations acceptable		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R - percent recovery

RPD - relative percent difference

DATA REVIEW REPORT

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
 Lab: Pace (Shealy)
 Project: Fort Belvoir

Date: 11/10/2020
 Page: 1
 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

Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calc Amount ng/L	Tvalue ng/L	%R Calc Amount/ Tvalue	Reported %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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/10/2020
Page: 2
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

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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
CCV 1000B_SVLC-1154 10/8/2020 20:02:07 Page 1218-1219 of SDG VJ02021

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/10/2020
Page: 3
Validated by: PK

Method: EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02
LCS VQ69283-002
File ID: 100920014.d

Page 722 & 2061-2065 of SDG VJ02021

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

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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/10/2020
Page: 4
Validated by: PK

Method: EPA modified 537 per DoD QSM 5.3

MS/MSD Sample ID FTBL-12-03-GW-092820

Page 2123 and 2193 SDG VJ02021

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

$$\%R = \frac{100 * (\text{MS Conc} - \text{Sample Conc})}{\text{MS TV}}$$

$$\text{RPD} = \frac{100 * |\text{MS \%R} - \text{MSD \%R}|}{\text{Average of MS MSD \%R}}$$

Sample Concentration 0
MS Concentration 14.109
MSD Concentration 16.117
MS TV 13
MSD TV 13

MS %R 108.53 MATCH
MSD %R 123.98 MATCH
RPD 13.29 MATCH

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

Stage 3 / 4
PFAS Sample Concentration

SDG #: VJ02021
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/10/2020
Page: 5
Validated by: PK

Method: EPA modified 537 per DoD QSM 5.3

Field Sample: FTBL-B1436-01-SO-092720

Lab ID: VJ02021-004

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

Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calculated Amount pg/g	Dry Weight Value pg/g	Calculated mg/kg	Reported Value 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

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DF = 200

Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calculated Amount pg/ml	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Reported 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

Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calculated Amount pg/ml	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Reported 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

Analyte	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calculated Amount pg/ml	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Reported ng/L	
PFBS	860159	698865	1001	1.230794	1.301024	946.97	10	273	38.12	38	MATCH
PFBA	985220	910319	1001	1.08228	1.042508	1039.19	10	273	41.83	42	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) / 0.91

Stage 3 / 4
PFAS EIS

SDG #: VJ02021
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/10/2020
Page: 6
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

$$\%R = \frac{100 * \text{EIS Area}}{\text{CCV 100 EIS Area}}$$

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

$$\%R = \frac{100 * \text{EIS Area}}{\text{CCV 100 EIS Area}}$$

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

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 Telephone No. 803-791-9700 Fax No. 803-791-9111
 www.pacelabs.com

Number 111743

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Client ARCADIS		Report to Contact AFION HESS / JUSTIN COFFEY / PFS		Telephone No. / E-mail SEE PAGE 1		Quote No.	
Address 9954 MAYLAND DR. SUITE 2400		Sampler's Signature 		Analysis (Attach for if more space is needed)		Page <u>2</u> of <u>4</u>	
City RICHMOND	State VA	Zip Code 23223	Printed Name JUSTIN COFFEY		Lot # Bar Code (lab use only) VJ02021 NMS		
Project Name ET BELVOIR / ARMY PFS SI PROGRAM							
Project No. 30001992-3DL10		P.O. No.	Matrix		No. of Containers by Preservative Type		TOC PH GRAP SIZE *NMS/MSD* *NMS/MSD*
Sample ID / Description (Containers for each sample may be combined on one line.)		Collection Date(s)	Collection Time (Military)	<input checked="" type="checkbox"/> Aqueous <input checked="" type="checkbox"/> Solid <input checked="" type="checkbox"/> Semi-solid <input checked="" type="checkbox"/> Other	<input checked="" type="checkbox"/> Direct <input checked="" type="checkbox"/> ABECH <input checked="" type="checkbox"/> HMO3 <input checked="" type="checkbox"/> H2O <input checked="" type="checkbox"/> 100% <input checked="" type="checkbox"/> 20% in <input checked="" type="checkbox"/> Four Filtered		
ETBL-DAAF-01-S0-092820		09/28/20	1334	G	X	4	
DUP-1-092820		09/28/20	---	G	X	1	
ETBL-DAAF-02-S0-092820		09/28/20	1350	G	X	3	
ETBL-12-01-S0-092820		09/28/20	1600	G	X	4	
ETBL-12-01-GW-092820		09/28/20	1655	G	X	2	
DUP 1-092820		09/28/20	---	G	X	2	
ETBL-12-03-GW-092820		09/28/20	1850	G	X	6	
ETBL-12-02-S0-092920		09/29/20	0900	G	X	1	
ETBL-12-02-GW-092920		09/29/20	0945	G	X	2	
ETBL-H3145-01-S0-092920		09/30/20	1135	G	X	4	
Turn Around Time Required (Prior lab approval required for expedited TAT.) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Disposal by Lab		Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown		QC Requirements (Specify)	
1. Relinquished by elab@arcadis.com (Matt Blower)		Date 09/10/20	Time 17:15	1. Received by		Date	Time
2. Relinquished by		Date	Time	2. Received by		Date	Time
3. Relinquished by		Date	Time	3. Received by		Date	Time
4. Relinquished by FedEx		Date 10-2-20	Time NMS	4. Laboratory received by Kalene Stepp		Date 10-2-20	Time NMS
Note: All samples are retained for four weeks from receipt unless other arrangements are made.				LAB USE ONLY Received on Ice (Circle) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Ice Pack		Receipt Temp. 5.4 °C	Temp Blank <input checked="" type="checkbox"/> Y <input type="checkbox"/> N

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DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy



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Number **111745**

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Client ARCADIS		Report to Contact ARW HPS / JUSCOW COFFEY / PFAAS		Telephone No. / E-mail SEE PAGE 1		Quote No.											
Address 9954 MANLAW DR. SUITE 2400		Sampler's Signature 		Analysis (Attach list if more space is needed)		Page 4 of 4											
City RICHMOND	State VA	Zip Code 23233	Printed Name JUSCOW COFFEY		 Lot # Bar Code VJ02021 NMS												
Project Name FORT BELVOIR / ARMY PFAAS SI PROGRAM		Project No.		PFAAS (USE ONLY)													
Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (M:PM)	Matrix	No. of Containers by Preservative Type													
				Unpres	H2SO4	HNO3	HCl	NaOH	None	Other							
FTBL-1980PC-01-GW-093020	09/30/20	1500	G X	2													
FTBL-MW-1R-093020	09/30/20	1650	G X	2													
FTBL-H3232-01-GW-093020	09/30/20	1820	G X	2													
FTBL-66-68-01-SW-290920	09/29/20	1015	G X	6													* MS/MSD*
FTBL-ADPC20-MW02-290920	09/29/20	1402	G X	2													
FTBL-M18-MW31-290920	09/29/20	1612	G X	2													
FTDUP-2-290920	09/29/20	—	G X	2													
FTBL-M26-LTM-06-300920	09/30/20	0907	G X	2													
FTBL-FATTS-LTM-MW03-300920	09/30/20	1103	G X	2													
FTBL-PSA2009-MW42-300920	09/30/20	1407	G X	2													
Turn Around Time Required (Prior lab approval required for expedited IAT) <input checked="" type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)		Sample Disposal <input type="checkbox"/> Return to Client <input checked="" type="checkbox"/> Dispose by Lab		Possible Hazard Identification <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown		QC Requirements (Specify)											
1. Relinquished by		Date	Time	1. Received by		Date	Time										
2. Relinquished by		Date	Time	2. Received by		Date	Time										
3. Relinquished by		Date	Time	3. Received by		Date	Time										
4. Relinquished by FedEx		Date	Time	4. Laboratory received by		Date	Time										
Note: All samples are retained for four weeks from receipt unless other arrangements are made.		LAB USE ONLY Received on ice (Circle) <input checked="" type="checkbox"/> No <input type="checkbox"/> Ice Pack		Receipt Temp. 5.4 °C 1.7		Temp Blank <input checked="" type="checkbox"/> Y <input type="checkbox"/> N											

