

# Evaluation of Per- and Polyfluoroalkyl Substances in Groundwater, Ault Field, Naval Air Station Whidbey Island, Oak Harbor, Washington

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DATE: March 2019

## Introduction

This evaluation describes the Phase 1 site inspection (SI) for per and polyfluoroalkyl substances (PFAS) at Ault Field, Naval Air Station (NAS) Whidbey Island, in Oak Harbor, Washington. The second phase of the SI for PFAS will occur after the Preliminary Assessment for Ault Field is complete. The objectives of Phase 1 SI were: (a) refine the understanding of groundwater flow at Ault Field; (b) confirm the presence of PFAS in groundwater and characterize their nature, if present; and (c) support evaluation of the long-term solution for two off-Base residential drinking water wells near Ault Field. CH2M HILL, Inc. (CH2M) prepared this document under the Department of the Navy (Navy), Naval Facilities Engineering Command, Comprehensive Long-term Environmental Action—Navy 9000 Contract N62470-16-D-9000, Contract Task Order 4041.

## Site Background

Ault Field is located on Whidbey Island near Oak Harbor, WA (**Figure 1**), and is one of three NAS Whidbey Island installations. Ault Field was commissioned on September 21, 1942. Currently, Ault Field supports Navy tactical electronic attack squadrons flying the EA-18G Growler, the P-3 Orion Maritime Patrol squadrons, and two Fleet Reconnaissance squadrons flying the EP-3E Aries (CNIC, 2017).

PFAS are compounds found in a variety of commercial and industrial sources and have been widely used since the 1970s, including in the generation of aqueous film-forming foam (AFFF), which was utilized by the Navy for fire training exercises, fire suppression systems, and suppressing aircraft fires or other fires. Areas located within Ault Field may have used, stored, or disposed of AFFF during historical operations. Based on a desktop review of available data and previous investigations, there are eight potential source areas at Ault Field where AFFF has been utilized: Area 16 (Ault Field Runway Ditches), Area 31 (former Runway Fire Training School), all hangars (collection and storage of AFFF), Area 29 (Clover Valley Fire School), Area 30 (Fire School Can Disposal Area), Area 27 (temporary fire school), Area 28 (Chapel Fire School), and the Current Firefighting School. The Phase 1 SI focused on areas around the Current Firefighting School, Area 29, and Area 30, and Navy's property between potential on-Base PFAS source areas and the two off-Base drinking water wells near Ault Field that have exceedances of the Lifetime Health Advisory of 70 parts per trillion (ppt) (**Figure 2**).

## Field Activities Summary

The following field activities were performed as part of this inspection:

- Monitoring well installation
- Soil sample collection
- Groundwater sample collection
- Groundwater level survey
- Archaeological survey

The following sections detail the field activities that were completed between January 3, 2018 and March 2, 2018.

## Monitoring Well Installation

Eleven groundwater wells (nine on-Base monitoring wells and two potential off-Base replacement residential drinking water wells) were installed between January 6, 2018 and February 23, 2018, ranging in depth from approximately 55 feet below ground surface (bgs) to 170 feet bgs. Newly installed groundwater wells were named in the field using the following nomenclature: "WI-AF-MW-6XX" and will be referred to as "MW-6XX" throughout this memorandum, associated tables, and figures.

The nine monitoring wells were installed using sonic drilling techniques in accordance with the Standard Operating Procedure (SOP) *Installation of Monitoring Wells by Sonic Drilling*, included in the Sampling and Analysis Plan (SAP) (CH2M, 2018). The two off-Base wells were installed using sonic drilling techniques in accordance with State of Washington drinking water regulations as described in Section 10, Table 2, in Washington Administrative Code (WAC) 173-160-201. Locations of groundwater monitoring wells are shown on **Figures 3, 4, and 5**. Soil boring logs and well construction details for these wells can be found in **Attachment 1**.

Because of the potential for groundwater contamination in the shallow aquifer zones, it was deemed necessary to install isolation casings to limit potential cross-contamination during well construction. For each well location, an 8-inch-diameter isolation casing was installed to extend through the first encountered groundwater zone and was advanced through the water-bearing zone into underlying lower permeability materials. The depth of the isolation seal was determined based on geology and consultation with the senior technical consultant, selecting to seal off the uppermost water-bearing unit. A seal comprised of hydrated bentonite pellets was installed within the isolation casing, after which the remainder of the borehole was drilled from the depth of the isolation casing using 6-inch-diameter casing to the target screen depth. Continuous soil cores were collected for lithologic classification, screened for volatile organic compounds (VOCs) using a photoionization detector (PID), and up to four soil samples were collected at each boring location.

Eight of the nine monitoring wells were constructed of 2-inch inside-diameter Schedule 80 polyvinyl chloride (PVC) riser with centralizers at varying intervals, connected to a 2-inch inside-diameter, 10-foot-long, factory-slotted, PVC screen with a 5-foot solid casing sump. One monitoring well (MW-614) was constructed of 2-inch inside-diameter PVC riser with centralizers at varying intervals. MW-614 was constructed without a sump. Well construction information is included in **Table 1** and **Attachment 1**.

The two potential replacement residential drinking water wells were constructed of 6-inch inside-diameter steel casing from ground surface to 20 feet bgs, connected to a 6-inch inside-diameter PVC riser with centralizers at varying depths. The risers for each well were connected to 20-foot, 6-inch inside-diameter factory-slotted, stainless steel screens with 5-foot Schedule 80 PVC sumps.

For all wells, a silica sand filter pack was placed around the annular space of the well screen from the bottom of the boring and extended to a minimum height of 2 feet above the top of the well screen. A bentonite seal, at least 2 feet thick, was placed above the top of the sand pack. After the bentonite had been hydrated, bentonite grout was placed in the remaining annular space.

The lithology throughout the site was not well known prior to this field inspection. Therefore, the precise screened intervals were determined based on subsurface lithology encountered during drilling. Two of the well clusters were located in areas with little to no information on subsurface lithology. To address this uncertainty, one boring in each well cluster (MW-607 and MW-610) was extended beyond the target depth for the screened interval. Lithology collected from these deeper borings was used to improve understanding of subsurface lithology at each location. The extended portions of the boreholes were backfilled with bentonite chips prior to constructing the wells. Individual well details are presented in **Attachment 1**.

All wells were finished with flush-mount completions that included a metal well vault and concrete pad. A locking watertight cap was placed on the riser and the wells were labeled on the exterior of the well vault with a metal stamp indicating the well identification.

Groundwater monitoring wells were developed concurrently with installation starting January 29, 2018 and ending on February 26, 2018. Wells were developed using surge and purge methods using a stainless-steel bailer and submersible pump. Select water quality parameter (WQP) measurements (pH, temperature, conductivity, and turbidity) and observations were recorded periodically to monitor development. Wells were considered developed once water quality parameters stabilized or until 4 hours of development was completed, whichever occurred first. All wells were developed based on the above criteria with the exception of wells that experienced insufficient recharge during development. MW-610 was not fully developed to the criteria specified due to high turbidity and insufficient recharge. Well development logs are included as **Attachment 2**.

Monitoring wells were surveyed by a professional land surveyor licensed in Washington. The survey report is included as **Attachment 3**.

## Soil Sample Collection

Soil samples were collected between January 5, 2018 and February 20, 2018 during borehole advancement for monitoring well installation of MW-605 through MW-615 (**Figures 3 and 4**). Soil samples were collected from MW-605 through MW-615 at varying intervals based on field observations (visual, olfactory, PID readings) and senior technical input using a clean, stainless steel spoon and appropriate laboratory containers. Soil sampling IDs (WI-AF-SB605 through WI-AF-SB615) can be correlated to these monitoring well locations. Soil sample collection details are provided in **Attachment 4**.

Quality control (QC) samples were collected at a rate of one field duplicate sample for every 10 samples and one matrix spike/matrix spike duplicate sample for every 20 samples collected. One equipment rinsate blank sample was collected each day of sampling from decontaminated equipment.

Soil samples were shipped on ice under chain-of-custody protocols to Vista Laboratories in El Dorado Hills, California, a National Environmental Laboratory Accreditation Program-accredited laboratory. Soil samples were analyzed for United States Environmental Protection Agency (USEPA) Modified Method 537 which includes: perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorobutanesulfonic acid (PFBS), and 11 other PFAS compounds.

## Groundwater Sample Collection

Groundwater samples were collected from 17 pre-selected existing groundwater monitoring wells and all newly installed wells between February 13, 2018 and March 1, 2018. Groundwater samples were collected from monitoring wells under low-flow and low-stress conditions, with the sample pump intake placed at the middle of the well screen interval. In accordance with the SAP, the pumps used were PFAS-free pneumatic pumps operated by compressed air, essentially a bladderless bladder pump, in which the air does not come into contact with the air and water interface. For shallow wells (less than 30 feet bgs), peristaltic pumps with disposable PFAS-free tubing were used to collect groundwater samples from the middle of the well screen interval.

Depth to water readings and WQPs (specific conductance, pH, turbidity, temperature, dissolved oxygen, and oxidation-reduction potential [ORP]) were measured and recorded approximately every 5 minutes before sampling using a water quality meter which was calibrated daily (at a minimum). If excessive drawdown was created at the minimum acceptable flow rate for low-flow and low-stress sampling conditions, the pump intake was raised to within a few feet of the top of the water column and a minimum of three well volumes was purged. If the well went dry before purging three well volumes, a sample was collected after recharge had taken place within 24 hours of purging.