PACE ANALYTICAL SERVICES, LLC

Inorganic non-metals

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

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/06/2020 2250	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 19.3 ° C		9045D	7.1	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-001**

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**

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 2044	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	0.0012	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-butanefluoronic 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-butanefluoronic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		96	50-150
13C2_8:2FTS		98	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-002**

Description: **FTBL-NPFS-02-SO-092720**

Matrix: **Solid**

Date Sampled: **09/27/2020 0945**

% Solids: **89.0 10/02/2020 2342**

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	10/08/2020 2055	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	0.0012	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		93	50-150
13C2_8:2FTS		99	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-003**

Description: **FTBL-NPFS-01-GW-092720**

Matrix: **Aqueous**

Date Sampled: **09/27/2020 1140**

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 0257	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	7.5	3.8	1.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	52		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-butanefulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	21		3.8	1.9	0.94	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	140		3.8	1.9	0.94	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	36		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	46		3.8	1.9	0.94	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	81		3.8	1.9	0.94	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	4.6		3.8	1.9	0.94	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	44		3.8	1.9	0.94	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	100		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 (PFTTrDA)	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	330		3.8	1.9	0.94	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		90	50-150
13C2_8:2FTS		76	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

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

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/06/2020 2259	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 19.1 ° C		9045D	5.2	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-004**

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**

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 2106	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	0.00095	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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150
13C2_8:2FTS		94	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-005**

Description: **FTBL-B1436-02-SO-092720**

Matrix: **Solid**

Date Sampled: **09/27/2020 1355**

% Solids: **93.4 10/02/2020 2342**

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	10/08/2020 2116	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	0.0011	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-butanefulfonic 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-butanefulfonic 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	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150
13C2_8:2FTS		83	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-006**

Description: **FTBL-B1436-01-GW-092720**

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	1	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	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	4.0	UQ 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	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.0	UQ 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-butanefulfonic 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	UQ 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	1 R
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	2.0	UQ UJ	4.0	2.0	1.0	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.0	UQ 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	Run 1			Run 2		
	Q	% Recovery	Acceptance Limits	Q	% Recovery	Acceptance Limits
13C2_6:2FTS		50	50-150		85	50-150
13C2_8:2FTS	N	33	50-150		83	50-150
13C2_PFDaA	N	22	50-150		86	50-150
13C2_PFTeDA	N	9.6	50-150		87	50-150
13C3_PFBs		50	50-150		88	50-150
13C3_PFHxS	N	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	N	34	50-150		85	50-150
13C7_PFUdA	N	26	50-150		84	50-150
13C8_PFOA		52	50-150		89	50-150
13C8_PFOs	N	18	50-150		90	50-150
13C9_PFNa	N	46	50-150		91	50-150
d5-EtFOSAA	N	21	50-150		94	50-150
d3-MeFOSAA	N	25	50-150		90	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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

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

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/06/2020 2303	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 19 ° C		9045D	4.5	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-007**

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**

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 2127	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	0.0011	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		93	50-150
13C2_8:2FTS		100	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-008**

Description: **FTBL-LVCF-01-GW-092720**

Matrix: **Aqueous**

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-butanefulfonic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		119	50-150
13C2_8:2FTS		85	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-009**

Description: **FTBL-B707-01-GW-092820**

Matrix: **Aqueous**

Date Sampled: **09/28/2020 0905**

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 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-butanefulfonic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		89	50-150
13C2_8:2FTS		79	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-010**

Description: **FTBL-DAAF-01-GW-092820**

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	1	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	S 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-butanefulfonic 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	S	3.6	1.8	0.90	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	790	S	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 (PFTTrDA)	72629-94-8	PFAS by ID SOP	1.8	U JJ	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	Run 1			Run 2		
	Q	% Recovery	Acceptance Limits	Q	% Recovery	Acceptance Limits
13C2_6:2FTS		89	50-150		89	50-150
13C2_8:2FTS		83	50-150		91	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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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
Date Received: 10/02/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/14/2020 1409	AAB		69906

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 20.3 ° C		9045D	6.2	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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**

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	10/08/2020 2137	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	0.0012	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-butanefluoronic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		103	50-150
13C2_8:2FTS		102	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-012**

Description: **DUP-1-092820**

Matrix: **Solid**

Date Sampled: **09/28/2020**

% Solids: **86.9 10/02/2020 2342**

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	10/08/2020 2148	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	0.0013	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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		98	50-150
13C2_8:2FTS		104	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-013**

Description: **FTBL-DAAF-02-SO-092820**

Matrix: **Solid**

Date Sampled: **09/28/2020 1350**

% Solids: **86.1 10/02/2020 2342**

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	10/08/2020 2159	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	0.0012	S 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-butanefluoronic 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	S J-	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	0.0060	S	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	0.0023	S	0.0012	0.00060	0.00023	mg/Kg	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	0.0064	S	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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		94	50-150
13C2_8:2FTS		92	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
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Inorganic non-metals

Client: Arcadis U.S., Inc.	Laboratory ID: VJ02021-014
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
1		(Soil pH meas) 9045D	1	10/06/2020 2306	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 18.9 ° C		9045D	5.3	J				su	1

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 ≥ DL L = LCS/LCSD failure
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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-014**

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			
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/08/2020 2230	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	0.0013	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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		86	50-150
13C2_8:2FTS		92	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-015**

Description: **FTBL-12-01-GW-092820**

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	1	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

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	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-butanefulfonic 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-butanefulfonic 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	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		Run 2	
		% Recovery	Acceptance Limits	% Recovery	Acceptance Limits
13C2_6:2FTS		77	50-150	93	50-150
13C2_8:2FTS		61	50-150	107	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-016**

Description: ~~DUP-1-092820~~ **DUP-1-GW-092820**

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-butanefulfonic 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	12000	DJ	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	U	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	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		Run 2	
		% Recovery	Acceptance Limits	% Recovery	Acceptance Limits
13C2_6:2FTS		80	50-150	93	50-150
13C2_8:2FTS		58	50-150	106	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-017**

Description: **FTBL-12-03-GW-092820**

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	Q	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	U S UJ-	140	70	36	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	70	U UJ-	140	70	36	ng/L	1
Perfluoro-1-butanefulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	3100	S DJ	72	36	18	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	60000	S	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	S	72	36	18	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	36	U S UJ-	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	S	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	S	720	360	180	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	12000	S	72	36	18	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	36	U S UJ-	72	36	18	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	36	U S UJ-	72	36	18	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	46	S 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	Run 1			Run 2		
	Q	% Recovery	Acceptance Limits	Q	% Recovery	Acceptance Limits
13C2_6:2FTS		73	50-150		96	50-150
13C2_8:2FTS		87	50-150		100	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-018**

Description: **FTBL-12-02-SO-092920**

Matrix: **Solid**

Date Sampled: **09/29/2020 0900**

% Solids: **83.4 10/02/2020 2342**

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	10/08/2020 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-butanefulfonic 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-butanefulfonic 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 (PFTTrDA)	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	Run 1			Run 2		
	Q	% Recovery	Acceptance Limits	Q	% Recovery	Acceptance Limits
13C2_6:2FTS		77	50-150		105	50-150
13C2_8:2FTS		95	50-150		94	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-019**

Description: **FTBL-12-02-GW-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020 0945**

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	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

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	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-butanefulfonic 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	J	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 (PFTTrDA)	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	Run 1			Run 2		
	Q	% Recovery	Acceptance Limits	Q	% Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150		72	50-150
13C2_8:2FTS		102	50-150		84	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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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	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/06/2020 2308	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 18.9 ° C		9045D	8.2	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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**

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 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-butanefulfonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		83	50-150
13C2_8:2FTS		94	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-021**

Description: **FTBL-H3145-01-GW-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020 1225**

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 1813	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	3.5	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-butanefulfonic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		98	50-150
13C2_8:2FTS		81	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-022**

Description: **FTBL-B3121-03-SO-092920**

Matrix: **Solid**

Date Sampled: **09/29/2020 1330**

% Solids: **81.0 10/02/2020 2342**

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	10/08/2020 2313	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	0.0011	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150
13C2_8:2FTS		86	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-023**

Description: **FTBL-B3121-03-GW-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020 1445**

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 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-butanefulfonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		93	50-150
13C2_8:2FTS		80	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

Client: Arcadis U.S., Inc.	Laboratory ID: VJ02021-024
Description: FTBL-OSPFS-01-SO-092920	Matrix: Solid
Date Sampled: 09/29/2020 1615	% Solids: 88.0 10/02/2020 2342
Date Received: 10/02/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/06/2020 2312	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 18.7 ° C		9045D	6.9	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ02021-024
Description: FTBL-OSPFS-01-SO-092920	Matrix: Solid
Date Sampled: 09/29/2020 1615	% Solids: 88.0 10/02/2020 2342
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	10/08/2020 2324	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	0.0012	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-butanefulfonic 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-butanefonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		89	50-150
13C2_8:2FTS		87	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/08/2020 2334	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	0.0011	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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150
13C2_8:2FTS		98	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-026**

Description: **FTBL-OSPFS-01-GW-092920**

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	1	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

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	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-butanefulfonic 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	U Q UJ	3.8	1.9	0.94	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	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		Q	Run 2	
		% Recovery	Acceptance Limits		% Recovery	Acceptance Limits
13C2_6:2FTS		128	50-150		96	50-150
13C2_8:2FTS		96	50-150		109	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-027**

Description: **DUP-3-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020**

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	10/12/2020 0106	MMM	10/09/2020 1637	69425
2	SOP SPE	PFAS by ID SOP QSM B-15	5	10/12/2020 1430	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	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-butanefulfonic 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	UQ 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		Q	Run 2	
		% Recovery	Acceptance Limits		% Recovery	Acceptance Limits
13C2_6:2FTS		113	50-150		89	50-150
13C2_8:2FTS		85	50-150		92	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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	

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 2345	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	0.0012	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		86	50-150
13C2_8:2FTS		92	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

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
1		(Soil pH meas) 9045D	1	10/06/2020 2315	SRB		69036

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 18.6 ° C		9045D	4.4	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/08/2020 2356	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	0.0014	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		82	50-150
13C2_8:2FTS		90	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-030**

Description: **FTBL-1980PC-02-GW-093020**

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	UQ	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	UQ	13	6.5	3.4	ng/L	1
Perfluoro-1-butanefluoronic acid (PFBS)	375-73-5	PFAS by ID SOP	3.4	U	6.7	3.4	1.7	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	14	Q 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	UQ	6.7	3.4	1.7	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	3.4	UQ	6.7	3.4	1.7	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	3.4	U	6.7	3.4	1.7	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	4.6	J J-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	3.4	U	6.7	3.4	1.7	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	11	J J-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	4.3	J J-	6.7	3.4	1.7	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	3.4	UQ	6.7	3.4	1.7	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	3.4	UQ	6.7	3.4	1.7	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	3.4	UQ	6.7	3.4	1.7	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	13	Q J+	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_PFDaA	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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-031**

Description: **FTBL-1980PC-01-GW-093020**

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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	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	J 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	U J-	8.5	4.3	2.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	4.3	UQ UJ-	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 J-	8.5	4.3	2.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	2.2	J 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 J-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	2.1	U UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	2.1	UQ UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	2.1	U UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	3.3	J J-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	2.1	U UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	2.1	U UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	2.3	J J-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	2.1	UQ UJ-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	72629-94-8	PFAS by ID SOP	2.1	UQ J-	4.2	2.1	1.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	2.1	U UJ-	4.2	2.1	1.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	11	Q J+	4.2	2.1	1.1	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		99	50-150
13C2_8:2FTS		64	50-150
13C2_PFDaA	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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-032**

Description: **FTBL-MW-1R-093020**

Matrix: **Aqueous**

Date Sampled: **09/30/2020 1650**

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 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	JQ 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	Q J-	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-butanefulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	38	Q J-	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		Run 2	
		% Recovery	Acceptance Limits	% Recovery	Acceptance Limits
13C2_6:2FTS	N	338	50-150	122	50-150
13C2_8:2FTS	N	207	50-150	123	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-033**

Description: **FTBL-H3232-01-GW-093020**

Matrix: **Aqueous**

Date Sampled: **09/30/2020 1820**

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 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-butanefulfonic 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	U	3.6	1.8	0.90	ng/L	1
Perfluoro-n-tridecanoic acid (PFTTrDA)	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_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-034**

Description: **FTBL-66-68-01-SW-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020 1015**

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 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	S, 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		147	50-150
13C2_8:2FTS		94	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-035**

Description: **FTBL-AOPC20-MW02-092920**

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	U 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	152	50-150
13C2_8:2FTS		89	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-036**

Description: **FTBL-M18-MW31-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020 1612**

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 1535	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-butanefulfonic 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-butanefulfonic 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 (PFTTrDA)	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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		100	50-150
13C2_8:2FTS		102	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-037**

Description: ~~DUP-2-093020~~ **DUP-2-092920**

Matrix: **Aqueous**

Date Sampled: **09/29/2020**

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	10/12/2020 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-butan sulfonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		107	50-150
13C2_8:2FTS		102	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-038**

Description: **FTBL-M26-LTM-06-093020**

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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		94	50-150
13C2_8:2FTS		95	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-039**

Description: **FTBL-FATTS-LTM-MW08-093020**

Matrix: **Aqueous**

Date Sampled: **09/30/2020 1103**

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 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-butanefulfonic 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-butanefulfonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		105	50-150
13C2_8:2FTS		117	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**

Laboratory ID: **VJ02021-040**

Description: **FTBL-PSA2009-MW42-093020**

Matrix: **Aqueous**

Date Sampled: **09/30/2020 1407**

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 1618	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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		115	50-150
13C2_8:2FTS		118	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Report#: 220101411