WQPs were considered stabilized if the following criteria were met for three consecutive readings:

- Temperature remained constant
- pH was within 0.1 pH units
- Conductivity was within 10 percent
- Turbidity measurements were less than 10 nephelometric turbidity units or agreed within 10 percent

- ORP
- Dissolved oxygen within 0.2 mg/L

Groundwater sample locations are shown on **Figures 5** and **6**. Stabilized WQPs recorded before sample collection are presented in **Table 2**. Depth-to-water, WQPs, and total well depth measurements were recorded on groundwater sampling data sheets included as **Attachment 4**.

During sample collection, sample containers were filled in such a manner so as to minimize aeration of the samples. QC samples were collected at a rate of one field duplicate sample for every 10 samples and one matrix spike/matrix spike duplicate sample for every 20 samples collected. One equipment rinsate blank sample was collected each day of sampling from decontaminated equipment.

Groundwater samples were shipped on ice under chain-of-custody protocols to Vista Laboratories in El Dorado Hills, California, a National Environmental Laboratory Accreditation Program-accredited laboratory. Groundwater samples were analyzed for USEPA Method 537 Modified which includes PFOA, PFOS, PFBS, and 11 other PFAS compounds.

## Investigation-derived Waste Management and Disposal

Wastes generated during the field activities were characterized as investigation-derived waste (IDW) and managed in accordance with the SAP and applicable SOPs. Solid IDW generated from soil cuttings and residual drilling mud was containerized in three 20-cubic-yard roll-off boxes with lids, inner plastic liners, and outer secondary containment. Liquid IDW, which included well development, purge, and decontamination water, was stored in two 21,000-gallon steel fractionation tanks within secondary containment. Additional liquid IDW, containing purge and decontamination water from WI-AF-4-MW-3, was stored in one 55-gallon stainless steel drum placed on a wooden pallet with secondary containment. Soil IDW was sampled for waste characterization and analyzed for PFAS, Toxicity Characteristic Leaching Procedure, VOCs, semivolatile organic compounds (SVOCs), and total Resource Conservation and Recovery Act of 1976 (RCRA) metals plus copper, nickel, and zinc, reactivity, corrosivity, and ignitability. Liquid IDW, excluding WI-AF-4-MW-3, was sampled for waste characterization and analyzed for PFAS, VOCs, SVOCs, total RCRA metals plus copper, nickel, and zinc, reactivity, corrosivity, and ignitability. Liquid IDW from WI-AF-4-MW-3, which was installed within the former Walker Barn foundation where transformers had been stored and known polychlorinated biphenyl (PCB) Aroclor 1260 and pentachlorophenol have been detected in surface soil, was sampled for waste characterization and analyzed for all the aforementioned contaminants plus PCBs. The solid and liquid IDW has been characterized as nonhazardous and is not considered a dangerous waste (State of Washington Dangerous Waste Regulations WAC 173-303). Two tanks contain aqueous IDW which exceeds 70 ppt PFOS and PFOA. The Navy has an internal policy that any IDW water that exceeds 70 ppt PFOS and/or PFOA must be treated prior to disposal off-Base. The Navy is evaluating treatment methods for this aqueous IDW prior to disposal.

## Groundwater Elevation Study

A groundwater elevation study was conducted on March 1 and 2, 2018, which consisted of collecting groundwater measurements using water level meters at both the newly installed and existing groundwater monitoring wells sampled during the 2018 Phase 1 SI. Groundwater-level measurements were collected from all of the monitoring wells within a 24-hour period, using a water level indicator to the nearest 0.01 foot from the top of the survey point on the PVC riser casing. Groundwater elevations are presented in **Table 3** and in **Attachment 5**. Groundwater contour maps were constructed using these data and are provided as **Figures 7** through **10**. These data are discussed in the Updated Conceptual Site Model section later in this technical memorandum.

## Archaeological Survey Report

CH2M conducted archaeological monitoring of proposed boring locations at Residence 1 (MW-611) and Residence 2 (MW-615) during installation. The Area of Potential Effect for each boring was 50 feet by 50 feet at each residence. No evidence of buried archaeological deposits, artifacts, features, or paleosols were observed during



the Phase 1 monitoring well installation. A finding of No Adverse Effect to Historical Resources was recommended. Further information on the protocols and results of the archaeological monitoring can be found in the Archaeological Monitoring Technical Memorandum included as **Attachment 6**.

## Deviations from the Sampling and Analysis Plan

The following list summarizes deviations from the SAP during the SI activities and justification for those deviations:

- Monitoring wells were installed at elevations relative to the mean sea level and considered the depths of impacted private drinking water wells, while screen intervals identified in the SAP were based on existing documentation and research of existing soil borings and wells. The depths specified in the SAP were not always consistent with actual water-bearing zones observed in the field. During borehole advancement, observations were made based on soil type and saturation to determine the appropriate installation depth. Where practical based on lithology, monitoring well screened intervals were selected to coincide with the well screen elevations of the affected water supply wells nearby, while also targeting the more transmissive units encountered.
- The SAP-proposed drilling depth for well MW-607 was 75 to 125 feet bgs. During drilling of the first two wells in this area (MW-605 and MW-606), the water-bearing unit was found to be between approximately 90 and 115 feet bgs. As discussed above, MW-607 was advanced significantly deeper than the target screened interval (to a depth of 199 feet bgs) to investigate the deeper stratigraphy in the area. The borehole was subsequently backfilled with bentonite chips to 116 feet bgs, and the screen installed from 100 to 110 feet bgs. No deeper water-bearing units were encountered in the extended portion of the boring.
- The SAP-proposed drilling depth for well MW-610 was 35 to 70 feet bgs. During drilling of the first two wells in this area (MW-608 and MW-609), the water-bearing unit was found to be between approximately 40 and 55 feet bgs. As with MW-607, MW-610 was advanced significantly deeper than the target screened interval (to a depth of 248 feet bgs) to investigate the deeper stratigraphy in the area. The borehole was subsequently backfilled with bentonite chips to 56 feet bgs, and the screen installed from 40 to 50 feet bgs. No deeper water-bearing units were encountered in the extended portion of the boring.
- Monitoring well MW-610 could not be fully developed nor sampled due to very low water levels, high turbidity, and slow recharge.
- The proposed boring location for MW-612 was moved approximately 80 feet due west of the SAP-proposed location to avoid drill rig navigation across a drainage ditch running from southwest to northeast across the site.
- One hour of well development was proposed in the SAP; however, because of the turbidity of the groundwater observed during development, well development duration was increased to 4 hours to allow for adequate development.
- During groundwater sampling of monitoring well N29-22D, excessive drawdown was observed during purging. This well was sampled within 24 hours of purging after recharge had occurred. This additional contingency procedure was not described in the SAP.
- Soil samples were collected on January 5 and January 7, 2018 and held on ice until the SAP was finalized on February 5, 2018 following Stakeholder review and approval. These samples were immediately shipped and arrived at Vista Analytical Laboratory on February 7, 2018. Soil sample SB-612 was received at the lab 3 days out of the hold time, sample SB-613 was received at the lab the same day as the hold time expired, and sample SB-614 was received at the lab 5 days out of hold time.

Data quality and usability were not affected by these deviations.

# Sampling Results Summary

## Soil Sample Results

The following is a summary of the soil sampling results from samples collected in January and February 2018:

- **PFBS** – All soil samples were non-detect for PFBS.
- **PFOS** – All soil samples were non-detect for PFOS.
- **PFOA** – PFOA was detected in one sample (SB606-0001) from 0 to 1 foot bgs, at 0.163 ng/g. Results were non-detect for all other soil intervals at all other boring locations.

The highest PFOA concentration was 0.163 ng/g. Project Action Limits currently do not exist for soil. Soil samples were collected in order to determine the approximate distribution of PFAS in the soil profile at each well location.

## Groundwater Sampling Results

Groundwater sample results are presented in **Table 4** and shown on **Figures 5** and **6**. Comprehensive laboratory results are presented in **Attachment 7**. The following is a summary of the groundwater sampling results from samples collected in February and March 2018:

- **PFBS** – PFBS was detected in 12 samples, ranging from an estimated 4.57 ppt in the sample collected from MW-608 to 2,090 ppt in the sample collected from MW-201. None of the detections of PFBS exceeded the Regional Screening Level (USEPA, 2017) of 400,000 ppt (based on a hazard quotient of 1.0).
- **PFOS** – PFOS was detected in 12 samples ranging from an estimated 2.8 ppt in the sample collected from MW-N29-22D to 29,200 ppt in the sample collected from MW-114-114-B2668. Ten samples—collected from MW-N2-7S, MW-201, N2-6C, MW-200, MW-N3-12, MW-114, MW-202, N2-5, MW-204, and MW-3—exceeded the USEPA Lifetime Health Advisory of 70 ppt for PFOS.
- **PFOA** – PFOA was detected in 15 samples, ranging from an estimated 0.702 ppt in the sample collected from MW-N29-22D to 3,010 ppt in the sample collected from MW-201. Ten samples—collected from wells MW-N2-7S, MW-201, N2-6C, MW-200, MW-N3-12, MW-114, MW-202, N2-5, MW-204, and MW-3—exceeded the Lifetime Health Advisory of 70 ppt for PFOA.