Project ID: VJ02021-Fort Belvoir Army PFAS

Report Date: 10/20/2020

Summary of Compounds Detected

FTBL-NPFS-01-SO-092720	Collect Date	09/27/2020 09:15	LAB ID	22010141101
	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-092720	Collect Date	09/27/2020 13:40	LAB ID	22010141102
	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-092720	Collect Date	09/27/2020 17:30	LAB ID	22010141103
	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-092820	Collect Date	09/28/2020 13:34	LAB ID	22010141104
	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-092920	Collect Date	09/29/2020 11:35	LAB ID	22010141106
	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-092920	Collect Date	09/29/2020 16:15	LAB ID	22010141107
	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-093020	Collect Date	09/30/2020 12:00	LAB ID	22010141108
	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

DATA REVIEW REPORT

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:

SDGs	Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
						PFAS	TOC	pH
VJ05046	FTBL-FB-01-100120	VJ05046-001	Water	10/1/2020		X		
	FTBL-SB-01-100120	VJ05046-002	Water	10/1/2020		X		
	FTBL-MO7-MW02-100120	VJ05046-003	Water	10/1/2020		X		
	FTBL-H3151-01-SO-100120	VJ05046-004	Soil	10/1/2020		X		X
	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		X
	FTBL-B3121-01-GW-100120	VJ05046-009	Water	10/1/2020		X		
	FTBL-EB-01-100120	VJ05046-010	Water	10/1/2020		X		
	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		X		
	FTBL-FBNAFS-02-GW-100120	VJ05046-017	Water	10/1/2020		X		
	FTBL-FBNAFS-01-SO-100120	VJ05046-018	Soil	10/1/2020		X		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		
220101408	FTBL-H3151-01-SO-100120	22010140801	Soil	10/1/2020			X	
	FTBL-B3121-01-SO-100120	22010140802	Soil	10/1/2020			X	
	FTBL-FBNAFS-01-SO-100120	22010140803	Soil	10/1/2020			X	

Notes:

1. Stage 4 validation was performed on samples FTBL-H3151-01-GW-100120 and FTBL-B3121-01-GW-100120.

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

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

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

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 537 DoD QSM 5.3	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
	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, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

DATA REVIEW REPORT

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%
FTBL-B3121-02-GW-100120	13C2_PFTeDA	Perfluoro-n-tetradecanoic acid (PFTeDA)	< 50% but > 20%
	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
> 150%	Non-detect	No Action
	Detect	J-
< 50% but > 20%	Non-detect	UJ

DATA REVIEW REPORT

Control Limit	Sample Result	Qualification
< 20%	Detect	J+
	Non-detect	X
	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 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 times 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	Original Analysis	Diluted Analysis	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.

DATA REVIEW REPORT

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 reformat the extractable internal standard. This reformat 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 reformat.	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 REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PFAS

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
C. Field blanks		X		X	
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)		X		X	
Field Duplicate (RPD)	X				X
Extracted Internal Standard %R		X	X		
Dilution Factor		X		X	
Moisture Content		X		X	
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

DATA REVIEW REPORT

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
D. Ion Ratio %D		X		X	
E. Transcription/calculations acceptable		X		X	
F. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

- %RSD Relative standard deviation
- %R Percent recovery
- RPD Relative percent difference
- %D Percent difference

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

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	15 days from collection; 11 days from receipt	Within 24 hours of receipt at laboratory
FTBL-B3121-01-SO-100120		
FTBL-FBNAFS-01-SO-100120		

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.

DATA REVIEW REPORT

pH: The initial and continuing calibration criteria were within the acceptance criteria of ± 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 REVIEW REPORT

DATA VALIDATION CHECKLIST FOR GENERAL CHEMISTRY

General Chemistry: SW846 9045D/9060A	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
Miscellaneous Instrumentation					
Stage 2 Validation					
Holding times		X	X		
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
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)	X				X
Field Duplicate (RPD)	X				X
Dilution Factor		X		X	
Moisture Content		X		X	
Stage 3/4 Validation pH Only					
Initial calibration		X		X	
Continuing calibration %R		X		X	
Raw Data		X		X	
Transcription/calculations acceptable		X		X	
Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%R - percent recovery

RPD - relative percent difference

DATA REVIEW REPORT

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
 Lab: Pace (Shealy)
 Project: Fort Belvoir

Date: 11/18/2020
 Page: 1
 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

Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	RF	Calc Amount ng/L	Tvalue ng/L	%R Calc Amount/Tvalue	Reported %R	
50	10874	164816	1000	0.065977	1.210077	54.52	46.4	117.51	118	MATCH
100	19554	177371	1000	0.110244	1.210077	91.10	92.8	98.17	98	MATCH
200	38822	173400	1000	0.223887	1.210077	185.02	185.6	99.69	99.7	MATCH
500	87706	161518	1000	0.543011	1.210077	448.74	464	96.71	96.7	MATCH
1000	192678	174937	1000	1.101414	1.210077	910.20	928	98.08	98.1	MATCH
2000	407305	182412	1000	2.232885	1.210077	1845.24	1856	99.42	99.4	MATCH
5000	912750	173176	1000	5.27065	1.210077	4355.63	4640	93.87	93.9	MATCH
10000	1971001	182452	1000	10.80285	1.210077	8927.40	9280	96.20	96.2	MATCH
15000	3079785	178224	1000	17.28042	1.210077	14280.43	13920	102.59	103	MATCH
20000	4032776	183677	1000	21.9558	1.210077	18144.14	18560	97.76	97.8	MATCH

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

Stage 3 / 4
PFAS ICV CCV Standards %R

SDG #: VJ05046
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/18/2020
Page: 2
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

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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
CCV 1000_SVLC-1154 10/13/2020 21:07:18 Page 804 - 805 of SDG VJ05046

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/18/2020
Page: 3
Validated by: SPR

Method: EPA modified 537 per DoD QSM 5.3

Instrument: LCMSMS02
LCS VQ69662-002

File ID: 101320036
Page 1289 - 1293 of SDG VJ05046

Analyte	Std Area	EIS Area	EIS Conc ng/L	Area Ratio	RF	Calculated Amount ng/L	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Tvalue ng/L	Calculated % R	Reported %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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/18/2020
Page: 4
Validated by: SPR

Method: EPA modified 537 per DoD QSM 5.3

MS/MSD Sample ID FTBL-EB-03-100120
ANALYTE PFHpA
REPORTED MS %R 108

Page 1343 of SDG VJ05046

$$\%R = \frac{100 * (MS\ Conc - Sample\ Conc)}{MS\ TV}$$

Sample Concentration 0
MS Concentration 14
MS TV 13

MS %R 107.7 MATCH

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

Stage 3 / 4
PFAS Sample Concentration

SDG #: VJ05046
 Lab: Pace (Shealy)
 Project: Fort Belvoir

Date: 11/18/2020
 Page: 5
 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

Analyte	Std Area	EIS Area	EIS Conc ng/L	Area Ratio	Avg RF	Calculated Amount ng/L	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Reported 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	MATCH

Field Sample: FTBL-B3121-01-GW-100120 Lab ID: VJ05046-009 Page 160-162 of SDG VJ05046

Analyte	Std Area	EIS Area	EIS Conc ng/L	Area Ratio	Avg RF	Calculated Amount ng/L	Extract Final Volume mls	Extracted Sample Volume mls	Calculated ng/L	Reported 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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 11/18/2020
Page: 6
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

$$\%R = \frac{100 * \text{EIS Area}}{\text{CCV 100 EIS Area}}$$

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**



PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-001
Description: FTBL-FB-01-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 0855	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 1942	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	4.2	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		134	50-150
13C2_8:2FTS		116	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection 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

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-002
Description: FTBL-SB-01-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 0900	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 1952	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	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		106	50-150
13C2_8:2FTS		111	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-003
Description: FTBL-MO7-MW02-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1102	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2211	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	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		119	50-150
13C2_8:2FTS		109	50-150
13C2_PFDoA		100	50-150
13C2_PFTeDA		98	50-150
13C3_PFBFS		104	50-150
13C3_PFHxS		110	50-150
13C4_PFBA		110	50-150
13C4_PFHpA		113	50-150
13C5_PFHxA		111	50-150
13C5_PFPeA		115	50-150
13C6_PFDA		113	50-150
13C7_PFUdA		103	50-150
13C8_PFOA		118	50-150
13C8_PFOS		93	50-150
13C9_PFNA		108	50-150
d5-EtFOSAA		109	50-150
d3-MeFOSAA		106	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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-004
Description: FTBL-H3151-01-SO-100120	Matrix: Solid
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
1		(Soil pH meas) 9045D	1	10/16/2020 1733	AAB		70227

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 20.7 ° C		9045D	5.4	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-004
Description: FTBL-H3151-01-SO-100120	Matrix: Solid
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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/15/2020 1842	SES	10/14/2020 1109	69796

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	0.0011	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		98	50-150
13C2_8:2FTS		87	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-005
Description: FTBL-H3151-01-GW-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 0925	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 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-butanefulfonic 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-butanefonic 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	UQ 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	Run 1 % 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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-006
Description: FTBL-B3121-02-SO-100120	Matrix: Solid
Date Sampled: 10/01/2020 1045	% Solids: 82.1 10/06/2020 2331
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/15/2020 1853	SES	10/14/2020 1109	69796

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	0.00049	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-butanefluoronic 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-butanefluoronic 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	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		86	50-150
13C2_8:2FTS		90	50-150
13C2_PFDaA		89	50-150
13C2_PFTeDA		84	50-150
13C3_PFBs		69	50-150
13C3_PFHxS		75	50-150
13C4_PFBa		83	50-150
13C4_PFHpA		88	50-150
13C5_PFHxA		81	50-150
13C5_PFPeA		85	50-150
13C6_PFDa		94	50-150
13C7_PFUdA		86	50-150
13C8_PFOA		87	50-150
13C8_PFOs		78	50-150
13C9_PFNa		87	50-150
d5-EtFOSAA		85	50-150
d3-MeFOSAA		86	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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-007
Description: FTBL-B3121-02-GW-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1100	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2233	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	3.5	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-butanefulfonic 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-butanefonic 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	UQ 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	Q J+	3.5	1.8	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		97	50-150
13C2_8:2FTS		82	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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Inorganic non-metals

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-008
Description: FTBL-B3121-01-SO-100120	Matrix: Solid
Date Sampled: 10/01/2020 1230	% Solids: 86.7 10/06/2020 2331
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		(Soil pH meas) 9045D	1	10/16/2020 1742	AAB		70227

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 21.1 ° C		9045D	5.5	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-008
Description: FTBL-B3121-01-SO-100120	Matrix: Solid
Date Sampled: 10/01/2020 1230	% Solids: 86.7 10/06/2020 2331
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/15/2020 1904	SES	10/14/2020 1109	69796

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	0.0012	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		88	50-150
13C2_8:2FTS		93	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-009
Description: FTBL-B3121-01-GW-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1255	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2243	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	3.5	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-butanefulfonic 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-butanefonic 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_PFBFS		87	50-150
13C3_PFHxS		94	50-150
13C4_PFBFA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-010
Description: FTBL-EB-01-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1430	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2003	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	4.2	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	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	153	50-150
13C2_8:2FTS		139	50-150
13C2_PFDaA		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

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-011
Description: FTBL-EB-02-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1435	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2014	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	8.6	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	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-butanefluoronic 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-butanefluoronic 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_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-012
Description: FTBL-EB-03-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1440	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2024	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	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	167	50-150
13C2_8:2FTS		120	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-013
Description: FTBL-EB-04-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1445	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2045	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	7.1	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		140	50-150
13C2_8:2FTS		116	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-014
Description: FTBL-EB-05-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1450	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 2056	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	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		141	50-150
13C2_8:2FTS		116	50-150
13C2_PFDaA		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

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-015
Description: FTBL-FB-02-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1500	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		149	50-150
13C2_8:2FTS		122	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-016
Description: FTBL-FBNAFS-02-SO-100120	Matrix: Solid
Date Sampled: 10/01/2020 1545	% Solids: 85.5 10/06/2020 2331
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/18/2020 1939	KMM2	10/16/2020 0930	69797

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	0.0011	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		105	50-150
13C2_8:2FTS		99	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-017
Description: FTBL-FBNAFS-02-GW-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1640	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 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-butanefulfonic 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-butanefonic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		112	50-150
13C2_8:2FTS		120	50-150
13C2_PFDoA		106	50-150
13C2_PFTeDA		97	50-150
13C3_PFBFS		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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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 (Soil pH meas)	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		9045D	1	10/16/2020 1744	AAB		70227

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	LOD	DL	Units	Run
Soil pH measured in water @ 21.2 ° C		9045D	6.1	J				su	1

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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/18/2020 1949	KMM2	10/16/2020 0930	69797

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	0.0012	U	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		107	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		102	50-150
13C2_PFTeDA		97	50-150
13C3_PFBFS		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-019
Description: FTBL-FBNAFS-01-GW-100120	Matrix: Aqueous
Date Sampled: 10/01/2020 1810	
Date Received: 10/05/2020	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/13/2020 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-butanefulfonic 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	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C2_6:2FTS		105	50-150		100	50-150
13C2_8:2FTS		115	50-150		87	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: VJ05046-020
Description: FTBL-FBNAFS-03-SO-100120	Matrix: Solid
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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/18/2020 2000	KMM2	10/16/2020 0930	69797

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	0.0012	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		96	50-150
13C2_8:2FTS		88	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection 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



Report#: 220101408

Project ID: VJ05046-Fort Belvoir PFAS SI

Report Date: 10/22/2020

Sample Results

FTBL-H3151-01-SO-100120	Collect Date	10/01/2020 09:00	LAB ID	22010140801
	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	By	Analytical Batch		
NA	NA	NA	1	10/20/2020 11:22	PLH	695062		
CAS#	Parameter			Result	DL	LOD	LOQ	Units
C-012	Total Organic Carbon			1140	153	200	250	mg/kg

FTBL-B3121-01-SO-100120	Collect Date	10/01/2020 12:30	LAB ID	22010140802
	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	By	Analytical Batch		
NA	NA	NA	1	10/20/2020 11:32	PLH	695062		
CAS#	Parameter			Result	DL	LOD	LOQ	Units
C-012	Total Organic Carbon			2990	153	200	250	mg/kg

FTBL-FBNAFS-01-SO-100120	Collect Date	10/01/2020 17:25	LAB ID	22010140803
	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	By	Analytical Batch		
NA	NA	NA	1	10/20/2020 12:05	PLH	695062		
CAS#	Parameter			Result	DL	LOD	LOQ	Units
C-012	Total Organic 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

DATA REVIEW REPORT

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:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis		
					PFAS	TOC	pH
FTBL-B1495-01-SO-031021	WC11006-001	Soil	3/10/2021		X		
FTBL-B1495-02-SO-031021	WC11006-002	Soil	3/10/2021		X		
FTBL-B1495-03-SO-031021	WC11006-003	Soil	3/10/2021		X		
FTBL-B1495-04-SO-031021	WC11006-004	Soil	3/10/2021		X		

Notes:

1. Stage 4 validation was performed on sample FTBL-B1495-02-SO-031021.

DATA REVIEW REPORT

ANALYTICAL DATA PACKAGE DOCUMENTATION

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

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

Note:

QA - Quality Assurance

DATA REVIEW REPORT

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.