The highest combined PFOA and PFOS concentration was 29,749 ppt in the sample from MW-114. The highest detection was of PFOS (29,200 ppt), also in the sample collected from MW-114. None of the new monitoring wells installed as part of this SI effort yielded groundwater samples that exceeded the USEPA Lifetime Health Advisory of 70 ppt for combined PFOS/PFOA.

## Data Validation

Data validation was performed on groundwater samples collected for this inspection. The data validation report is included in **Attachment 7**. The data validation included a review for systematic errors or patterns that are found in the distribution of data qualifiers.

Select PFAS were analyzed by USEPA Method 537 Modified as specified in the SAP (CH2M, 2018). The data packages were then reviewed by an independent data validator on the basis of the criteria outlined by *National Functional Guidelines for Superfund Organic Data Review* (USEPA, 2016). Excluding field QC samples, 84 distinct data points were generated, and six results were qualified with J-qualifiers (because of the low sample concentrations) or U-qualified (because of blank contamination).

All results are usable as qualified. The overall conclusion is that the dataset generated is acceptable and appropriate for its intended use.

# Conceptual Site Model

## Regional Conceptual Site Model

The following discussion provides a general description of the conceptual site model across Ault Field based on historical documents available for the site. A more detailed discussion of the updated conceptual site model specific to the areas investigated during this field efforts is provided in the following section.

Whidbey Island, including the entire SI area, lies within the Puget Lowland, a topographic and structural depression between the Olympic Mountains and the Cascade Range. The surface soil in the vicinity of Ault Field primarily consists of artificial fill, post-glacial deposits, glaciomarine drift, and glacial deposits. Artificial fill, consisting of coarse- or fine-grained material, underlies the runway areas. Post-glacial deposits, consisting of peaty sand and silt, are generally found in the low-lying marshy areas (Navy, 1994).

The 1994 Remedial Investigation (RI) Report (Navy, 1994) identified a confined aquifer beneath Area 16, Ault Field Runway Ditches (**Figure 2**), at a depth of approximately 20 to greater than 150 feet bgs consisting of fine to medium sand with some silt. Clay and silt of the Everson glaciomarine drift forms the overlying confining layer. A single, unconfined aquifer was identified beneath Area 31, the Former Runway Fire Training Area (**Figure 2**), interpreted to be the same as that encountered in Area 16, but without the glaciomarine drift that confines the aquifer in Area 16 (presumed to pinch out).

Ault Field is located in a valley, with elevated areas to the south, northeast, and east of the field. Because Area 31 lies at the base of the south side of Monkey Hill, groundwater flow mimics topography in that area, flowing to the south, away from the hill and toward the Strait of Juan de Fuca. This was confirmed by the RI Report (Navy, 1994).

Across the remainder of the Base, east of the runway, groundwater generally flows to the northeast, and east toward Clover Valley Stream, Clover Valley Lagoon, and Dugualla Bay. West of the runway, there is likely a component of flow to the west toward the Strait of Juan de Fuca.

## Updated Conceptual Site Model for Areas Investigated in this Field Effort

Drilling conducted during this effort provided additional information on lithology and groundwater conditions in the three areas of Ault Field where the well clusters were installed (**Figures 3 and 4**). These data were used to refine the conceptual site model in the areas where investigative work was conducted. In the updated conceptual site model discussion below, the areas where new information has been collected will be referred to as the Eastern Ault Field Area (containing wells MW-605, MW-606, MW-607 and MW-608, MW-609, MW-610 and the Residence 1 potential replacement well MW-611) and the Southern Ault Field area (containing wells MW-612, MW-613, MW-614 and the Residence 2 potential replacement well MW-615). The locations of these areas and associated wells are shown on **Figures 3 and 4**, respectively.

In the Eastern Ault Field area, it was anticipated prior to drilling that the aquifer system would look much like that encountered in Area 6 to the south: a series of three aquifers comprised of (from shallow to deep) the Vashon advance outwash unit, the Whidbey subunit 2, and the Whidbey subunit 4 (or sea level aquifer). These aquifers are separated by two lower permeability aquitards known as Whidbey subunit 1 (or upper confining unit) and Whidbey subunit 3 (or lower confining unit) (Sapik, et al., 1988). However, the stratigraphy observed during drilling in the Eastern Ault Field area is significantly different than that seen in Area 6. The upper 30 to 40 feet of sediment is composed primarily of silt with thin layers of interbedded sand and silty sand. An upper aquifer was encountered beneath this upper unit composed of silty sand, extending to a depth of 175 feet bgs. A thick clay unit was then encountered at 175 feet, extending to the total depth of well MW-610 at a depth of 248 feet bgs. It is not clear whether the relatively shallow aquifer encountered in this area directly correlates with any of the three aquifer units observed in Area 6. The final well drilled in this area is the potential replacement well for Residence 1 (MW-611), located approximately 3,000 feet east of well MW-609. At this location, a shallow sandy aquifer is present from ground surface to a depth of 50 feet, where a clay confining unit is encountered that extends from 50 to 100 feet bgs. A second silty sand aquifer is then encountered at 100 feet bgs extending

through the total depth of MW-611 of 180 feet bgs. Two cross-sections, A-A' and B-B', have been developed to present observed lithology in this area are shown on **Figures 11** and **12**, the units on all cross-section figures are feet above mean sea level.

The wells constructed in the Southern Ault Field area are located due south of the Current Firefighting School. A series of wells drilled in the vicinity of the Current Firefighting School indicate the presence of three aquifers in the area: a shallow, an intermediate, and a sea level aquifer. The stratigraphy encountered in the Southern Ault Field area is somewhat similar; however, fewer aquifer units were identified during this inspection. Insufficient data exist to correlate the aquifer identified in the Southern Ault Field area with those observed previously at the Current Firefighting School. The sediments in Southern Ault Field consist of a thin layer of sand with silt from approximately 0 to 5 feet bgs, under which a thick layer of sandy lean clay is encountered to a depth of 50 to 75 feet bgs. A clayey sand with gravel aquifer was encountered beneath the clay layer, extending to a depth of about 100 feet bgs. This aquifer is underlain by a second clay unit of unknown thickness. Well MW-615, located at Residence 2, was drilled south of the MW-612, MW-613, MW-614 cluster. At well MW-615, observed stratigraphy was similar to that seen in the on-Base wells MW-612 through MW-614, but the well was drilled to a total depth of 210 feet bgs to provide lithologic information at deeper depths. Based on observations at this well, it appears that a second relatively thin aquifer unit exists from 105 to 120 feet bgs, which is underlain by a clay unit that extends down to 180 feet bgs. The boring then encountered an underlying shale unit that is present to the total well depth of 210 feet bgs. A conceptual geologic cross-section has also been developed to present observed lithology in this area as shown on **Figure 13**. The units on all cross-section figures are feet above mean sea level.

Groundwater levels were also collected at all new and selected existing groundwater monitoring wells in the area as discussed in the Groundwater Elevation Study section. These data were used to assess the degree of hydraulic connection between aquifer units at the site and to estimate groundwater flow directions. Estimates of groundwater flow directions in the areas investigated as part of this field program are summarized on **Figures 3** and **4**, and potentiometric maps are shown on **Figures 7** through **10**. As shown on **Figure 3**, groundwater flow patterns in the Eastern Ault Field area are to the north in the vicinity of well clusters MW-605, MW-606, MW-607 and MW-608, MW-609, MW-610. Flow directions shift toward the east farther north in the Clover Valley Stream drainage as groundwater converges toward Clover Valley Stream from uplands to the north and south, and move eastward prior to discharge to Dugualla Bay. In the Southern Ault Field area, shown on **Figure 4**, groundwater flow directions appear to be toward the northeast in the vicinity of well cluster MW-612, MW-613, MW-614 based on groundwater levels collected during the synoptic groundwater level survey on March 2, 2018. However, groundwater level data collected during the on-Base sampling event conducted from February 13 to February 20, 2018, show groundwater flow directions appear to flow toward the southeast, so some variability in flow direction may occur in the area. Additional sitewide groundwater level information will be collected during future site characterization efforts and will support a more complete understanding of groundwater conditions across Ault Field.

All newly constructed wells and a subset of on-Base existing monitoring wells were sampled for PFAS compounds. In the Eastern Ault Field area, PFAS were not detected in the six newly installed wells sampled during the February 2018 sampling event conducted as part of this SI. Analytical results are presented in **Table 4**.

In the Southern Ault Field area, PFAS were detected in well MW-615 during the February 2018 groundwater sampling event conducted as part of this SI, results are presented in **Table 4**. All three wells installed as part of the MW-612, MW-613, and MW-614 cluster, located between the Current Firefighting School and Residence 2, were non-detect for PFOS and PFOA during the February 2018 groundwater sampling event. As monitored under the *Sampling and Analysis Plan Investigation of Per- and Polyfluoroalkyl Substances in Drinking Water* (CH2M, 2017) and related SAP Addendum, PFAS concentrations in excess of the USEPA Lifetime Health Advisory were detected in the current water supply well at Residence 2, at a concentration of 8,030 ppt, in March 2018 as shown on **Figure 4**.

## Conclusions

The primary conclusions of this SI effort are summarized as follows:

- Eleven on-Base groundwater wells were installed on, or directly adjacent to, Ault Field in the eastern and southern portions of the Base. Nine of the new wells are on-Base groundwater monitoring wells. The remaining two wells are potential replacement drinking water wells on parcels adjacent to Ault Field where PFOS and/or PFOA have been detected above the USEPA Lifetime Health Advisory in the existing drinking water wells on the properties.
- Lithologic data collected during drilling identified aquifer units in the eastern and southern inspection areas; however, these aquifer units could not be directly correlated with previously identified aquifer units in areas adjacent to the inspection areas. Additional subsurface information would be required to identify the hydrogeologic relationship between the aquifers screened by the new monitoring wells and the previously identified aquifer units nearby.
- Groundwater flow directions in the Southern Ault Field area appear to be oriented to the northeast; however, variability in water level data collected from the newly installed wells in this area may indicate variable groundwater flow directions over time.
- Groundwater flow directions in the Eastern Ault Field area appear to be oriented to the north in the areas where the new wells were installed. Further north in the Clover Valley Stream drainage, groundwater flow directions appear to transition to an easterly flow direction following the orientation of Clover Valley Stream and eventually discharging to either the creek or nearby Dugualla Bay.
- The three wells installed as part of the MW-612, MW-613, and MW-614 cluster, located between the Current Firefighting School and Residence 2, were non-detect for PFOS and PFOA. Additional groundwater data and lithologic information is needed in this area to determine if on-Base PFAS sources have impacted the existing drinking water well at Residence 2.
- In the Eastern Ault Field area, all six wells installed were non-detect for PFAS compounds. Additional groundwater data and lithologic information is needed between known and potential source areas at Ault Field, such as the Hangars and runways, to determine if on-Base PFAS sources have impacted the existing drinking water well at Residence 1.

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EVALUATION OF PER- AND POLYFLUOROALKYL SUBSTANCES IN GROUNDWATER, AULT FIELD  
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Tables

TABLE 1

## Monitoring Well Construction Summary

Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater

Ault Field, Naval Air Station Whidbey Island

Oak Harbor, Washington

Monitoring Well	Installation Date	Ground Elevation (ft msl)	Top of PVC Casing Elevation (ft msl)	Well Diameter (in)	Total Well Depth (ft bgs)	Measured Total Well Depth (ft btoc)	Length of Screen (ft)	Screen Slot Size (in)	Length of Sump (ft)	Depth of Top of Screen (ft bgs)	Depth of Bottom of Screen (ft bgs)	Elevation of Top of Screen (ft msl)	Elevation of Bottom of Screen (ft msl)	Pump Intake Depth (ft btoc)	Screened Aquifer	Northing (feet NAD83)	Easting (feet NAD83)
<b>New Wells</b>																	
MW-605	1/22/2018	30.56	30.27	2.00	120.89	120.60	10	0.010	5	105.00	115.00	-74.44	-84.44	207.00	Surface East	496011.66	1200073.92
MW-606	1/20/2018	16.34	16.11	2.00	103.97	103.74	10	0.010	5	90.00	100.00	-73.66	-83.66	153.00	Surface East	496551.20	1200405.99
MW-607	1/12/2018	19.15	18.90	2.00	105.06	104.80	10	0.010	5	100.00	110.00	-80.85	-90.85	157.50	Surface East	496664.60	1200992.79
MW-608	1/23/2018	49.47	49.18	2.00	54.79	54.50	10	0.010	5	40.00	50.00	9.47	-0.53	100.00	Surface East	494698.52	1200421.10
MW-609	1/24/2018	53.09	52.75	2.00	60.04	59.70	10	0.010	5	45.00	55.00	8.09	-1.91	227.00	Surface East	494571.87	1200607.07
MW-610	1/25/2018	56.99	56.72	2.00	NM	NM	10	0.010	5	40.00	50.00	16.99	6.99	150.00	Surface East	494401.08	1200544.45
MW-611	2/20/2018	101.13	100.66	6.00	170.21	169.74	20	0.010	--	145.00	165.00	-43.87	-63.87	153.00	Surface East	494569.61	1203629.96
MW-612	1/7/2018	87.42	87.14	2.00	84.73	84.45	10	0.010	5	69.00	79.00	18.42	8.42	74.00	Intermediate	490240.07	1189445.22
MW-613	1/10/2018	92.94	92.69	2.00	78.85	78.60	10	0.010	5	64.00	74.00	28.94	18.94	165.00	Intermediate	490272.46	1188887.70
MW-614	1/5/2018	89.36	89.11	2.00	70.05	69.80	10	0.010	--	59.00	69.00	30.36	20.36	122.00	Intermediate	489730.10	1189248.99
MW-615	2/13/2018	92.06	91.67	6.00	95.93	95.54	20	0.010	5	70.00	90.00	22.06	2.06	179.00	Intermediate	488678.09	1189640.43
<b>Existing Wells</b>																	
3-MW-2	2/10/1992	82.71	84.95	4.00	95.86	98.10	10	UNK	1	84.00	94.00	-1.29	-11.29	91.2	Intermediate	491368.70	1190681.00
4-MW-3	1/13/1992	82.83	85.21	4.00	80.40	82.78	10	UNK	1	69.00	79.00	13.83	3.83	76.4	Deep	492262.60	1190041.00
29-MW-4	7/13/1992	94.27	96.16	4.00	64.05	65.94	10	UNK	1	52.00	62.00	42.27	32.27	58.9	Intermediate	489353.60	1188495.00
MW3	3/16/1994	89.56	89.33	2.00	13.58	13.35	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	Surface West	491763.00	1189695.00
MW-114-114-B2668	11/11/1997	96.10	95.29	2.00	14.81	14.00	10	UNK	0	8.00	18.00	88.1	78.1	12.2	Surface West	491877.30	1189577.00
MW-200	UNK	93.86	95.92	2.00	105.60	107.66	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	Deep	491895.12	1189354.31
MW-201	UNK	97.53	99.65	2.00	76.13	78.25	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	Deep	491982.33	1189455.54
MW-202	UNK	90.03	89.46	2.00	15.85	15.28	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	Surface West	491689.50	1189597.51
MW-204	UNK	97.17	96.61	2.00	18.98	18.42	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK	Surface West	491958.56	1189575.78
N2-3	3/26/1987	121.97	122.40	2.00	122.37	122.80	10	UNK	1	112.00	122.00	9.97	-0.03	117.4	Deep	491030.20	1188592.00
N2-5	3/19/1987	91.81	92.91	2.00	17.70	18.80	10	UNK	3	7.00	17.00	84.81	74.81	13.1	Surface West	491758.20	1189620.00
N2-6	4/15/1987	87.55	89.19	2.00	72.45	74.09	10	UNK	0	64.00	74.00	23.55	13.55	70.6	Intermediate	491543.50	1189532.00
N2-7S	3/24/1987	96.66	98.00	2.00	19.03	20.36	10	UNK	2	8.00	18.00	88.66	78.66	14.3	Surface West	491081.00	1188933.00
N2-8	4/2/1987	87.47	87.88	2.00	112.97	113.38	10	UNK	7	102.00	112.00	-14.53	-24.53	107.4	Intermediate	490793.70	1189305.00
N2-9	4/7/1987	86.99	87.56	2.00	98.12	98.70	10	UNK	1	88.00	98.00	-1.01	-11.01	93.6	Intermediate	490504.70	1189359.00
N3-12	4/17/1987	98.25	99.11	2.00	58.09	58.95	10	UNK	2	48.00	58.00	50.25	40.25	53.9	Intermediate	491400.00	1190575.00
N29-22D	5/26/1987	95.93	99.52	2.00	101.62	105.21	10	UNK	1	18.00	28.00	77.93	97.93	26.6	Deep	489251.20	1188284.00

## Notes:

NAD 83 - Washington State Plane Coordinate System, North Zone NAD83-11

-- - No sump used in well construction

bgs - below ground surface

btoc - below top of casing

ft - feet

msl - mean sea level

NM - not measured



TABLE 2

## Water Quality Parameters

Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater

Ault Field, Naval Air Station Whidbey Island

Oak Harbor, Washington

Station ID	Sample ID	Sample Date	Sample Time	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
<b>New Wells</b>									
MW-605	WI-AF-MW-605-0218	2/17/2018	13:00	7.60	0.343	10.77	0.5	-101	0.89
MW-606	WI-AF-MW-606-0218	2/16/2018	14:50	7.55	0.515	11.8	0.77	-130	113.0
MW-607	WI-AF-MW-607-0218	2/17/2018	11:08	7.78	0.432	10.79	0.57	-83	140
MW-608	WI-AF-MW-608-0218	2/15/2018	15:55	7.74	0.647	12.88	3.69	-191	1.5
MW-609	WI-AF-MW-609-0218	2/17/2018	15:55	7.77	0.316	12.17	0.50	-135	0.08
MW-611	WI-AF-MW-611-0318	3/1/2018	15:20	7.30	0.470	13.1	0.79	-165	1.58
MW-612	WI-AF-MW-612-0218	2/15/2018	11:20	8.08	1.07	11.2	0	-154	43.7
MW-613	WI-AF-MW-613-0218	2/14/2018	16:55	8.26	0.83	11.51	0.00	-133	15.9
MW-614	WI-AF-MW-614-0218	2/14/2018	11:45	7.81	1.03	11.53	11.09	-120	22.9
MW-615	WI-AF-MW-615-0318	3/1/2018	11:40	7.76	0.941	12.89	0.31	-284	6.28
<b>Existing Wells</b>									
3MW-2	WI-AF-3-MW-2-0218	2/18/2018	14:05	8.39	0.841	6.03	2.07	9	10.8
4-MW-3	WI-AF-4-MW-3-0218	2/17/2018	13:35	7.83	1.03	13.18	1.03	-37	303
29-MW-4	WI-AF-29-MW-4-0218	2/13/2018	13:50	8.61	0.949	12.74	2.74	125	0
MW3	WI-AF-MW-3-0218	2/20/2018	11:40	5.67	0.122	6.49	1.44	127	2.9
MW-114-114-B2668	WI-AF-MW-114-0218	2/20/2018	15:50	6.96	0.213	15.09	2.37	186	17
MW-200	WI-AF-MW-200-0218	2/18/2018	11:50	8.06	0.511	9.76	0.85	85	8.01
MW-201	WI-AF-MW-201-0218	2/17/2018	14:50	7.31	0.93	13.17	4.5	106	3.98
MW-202	WI-AF-MW-202-0218	2/20/2018	11:35	6.89	0.207	9.31	0.57	103	3.8
MW-204	WI-AF-MW-204-0218	2/20/2018	15:40	6.60	0.408	11.25	5.03	143	2.1
N2-3	WI-AF-N3-2-0218	2/16/2018	12:40	8.16	1.17	12.20	1.04	-92	38.4
N2-5	WI-AF-N2-5-0218	2/20/2018	9:55	6.96	0.185	8.66	1.39	36	9
N2-6	WI-AF-N2-6C-0218	2/18/2018	11:40	7.80	0.317	10.75	1.09	240	4
N2-7S	WI-AF-N2-7S-0218	2/15/2018	16:00	6.82	0.733	11.81	0.71	145	4
N2-8	WI-AF-N2-8-0218	2/16/2018	17:40	13.87	3.18	10.87	4.89	-87	174