DATA REVIEW REPORT

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 537 DoD QSM 5.3	Soil	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C
	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, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

DATA REVIEW REPORT

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 times the LOQ for soil matrices.

A field duplicate sample was not collected on sample associated with this SDG.

DATA REVIEW REPORT

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 REVIEW REPORT

DATA VALIDATION CHECKLIST FOR PFAS

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
Stage 2 Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks	X				X
C. Field blanks	X				X
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)	X				X
Field Duplicate (RPD)	X				X
Extracted Internal Standard %R		X		X	
Dilution Factor		X		X	
Moisture Content		X		X	
Stage 3/4 Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

DATA REVIEW REPORT

PFAS: 537M/DoD QSM 5.3	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/MASS SPECTROMETRY (LC/MS/MS)					
D. Ion Ratio %R		X		X	
E. Transcription/calculations acceptable		X		X	
F. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD Relative standard deviation

%R Percent recovery

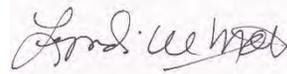
RPD Relative percent difference

%D Percent difference

DATA REVIEW REPORT

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
 Lab: Pace (Shealy)
 Project: Fort Belvoir

Date: 6/1/2021
 Page: 1
 Validated by: LWM

Method: EPA modified 537 per DoD QSM 5.3

Instrument : LCMSMS02

PFOS 3/16/2021 Calibration

Page 73 of SDG WC11006

Cal Conc	Std Area	EIS Area	EIS Conc	Area Ratio	Calculated RF	Reported RF	Calc Amount ng/L	Tvalue ng/L	%R Calc Amount/Tvalue	Reported %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
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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 6/2/2021
Page: 2
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

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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

Analyte	ICV ng/L	ICV TV ng/L	Calculated %R	Reported %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: Pace (Shealy)
Project: 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

Analyte	Std Area	EIS Area	EIS Conc ng/L	Area Ratio	Avg RF	Calculated Amount ng/L	Extract Final Volume mls	Extracted Sample Weight gm	Calculated mg/kg	Tvalue mg/kg	Calculated % R	Reported %R	
PFHpA	99410	655784	1001	0.15159	1.05638	143.64	10	1	0.00158	0.0020	78.92	79	MATCH
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
 Lab: Pace (Shealy)
 Project: Fort Belvoir

Date: 6/1/2021
 Page: 4
 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%

Analyte	Area	EIS Area	EIS Conc ng/L	Area Ratio	Avg RF	Calculated Amount ug/kg	Dry Weight Value ug/kg	mg/kg	Reported 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
Lab: Pace (Shealy)
Project: Fort Belvoir

Date: 6/1/2021
Page: 5
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

$$\%R = \frac{100 * \text{EIS Area}}{\text{ICAL 1000 EIS Area}}$$

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 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: MCH / 03/11/2021 Lot #: WC11006

Means of receipt: <input type="checkbox"/> Pace <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other: _____	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1. Were custody seals present on the cooler?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	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 %Solid Snap-Cup ID: 21-443	
2.7 / 2.7 °C NA / NA °C NA / NA °C NA / NA °C	
Method: <input checked="" type="checkbox"/> Temperature Blank <input type="checkbox"/> Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Were sample IDs listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Was collection date & time listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Was collection date & time listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all container label information (ID, date, time) agree with the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Was adequate sample volume available?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	19. Were all applicable NH ₄ /TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	21. Was the quote number listed on the container label? If yes, Quote # 22912
Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, 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.	
Sample(s) NA were received with TRC > 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: M Bxd Date: 3/11/21	

Comments:

PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: WC11006-001
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
1	SOP SPE	PFAS by ID SOP QSM B-15	1	03/17/2021 0030	JJG	03/15/2021 1121	85713

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	0.0012	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-butanefluoronic 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-butanefluoronic 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	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		99	50-150
13C2_8:2FTS		94	50-150
13C2_PFDaA		103	50-150
13C2_PFTeDA		104	50-150
13C3_PFBs		85	50-150
13C3_PFHxS		97	50-150
13C4_PFBa		104	50-150
13C4_PFHpA		106	50-150
13C5_PFHxA		101	50-150
13C5_PFPeA		106	50-150
13C6_PFDa		100	50-150
13C7_PFUdA		103	50-150
13C8_PFOA		107	50-150
13C8_PFOs		98	50-150
13C9_PFNa		101	50-150
d5-EtFOSAA		103	50-150
d3-MeFOSAA		108	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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: WC11006-002
Description: FTBL-B1495-02-SO-031021	Matrix: Solid
Date Sampled: 03/10/2021 1305	% Solids: 89.1 03/11/2021 2358
Date Received: 03/11/2021	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	03/17/2021 0040	JJG	03/15/2021 1121	85713

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	0.0011	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		95	50-150
13C2_8:2FTS		92	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: WC11006-003
Description: FTBL-B1495-03-SO-031021	Matrix: Solid
Date Sampled: 03/10/2021 1400	% Solids: 88.7 03/11/2021 2358
Date Received: 03/11/2021	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	03/17/2021 0051	JJG	03/15/2021 1121	85713

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	0.00095	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-butanefluoronic 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-butanefluoronic 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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		98	50-150
13C2_8:2FTS		113	50-150
13C2_PFDaA		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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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PFAS by LC/MS/MS

Client: Arcadis U.S., Inc.	Laboratory ID: WC11006-004
Description: FTBL-B1495-04-SO-031021	Matrix: Solid
Date Sampled: 03/10/2021 1210	% Solids: 80.7 03/11/2021 2358
Date Received: 03/11/2021	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	03/17/2021 0102	JJG	03/15/2021 1121	85713

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	0.0011	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-butanefluoronic 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-butanefluoronic 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	Acceptance Limits
13C2_6:2FTS		95	50-150
13C2_8:2FTS		104	50-150
13C2_PFDaA		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 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 ≥ DL L = LCS/LCSD failure
 H = Out of holding time W = Reported on wet weight basis LOD = Limit of Detection S = MS/MSD failure

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APPENDIX N

Site Inspection Laboratory Analytical Results



Appendix N - Site Inspection Laboratory Analytical Results - Groundwater
 USAEC PFAS Preliminary Assessment/Site Inspection
 Fort Belvoir, Virginia



Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		1980s Plane Crash		1980s Plane Crash		Building 1436 (LRC)		Building 3121 (LRC)	
			Location		FTBL-1980PC-01		FTBL-1980PC-02		FTBL-B1436-01		FTBL-B3121-01	
			Sample ID		FTBL-1980PC-01-GW-093020		FTBL-1980PC-02-GW-093020		FTBL-B1436-01-GW-092720		FTBL-B3121-01-GW-100120	
			Sample Date		9/30/2020		09/30/2020		09/27/2020		10/01/2020	
			Sample Type		N		N		N		N	
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater	
			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-Methylperfluorooctane 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 (PFTTrDA)	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	

Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		Building 3121 (LRC)		Building 3121 (LRC)		Building 707 (LRC)		DAAF Fire Station		FBNA Fire Station	
			Location		FTBL-B3121-02		FTBL-B3121-03		FTBL-B707-01		FTBL-DAAF-01		FTBL-FBNAFS-01	
			Sample ID		FTBL-B3121-02-GW-100120		FTBL-B3121-03-GW-092920		FTBL-B707-01-GW-092820		FTBL-DAAF-01-GW-092820		FTBL-FBNAFS-01-GW-100120	
			Sample Date		10/01/2020		09/29/2020		09/28/2020		09/28/2020		10/01/2020	
			Sample Type		N		N		N		N		N	
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater	
			Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result
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-Methylperfluorooctane 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 (PFTTrDA)	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	

Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		FBNA Fire Station		FBNA Fire Station		FTBL-66 and FTBL-68		FTBL-66 and FTBL-68	
			Location		FTBL-FBNAFS-02		FTBL-PSA2009-MW42		FTBL-AOPC20-MW02		FTBL-FATTS-LTM-MW08	
			Sample ID		FTBL-FBNAFS-02-GW-100120		FTBL-PSA2009-MW42-093020		FTBL-AOPC20-MW02-092920		FTBL-FATTS-LTM-MW08-093020	
			Sample Date		10/01/2020		09/30/2020		09/29/2020		09/30/2020	
			Sample Type		N		N		N		N	
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater	
			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-Methylperfluorooctane 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 (PFTTrDA)	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	

Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		FTBL-66 and FTBL-68		FTBL-66 and FTBL-68		FTBL-66 and FTBL-68		FTBL-12	
			Location		FTBL-M18-MW31		FTBL-M26-LTM-06		FTBL-M07-MW02		FTBL-12-01	
			Sample ID		FTBL-M18-MW31-092920		FTBL-M26-LTM-06-093020		FTBL-M07-MW02-100120		FTBL-12-01-GW-092820	
			Sample Date		09/29/2020		09/30/2020		10/01/2020		09/28/2020	
			Sample Type		N		N		N		N	
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater	
			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-Methylperfluorooctane 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 (PFTTrDA)	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	

Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		FTBL-12		FTBL-12		FTBL-12		Hangar 3145		Hangar 3151			
			Location		FTBL-12-01		FTBL-12-02		FTBL-12-03		FTBL-H3145-01		FTBL-H3151-01			
			Sample ID		DUP-1-GW-092820 / FTBL-12-01-GW-092820		FTBL-12-02-GW-092920		FTBL-12-03-GW-092820		FTBL-H3145-01-GW-092920		FTBL-H3151-01-GW-100120			
			Sample Date		09/28/2020		09/29/2020		09/28/2020		09/29/2020		10/01/2020			
			Sample Type		FD		N		N		N		N			
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater		Groundwater			
			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	--	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-Methylperfluorooctane 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 (PFTTrDA)	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			

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Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI		Hangar 3232		Hangar 3232		Lewis Village Car Fire		North Post Fire Station	
			Location		FTBL-H3232-01		FTBL-MW-1R		FTBL-LVCF-01		FTBL-NPFS-01	
			Sample ID		FTBL-H3232-01-GW-093020		FTBL-MW-1R-093020		FTBL-LVCF-01-GW-092720		FTBL-NPFS-01-GW-092720	
			Sample Date		09/30/2020		09/30/2020		09/27/2020		09/27/2020	
			Sample Type		N		N		N		N	
			Matrix		Groundwater		Groundwater		Groundwater		Groundwater	
			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-Methylperfluorooctane 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 (PFTTrDA)	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	

Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI	Old and New South Post Fire Stations		Old and New South Post Fire Stations	
			Location	FTBL-OSPFS-01		FTBL-OSPFS-01	
			Sample ID	FTBL-OSPFS-01-GW-092920		DUP-3-092920 / FTBL-OSPFS-01-GW-092920	
			Sample Date	09/29/2020		09/29/2020	
			Sample Type	N		FD	
			Matrix	Groundwater		Groundwater	
			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-Methylperfluorooctane 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 (PFTTrDA)	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

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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.

Analyte	CAS	OSD Residential Risk Screening Level	OSD Industrial/Commercial Risk Screening Level	AOPI	1980s Plane Crash		1980s Plane Crash		Building 1436 (LRC)		Building 1436 (LRC)		Building 3121 (LRC)	
				Location	FTBL-1980PC-01		FTBL-1980PC-02		FTBL-B1436-01		FTBL-B1436-02		FTBL-B3121-01	
				Sample ID	FTBL-1980PC-01-SO-093020		FTBL-1980PC-02-SO-093020		FTBL-B1436-01-SO-092720		FTBL-B1436-02-SO-092720		FTBL-B3121-01-SO-100120	
				Sample Date	09/30/2020		09/30/2020		09/27/2020		09/27/2020		10/01/2020	
				Sample Type	N		N		N		N		N	
				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-Methylperfluorooctane 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
TOC														
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		--		61.2	
Silt	--	--	--	%	--		--		12.6		--		11.2	
General Chemistry														
Percent Moisture	--	--	--	%	18.3		14.9		11.9		6.6		13.3	
pH	--	--	--	SU	4.4	J	--		5.2	J	--		5.5	J

Analyte	CAS	OSD Residential Risk Screening Level	OSD Industrial/Commercial Risk Screening Level	AOPI	Building 3121 (LRC)		Building 3121 (LRC)		DAAF Fire Station		DAAF Fire Station		DAAF Fire Station		FBNA Fire Station	
				Location	FTBL-B3121-01		FTBL-B3121-03		FTBL-DAAF-01		FTBL-DAAF-01		FTBL-DAAF-02		FTBL-FBNAFS-01	
				Sample ID	FTBL-B3121-02-SO-100120		FTBL-B3121-03-SO-092920		FTBL-DAAF-01-SO-092820		DUP-1-092820 / FTBL-DAAF-01-SO-092820		FTBL-DAAF-02-SO-092820		FTBL-FBNAFS-01-SO-100120	
				Sample Date	10/01/2020		09/29/2020		09/28/2020		09/28/2020		09/28/2020		10/01/2020	
				Sample Type	N		N		N		FD		N		N	
				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	0.0020	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	0.0021	U	0.0024	U	0.0026	U	0.0023	U	0.0023	U
N-Methylperfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	--	--	mg/kg	0.0020	U	0.0021	U	0.0024	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	0.0011	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
TOC																
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

Analyte	CAS	OSD Residential Risk Screening Level	OSD Industrial/Commercial Risk Screening Level	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-H3151-01	
				Sample ID	FTBL-FBNAFS-02-SO-100120		FTBL-FBNAFS-03-SO-100120		FTBL-12-01-SO-092820		FTBL-12-02-SO-092920		FTBL-H3145-01-SO-092920		FTBL-H3151-01-SO-100120	
				Sample Date	10/01/2020		10/01/2020		09/28/2020		09/29/2020		09/29/2020		10/01/2020	
				Sample Type	N		N		N		N		N		N	
				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-Methylperfluorooctane 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
TOC																
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	
pH	--	--	--	SU	--		--		5.3	J	--		8.2	J	5.4	J