TABLE 2

Water Quality Parameters

*Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater*

*Ault Field, Naval Air Station Whidbey Island*

*Oak Harbor, Washington*

Station ID	Sample ID	Sample Date	Sample Time	pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	Turbidity (NTU)
N2-9	WI-AF-N2-9-0218	2/15/2018	13:05	9.82	1.09	11.91	2.73	139	58.1
N3-12	WI-AF-N3-12-0218	2/18/2018	11:10	7.00	0.851	10.70	1.43	-102	2.48
N29-22D	WI-AF-N29-22D-0218	2/19/2018	9:40	8.16	0.833	10.24	2.11	191	14.8

Note:

°C - Degrees centigrade

mg/L - Milligrams per liter

mS/cm - Milliseimens per centimeter

mV - Millivolts

NTU - Nephelometric turbidity units

TABLE 3

Groundwater Elevations (March 1 and 2, 2018)

*Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater**Ault Field, Naval Air Station Whidbey Island**Oak Harbor, Washington*

Monitoring Well ID	Top of Casing Elevation	Depth to Water (03/1/2018 & 3/2/2018)	Groundwater Elevation (03/1/2018 & 3/2/2018)
	ft msl	ft btoc	ft msl
<b>New Wells</b>			
MW-605	30.269	13.19	16.51
MW-606	16.112	0.00	15.96
MW-607	18.895	2.38	16.52
MW-608	49.184	30.70	18.48
MW-609	52.754	34.17	18.59
MW-610	56.717	37.79	18.93
MW-611	100.66	81.75	18.91
MW-612	87.143	49.28	37.84
MW-613	92.688	54.64	38.05
MW-614	89.108	51.06	38.05
MW-615	91.667	53.82	38.28
<b>Existing Wells</b>			
3MW-2	84.948	56.88	28.07
4-MW-3	85.212	69.33	15.81
29-MW-4	96.159	57.89	38.23
MW3	89.331	1.62	87.71
MW-114-114-B2668	95.289	7.94	84.67
MW-200	95.922	83.45	12.47
MW-201	99.654	86.63	13.02
MW-202	89.462	2.15	87.31
MW-204	96.609	9.47	87.14
N2-3	122.403	112.46	9.92
N2-5	92.906	5.57	87.34
N2-6	89.195	58.22	30.97
N2-7S	97.999	7.39	90.47
N2-8	87.884	56.37	31.52
N2-9	87.564	49.68	37.81
N3-12	99.112	52.06	47.57
N29-22D	99.521	92.72	4.09

Notes:

btoc = below top of casing

ft = feet

msl = mean sea level

TABLE 4  
 Groundwater Sample Results for PFAS (February and March 2018)  
 Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater  
 Ault Field, Naval Air Station Whidbey Island  
 Oak Harbor, Washington

Sample ID	USEPA LHA (May 2016)	USEPA RSL (May 2016)	WI-AF-29-MW-4-0218 2/13/18	WI-AF-MW-N29-22D-0218 2/14/18	WI-AF-MW-613-0218 2/14/18	WI-AF-MW-614-0218 2/14/18	WI-AF-MW-N2-9-0218 2/15/18	WI-AF-MW-N2-7S-0218 2/15/18	WI-AF-MW-608-0218 2/15/18
Chemical Name									
Perfluorobutanesulfonic acid (PFBS)	--	380,000	ND	ND	ND	ND	ND	182	4.57 J
Perfluorooctane Sulfonate (PFOS)	70	--	ND	2.8 J	ND	ND	ND	568	ND
Perfluorooctanoic acid (PFOA)	70	--	ND	0.702 J	ND	ND	ND	117 B	ND

Notes:  
 -- - no screening criteria available  
 J = analyte present, value is estimated  
 LHA = Lifetime Health Advisory  
 ng/L = all results are presented in nanograms per liter  
 ND = non-detect  
 RSL = regional screening level  
 USEPA = United States Environmental Protection Agency  
 Shading indicates detection  
**Bolded text indicated exceedance of USEPA Lifetime Health Advisory**  
Underlined text indicated exceedance of USEPA Tapwater RSL, Hazard Quotient = 1.0

TABLE 4  
 Groundwater Sample Results for PFAS (February and March 2018)  
 Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater  
 Ault Field, Naval Air Station Whidbey Island  
 Oak Harbor, Washington

Sample ID	USEPA LHA (May 2016)	USEPA RSL (May 2016)	WI-AF-MW-612-0218 2/15/18	WI-AF-MW-N2-8-0218 2/16/18	WI-AF-MW-N2-3-0218 2/16/18	WI-AF-MW-606-0218 2/16/18	WI-AF-4-MW-3-0218 2/17/18	WI-AF-MW-201-0218 2/17/18	WI-AF-MW-605-0218 2/17/18
Chemical Name									
Perfluorobutanesulfonic acid (PFBS)	--	380,000	ND	ND	ND	ND	ND	2090	ND
Perfluorooctane Sulfonate (PFOS)	70	--	ND	ND	ND	ND	ND	<b>23500 D</b>	ND
Perfluorooctanoic acid (PFOA)	70	--	ND	ND	1.95 J,B	ND	0.903 J,B	<b>3010 B</b>	ND

Notes:  
 -- - no screening criteria available  
 J = analyte present, value is estimated  
 LHA = Lifetime Health Advisory  
 ng/L = all results are presented in nanograms  
 per liter  
 ND = non-detect  
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TABLE 4  
 Groundwater Sample Results for PFAS (February and March 2018)  
 Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater  
 Ault Field, Naval Air Station Whidbey Island  
 Oak Harbor, Washington

Sample ID	USEPA LHA (May 2016)	USEPA RSL (May 2016)	WI-AF-MW-607-0218 2/17/18	WI-AF-MW-609-0218 2/17/18	WI-AF-N2-6C-0218 2/18/18	WI-AF-MW-200-0218 2/18/18	WI-AF-3-MW-2-0218 2/18/18	WI-AF-MW-N3-12-0218 2/18/18	WI-AF-MW-114-0218 2/20/17
Chemical Name									
Perfluorobutanesulfonic acid (PFBS)	--	380,000	ND	ND	98.7	879	ND	71.4	68.8
Perfluorooctane Sulfonate (PFOS)	70	--	ND	ND	<b>9450 D</b>	<b>96.5</b>	ND	<b>1620</b>	<b>29200 D</b>
Perfluorooctanoic acid (PFOA)	70	--	ND	ND	<b>671 B</b>	<b>436</b>	ND	<b>175</b>	<b>549 B</b>

Notes:  
 -- - no screening criteria available  
 J = analyte present, value is estimated  
 LHA = Lifetime Health Advisory  
 ng/L = all results are presented in nanograms  
 per liter  
 ND = non-detect  
 RSL = regional screening level  
 USEPA = United States Environmental Protection Agency  
 Shading indicates detection  
**Bolded text indicated exceedance of USEPA Lifetime Health Advisory**  
Underlined text indicated exceedance of USEPA Tapwater RSL, Hazard Quotient = 1.0

TABLE 4  
 Groundwater Sample Results for PFAS (February and March 2018)  
 Site Inspection for Per- and Polyfluoroalkyl Substances in Groundwater  
 Ault Field, Naval Air Station Whidbey Island  
 Oak Harbor, Washington

Sample ID	USEPA LHA (May 2016)	USEPA RSL (May 2016)	WI-AF-MW-202-0218 2/20/18	WI-AF-N2-5-0218 2/20/18	WI-AF-MW-204-0218 2/20/18	WI-AF-MW-3-0218 2/20/18	WI-AF-MW-611-0318 3/1/18	WI-AF-MW-615-0318 3/1/18
Chemical Name								
Perfluorobutanesulfonic acid (PFBS)	--	380,000	126	38.8	63.6	49	ND	89.1
Perfluorooctane Sulfonate (PFOS)	70	--	<b>10900 D</b>	<b>14500 D</b>	<b>20600 D</b>	<b>6050 D</b>	ND	3.37 J
Perfluorooctanoic acid (PFOA)	70	--	<b>815 B</b>	<b>338 B</b>	<b>2520 B</b>	<b>312 B</b>	ND	7.85 J

Notes:  
 -- - no screening criteria available  
 J = analyte present, value is estimated  
 LHA = Lifetime Health Advisory  
 ng/L = all results are presented in nanograms  
 per liter  
 ND = non-detect  
 RSL = regional screening level  
 USEPA = United States Environmental Protection Agency  
 Shading indicates detection  
**Bolded text indicated exceedance of USEPA Lifetime Health Advisory**  
Underlined text indicated exceedance of USEPA Tapwater RSL, Hazard Quotient = 1.0

Figures





DATA SOURCE: ESRI & NIRIS  
IMAGERY SOURCE: ESRI 2017

- Legend**
- City
  - Secondary Road
  - Local Connecting Road
  - Important Local Road
  - Base Boundary



Figure 1  
Ault Field Base Map  
Naval Air Station Whidbey Island  
Oak Harbor, Washington





***Final Technical Memorandum  
Evaluation of Per- and Polyfluoroalkyl  
Substances in Groundwater  
Naval Air Station Whidbey Island  
Oak Harbor, Washington***

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**Legend**

- Surface Aquifer Monitoring Well
- 88— Contour of Equal Groundwater Elevation
- ▭ Base Boundary

Note:  
90.61 - Measured Groundwater Elevation at well (ft. Msl)

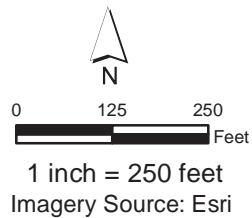


Figure 7  
Surface West Aquifer Groundwater Contour Map - West Area  
March 2018  
Naval Air Station Whidbey Island  
Oak Harbor, Washington

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Substances in Groundwater  
Naval Air Station Whidbey Island  
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**Legend**

- Deep Aquifer Monitoring Well
- 10— Contour of Equal Groundwater Elevation
- Base Boundary

Note:  
9.94 - Measured Groundwater Elevation at well (ft. Msl)

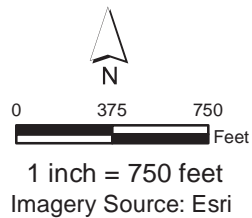
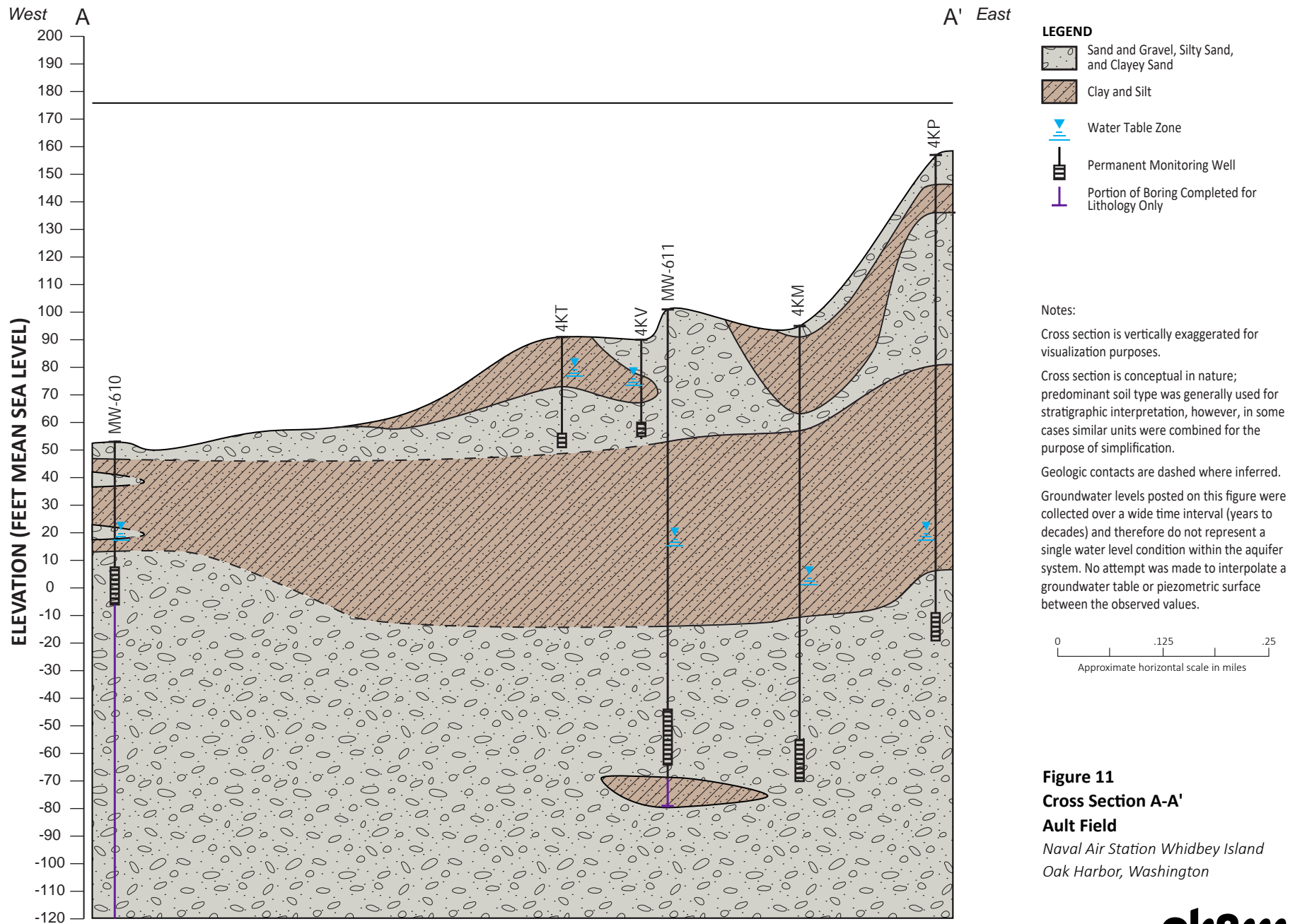


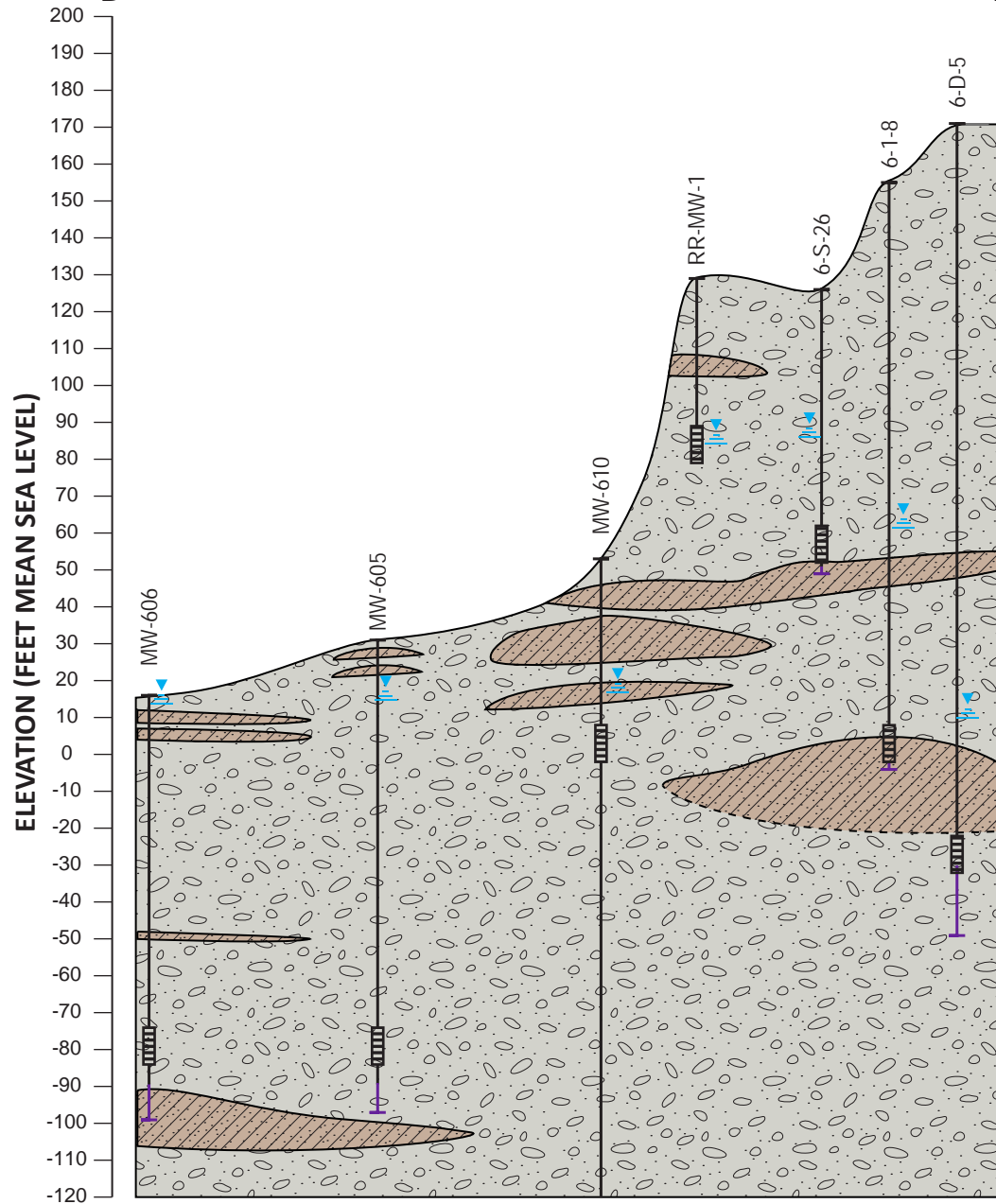
Figure 10  
Deep Aquifer Groundwater Contour Map - West Area  
March 2018  
Naval Air Station Whidbey Island  
Oak Harbor, Washington

**FINAL**  
For Official Use Only








North B

B' South



**LEGEND**

-  Sand and Gravel, Silty Sand, and Clayey Sand
-  Clay and Silt
-  Water Table Zone
-  Permanent Monitoring Well
-  Portion of Boring Completed for Lithology Only

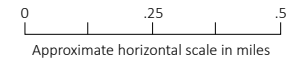
**Notes:**

Cross section is vertically exaggerated for visualization purposes.