Analyte	CAS	OSD Residential Risk Screening Level	OSD Industrial/Commercial Risk Screening Level	AOPI	Lewis Village Car Fire		North Post Fire Station		North Post Fire Station		Old and New South Post Fire Stations		Old and New South Post Fire Stations	
				Location	FTBL-LVCF-01		FTBL-NPFS-01		FTBL-NPFS-02		FTBL-OSPFS-01		FTBL-OSPFS-02	
				Sample ID	FTBL-LVCF-01-SO-092720		FTBL-NPFS-01-SO-092720		FTBL-NPFS-02-SO-092720		FTBL-OSPFS-01-SO-092920		FTBL-OSPFS-02-SO-092920	
				Sample Date	09/27/2020		09/27/2020		09/27/2020		09/29/2020		09/29/2020	
				Sample Type	N		N		N		N		N	
				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-Methylperfluorooctane 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
TOC														
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	
pH	--	--	--	SU	4.5	J	7.1	J	--		6.9	J	--	

Analyte	CAS	OSD Residential Risk Screening Level	OSD Industrial/Commercial Risk Screening Level	AOPI	Building 1495							
				Location	FTBL-B1495-01		FTBL-B1495-02		FTBL-B1495-03		FTBL-B1495-04	
				Sample ID	FTBL-B1495-01-SO-031021		FTBL-B1495-02-SO-031021		FTBL-B1495-03-SO-031021		FTBL-B1495-04-SO-031021	
				Sample Date	03/10/2021		03/10/2021		03/10/2021		03/10/2021	
				Sample Type	N		N		N		N	
				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-Methylperfluorooctane 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
TOC												
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	--	--	--	%	--		--		--		--	
pH	--	--	--	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.

Appendix N - Site Inspection Laboratory Analytical Results - Surface Water
 USAEC PFAS Preliminary Assessment/Site Inspection
 Fort Belvoir, Virginia



Analyte	CAS	OSD Tapwater Risk Screening Level	AOPI	FTBL-66 and FTBL-68		FTBL-66 and FTBL-68	
			Location	FTBL-66-68-01		FTBL-66-68-01	
			Sample ID	FTBL-66-68-01-SW-092920		DUP-2-093020 / FTBL-66-68-01-SW-092920	
			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-Methylperfluorooctane 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 (PFTTrDA)	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).

Analyte	CAS	Sample/Parent ID	FTBL-EB-01-100120		FTBL-EB-02-100120		FTBL-EB-03-100120		FTBL-EB-04-100120		FTBL-EB-05-100120		FTBL-FB-01-100120		FTBL-FB-02-100120		FTBL-FB-02-100120LR		FTBL-SB-01-100120	
		Sample Date	10/01/2020		10/01/2020		10/01/2020		10/01/2020		10/01/2020		10/01/2020		10/01/2020		10/01/2020		10/01/2020	
		Sample Type	Equipment Blank		Field Blank		Field Blank		Field Blank		Source Blank									
		Equipment Type	Tubing		Water Level Meter		Hang Auger		Drill Rod/Shoe		Screen		-		-		-		-	
		Units	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-Methylperfluorooctane 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 (PFTTrDA)	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	
		Sample Type	N	
		Units	Result	Qual
PFASs				
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-Methylperfluorooctane 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	
Perfluorooctanoic acid (PFOA)	335-67-1	ng/L	350	
Perfluoropentanoic acid (PFPeA)	2706-90-3	ng/L	280	
Perfluorotetradecanoic acid (PFTeA)	376-06-7	ng/L	18	U
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	ng/L	18	U
Perfluoroundecanoic acid (PFUdA)	2058-94-8	ng/L	18	U
Metal				
Arsenic	7440-38-2	mg/L	0.15	U
Barium	7440-39-3	mg/L	0.16	J
Cadmium	7440-43-9	mg/L	0.050	U
Chromium	7440-47-3	mg/L	0.068	J
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
VOC				
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
Pyridine	110-86-1	mg/L	0.040	U

**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	
		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-Methylperfluorooctane 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	
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				
Arsenic	7440-38-2	mg/l	0.15	U
Barium	7440-39-3	mg/l	0.42	
Cadmium	7440-43-9	mg/l	0.050	U
Chromium	7440-47-3	mg/l	0.10	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				
Percent Solids	--	%	88.1	
VOC				
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

**Appendix N - Site Inspection Laboratory Analytical Results - IDW 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

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



FB020-075

Dule 378

Form Approved OMB No. 2050-0039

Please print or type.

UNIFORM HAZARDOUS WASTE MANIFEST		1. Generator ID Number VA7213720002	2. Page 1 of 1	3. Emergency Response Phone 1-800-255-3924	4. Manifest Tracking Number 014185191 FLE		
5. Generator's Name and Mailing Address USARMY GARRISON BELVOIR 9430 JACKSON LOOP, SUITE 107 FORTBELVOIR VA 22060		Att: PHYLEATA RHODES		Generator's Site Address (if different than mailing address) US ARMY GARRISON BELVOIR 9820 FLAGLER ROAD FORT BELVOIR, VA 22060 (HQ) FORTBELVOIR VA 22060			
6. Transporter 1 Company Name BROADVIEW WASTE SOLUTIONS, INC.		Generator's Phone: 703-808-2110		U.S. EPA ID Number MDR000527705			
7. Transporter 2 Company Name				U.S. EPA ID Number			
8. Designated Facility Name and Site Address CYCLE CHEM, INC. 350 INDUSTRIAL DRIVE LEWISBERRY PA 17339		Facility's Phone: 717-838-4700		U.S. EPA ID Number PAD007098822			
GENERATOR	9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers		11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
		NON REGULATED MATERIAL (PFAS WATER)	No.	Type			
			2	DM DF	48	B	NONE
		NON REGULATED SOLIDS	2	DM DF	200	P	NONE
14. Special Handling Instructions and Additional Information 1-2 XLS DP 2-2 XLS DP DM SS DM Disposal method: Incineration Pro file: 728895							
15. 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 labeled/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.							
Generator's/Officer's Printed/Typed Name X Phyleata Rhodes				Signature [Signature]		Month Day Year 13 20	
INT'L	16. International Shipments <input type="checkbox"/> Import to U.S. <input type="checkbox"/> Export from U.S.		Port of entry/exit: Date leaving U.S.:				
TRANSPORTER	17. Transporter Acknowledgment of Receipt of Materials		Transporter 1 Printed/Typed Name [Signature]		Signature [Signature]		Month Day Year 13 20
	Transporter 2 Printed/Typed Name		Signature		Month Day Year		
DESIGNATED FACILITY	18. Discrepancy						
	18a. Discrepancy Indication Space <input type="checkbox"/> Quantity <input type="checkbox"/> Type <input type="checkbox"/> Residue <input type="checkbox"/> Partial Rejection <input type="checkbox"/> Full Rejection						
	18b. Alternate Facility (or Generator)				Manifest Reference Number		
	Facility's Phone:				U.S. EPA ID Number		
18c. Signature of Alternate Facility (or Generator)						Month Day Year	
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)							
1.		2.		3.		4.	
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a				Printed/Typed Name Annie E. Hied		Signature [Signature]	
						Month Day Year 11 15 20	