Cross section is conceptual in nature; predominant soil type was generally used for stratigraphic interpretation, however, in some cases similar units were combined for the purpose of simplification.

Geologic contacts are dashed where inferred.

Groundwater levels posted on this figure were collected over a wide time interval (years to decades) and therefore do not represent a single water level condition within the aquifer system. No attempt was made to interpolate a groundwater table or piezometric surface between the observed values.



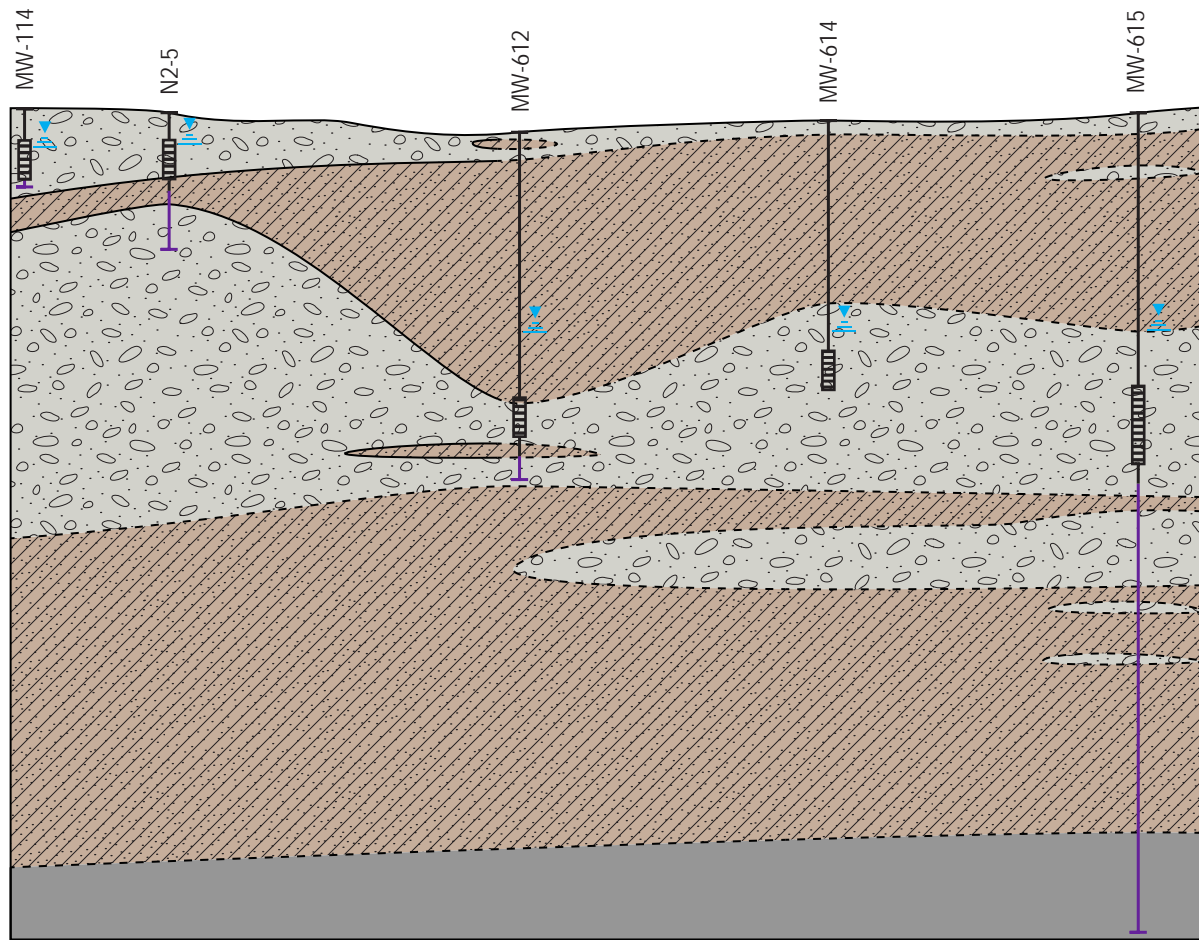
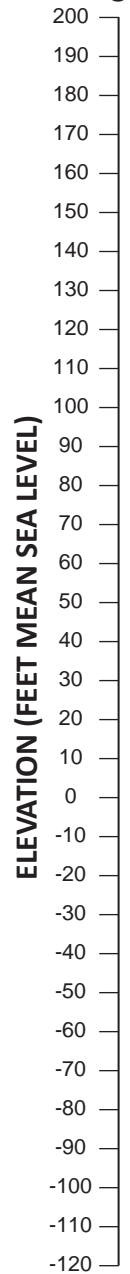
**Figure 12**  
**Cross Section B-B'**  
**Ault Field**

Naval Air Station Whidbey Island  
Oak Harbor, Washington



North C

C' South



**LEGEND**

- Sand and Gravel, Silty Sand, and Clayey Sand
- Clay and Silt
- Shale
- Water Table Zone
- Permanent Monitoring Well
- Portion of Boring Completed for Lithology Only

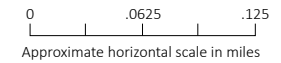
**Notes:**

Cross section is vertically exaggerated for visualization purposes.

Cross section is conceptual in nature; predominant soil type was generally used for stratigraphic interpretation, however, in some cases similar units were combined for the purpose of simplification.

Geologic contacts are dashed where inferred.

Groundwater levels posted on this figure were collected over a wide time interval (years to decades) and therefore do not represent a single water level condition within the aquifer system. No attempt was made to interpolate a groundwater table or piezometric surface between the observed values.



**Figure 13**  
**Cross Section C-C'**  
**Ault Field**

Naval Air Station Whidbey Island  
Oak Harbor, Washington



Attachment 1  
Soil Boring Logs and Well Construction  
Diagrams





PROJECT NUMBER:  
**695610.04.FI.WI**

BORING NUMBER:  
**WI-AF-MW-605** SHEET 1 OF 5

## SOIL BORING LOG

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA

LOCATION : Oak Harbor, WA (496011.7 N, 1200073.9 E)

ELEVATION : 30.6 ft

DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 13.8 ft bgs

START : 1/4/2018

END : 1/23/2018

LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	2.0	2.0	<b>Sandy SILT with Gravel (ML)</b> Dark Brown (7.5YR 3/2) Silt, soft, wet, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 4" diameter, sub-rounded to rounded, well graded. No cementation. No stain/odor		0.0	1/4/18 Clear boring via 3-point hand auger to 7 ft x 12 in OD	
2.0	2.0	2.0	20% Gravel; 25% Sand; 55% Fines			1/22/18 @ 0945 Collect soil sample WI-AF-SB605-0001-0118 from 0-1 ft bgs	
4.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Brown (10YR 5/3) Sand, loose, wet, fine to coarse grained, sub-angular to subrounded, well graded. Fines: medium plasticity. Gravel up to 1" diameter, sub-rounded to rounded, poorly graded. No stain/odor			1/22/18 @ 0950 Collect soil sample WI-AF-SB605-0202.5-0118 from 2-2.5 ft bgs	
6.0	2.0	2.0	15% Gravel; 70% Sand; 15% Fines			1/22/18 @ 0930 GW encountered from 0 to 4 ft bgs	
8.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Brown (10YR 5/3) Clay, stiff, moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-angular, poorly graded. Weak cementation. Mottled FeO staining, no odor			1/22/18 @ 1000 Collect soil sample WI-AF-SB605-02.504.5-0118 from 3.5-4.5 ft bgs	
10.0	2.0	2.0	30% Sand; 70% Fines			1/22/18 @ 0920 Begin drilling w/ 10 ft x 8 in OD outer casing & 10 ft x 7 in OD core barrel	
12.0	2.0	2.0	<b>Silty SAND (SM)</b> Dark Yellowish Brown (10YR 4/4) Sand, loose, damp, fine to medium grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. No cementation. No stain/odor		0.0		
14.0	2.0	2.0	75% Sand; 25% Fines				
16.0	2.0	2.0	<b>Clayey SAND (SC)</b> Dark Yellowish Brown (10YR 4/4), Sand, loose, damp, fine to medium grained, sub-angular to sub-rounded, poorly graded, no cementation. Fines: medium plasticity, discontinuous clay stringers. No cementation. No stain/odor				
18.0	2.0	2.0	60% Sand; 40% Fines				
20.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Yellowish Brown (10YR 5/4) Clay, stiff, moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-angular, poorly graded, discontinuous clay stringers. Weak cementation. Mottled FeO staining, no odor		0.0		
22.0	2.0	2.0	40% Sand; 60% Fines			1/22/18 @ 1010 Switch to 10 ft x 6 in OD casing & 4 10 ft x 4 in core barrel & begin mud recirculation using mud puppy #MP170-25C	
24.0	2.0	2.0	<b>Clayey SAND (SC)</b> Yellowish Brown (10YR 5/4) Sand, loose, damp, fine to medium grained, sub-angular to subrounded, poorly graded. Fines: medium plasticity. No cementation. No stain/odor				
26.0	2.0	2.0	70% Sand; 30% Fines				
28.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Same description as 4.5-5.5 ft bgs				
30.0	2.0	2.0	40% Sand; 60% Fines				
	2.0	2.0	<b>Silty SAND (SM)</b> Dark Yellowish Brown (10YR 3/4) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor				
	2.0	2.0	75% Sand; 25% Fines				
	2.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Dark Grayish Brown (10YR 4/2) Sand, loose, very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor				
	2.0	2.0	90% Sand; 10% Fines				





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-605</b>	SHEET 2 OF 5
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496011.7 N, 1200073.9 E)

ELEVATION : 30.6 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-128' bgs), Rotosonic

WATER LEVELS : 13.8 ft bgs      START : 1/4/2018      END : 1/23/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
30.0	2.0		<b>Poorly Graded SAND (SP)</b> Very Dark Gray (GLEY1 3/N) Sand, loose, very moist, no standing water, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Very weak cementation. No stain/odor 95% Sand; 5% Fines		0.0		
32.0	2.0						
34.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Very Dark Gray (GLEY1 3/N) Sand, loose, very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Very weak cementation. No stain/odor 90% Sand; 10% Fines				
35.0	2.0						
36.0	2.0						
38.0	2.0						
40.0	2.0						
42.0	2.0						
44.0	2.0						
45.0	2.0						
46.0	2.0						
48.0	2.0						
50.0	2.0						
52.0	2.0						
54.0	2.0						
55.0	2.0						
56.0	2.0						
58.0	2.0						
60.0	2.0						

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-605</b>	SHEET 3 OF 5
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496011.7 N, 1200073.9 E)

ELEVATION : 30.6 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-128' bgs), Rotosonic

WATER LEVELS : 13.8 ft bgs      START : 1/4/2018      END : 1/23/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM					
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY									
60.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs 95% Sand; 5% Fines		0.0							
62.0												
64.0	2.0											
66.0	2.0											
68.0	2.0											
70.0	2.0											
72.0	2.0											
74.0	2.0							<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs but with clay stringers 95% Sand; 5% Fines		0.0		
76.0	2.0											
78.0	2.0							<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs 95% Sand; 5% Fines		0.0		
80.0	2.0											
82.0	2.0		<b>Silty SAND (SM)</b> Dark Gray (GLEY1 4/N) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor 75% Sand; 25% Fines		0.0							
84.0	2.0											
86.0	2.0											
88.0	2.0											
90	2.0											



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-605</b>	SHEET 4 OF 5
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496011.7 N, 1200073.9 E)

ELEVATION : 30.6 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-128' bgs), Rotosonic

WATER LEVELS : 13.8 ft bgs      START : 1/4/2018      END : 1/23/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
90.0	2.0				0.0		
92.0							
94.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs 95% Sand; 5% Fines				
96.0							
98.0	2.0		<b>Silty SAND (SM)</b> Same description as 82-93 ft bgs 70% Sand; 30% Fines				
100.0							
102.0	2.0				0.0		← 3/8" Bentonite Chips
104.0							
106.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs but with fine to medium sand 95% Sand; 5% Fines				← 20/40 Sand
108.0							
110.0	2.0				0.0		← 2" Schedule 80 PVC - 0.010" Slot
112.0							
114.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 18-30 ft bgs 95% Sand; 5% Fines				
116.0							
118.0	2.0		<b>Silty SAND (SM)</b> Same description as 82-93 ft bgs 80% Sand; 20% Fines				← Schedule 80 PVC Sump
120.0							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-605</b>	SHEET 5 OF 5
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496011.7 N, 1200073.9 E)

ELEVATION : 30.6 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-128' bgs), Rotosonic

WATER LEVELS : 13.8 ft bgs      START : 1/4/2018      END : 1/23/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
120.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 105-124 ft bgs 95% Sand; 5% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram]
122.0							
124.0	2.0		<b>Silty SAND (SM)</b> Same description as 18-30 ft bgs 95% Sand; 5% Fines	[Symbolic Log Pattern]			[Well Diagram]
125.0							
126.0	2.0						
128.0	2.0		Bottom of Boring at 128.0 ft bgs on 1/23/2018				
						1/22/18 @ 1405 Boring terminated @ 128 ft bgs. Construct monitoring well of 2" OD Sch 80 PVC w/ 0.010" slot screen from 105 to 115 ft bgs w/ 5 ft sump to 120 ft bgs. Backfill w/ time release bentonite 3/8" chips from 128-120 ft bgs. #20 x 40 sand filter p 1/23/18 @ 0830 Monitoring well dropped ~6 inches overnight before grouting & after transition seal & sand were set. New screened interval from 105.5-115.5 ft bgs w/ sump to 120.5 ft bgs. Sand filter pack from 103.5-115.5 ft bgs	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-606</b>	SHEET 1 OF 4
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496551.2 N, 1200406.0 E)

ELEVATION : 16.3 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-19' bgs); 6" casing, 4" barrel (19'-115' bgs), Rotasonic

WATER LEVELS : 0.3 ft bgs      START : 1/4/2018      END : 1/21/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	2.0	<b>Sandy SILT with Gravel (ML)</b> Very Dark Grayish Brown (10YR 3/2) Silt, soft, saturated, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1" diameter, sub-rounded to rounded, poorly graded. No cementation. Roots & grass. No stain/odor 20% Gravel; 25% Sand; 55% Fines		0.0	1/4/18 @ 1130 Clear Boring via 3-point hand auger to 7 ft x 12 inch OD	
	3.0	2.0				1/20/18 @ 1440 Soil sample WI-AF-SB606-0001-0118 collected from 0 to 1 ft bgs	
	5.0	2.0	<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Grayish Brown (10YR 5/2) Sand, loose wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-angular to sub-rounded, well graded. Fines: medium plasticity. No stain/odor 15% Gravel; 75% Sand; 10% Fines		0.0	1/20/18 @ 1430 GW encountered from 0 to 4 ft bgs	
	7.0	2.0				1/20/18 @ 1445 Collect soil sample WI-AF-SB606-0405-0118 from 4 to 5 ft bgs	
	9.0	2.0	<b>Sandy Lean CLAY (CL)</b> Gray (10YR 5/1) Clay, stiff, moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-angular to sub-rounded, poorly graded. Weak cementation. Mottled FeO staining, no odor 40% Sand; 60% Fines			1/20/18 @ 1450 Collect soil sample WI-AF-SB606-06.507.5-0118 from 6.5 to 7.5 ft bgs	
	11.0	2.0	<b>Clayey SAND (SC)</b> Dark Gray (GLE Y1 4/N) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 5" diameter, angular to rounded, well graded. Fines: medium plasticity. Weak cementation. No stain/odor 30% Gravel; 50% Sand; 20% Fines			1/20/18 @ 1420 Begin drilling w/ 10 ft x 8 in OD casing & 10 ft x 7 in OD core barrel	
	13.0	2.0				1/20/18 @ 1435 GW encountered from 7.5 to 9 ft bgs	
	15.0	2.0	<b>Sandy Lean CLAY (CL)</b> Dark Gray (GLE Y1 4/N) Clay, stiff, damp, medium plasticity, no dilatancy, moderate cementation. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel to 1" diameter, angular to sub-rounded, poorly graded. No stain/odor 15% Gravel; 20% Sand; 65% Fines				
	17.0	2.0	<b>Poorly Graded SAND (SP)</b> Very Dark Gray (GLE Y1 3/N) Sand, loose, very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Weak cementation. No stain/odor 95% Sand; 5% Fines				
	19.0	2.0					
	21.0	2.0				1/20/18 @ 1520 Switch to 10 ft x 6 in casing & 10 ft x 4 in core barrel, begin mud recirculation using mudpuppy #MP170-25C	
	23.0	2.0					
	25.0	2.0					
	27.0	2.0					
	29.0	2.0					



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-606</b>	SHEET 2 OF 4
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496551.2 N, 1200406.0 E)

ELEVATION : 16.3 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-19' bgs); 6" casing, 4" barrel (19'-115' bgs), Rotasonic

WATER LEVELS : 0.3 ft bgs      START : 1/4/2018      END : 1/21/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	31.0	2.0					
		2.0					
	33.0						
		2.0					
35	35.0						
		2.0			0.0		
	37.0						
		2.0					
40	39.0						
		2.0					
	41.0						
		2.0					
	43.0						
		2.0					
45	45.0						
		2.0			0.0		
	47.0						
		2.0					
	49.0						
50		2.0					
	51.0						
		2.0					
	53.0						
		2.0					
55	55.0						
		2.0			0.0		
	57.0						
		2.0					
	59.0						
60							

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-606</b>	SHEET 3 OF 4
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496551.2 N, 1200406.0 E)

ELEVATION : 16.3 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-19' bgs); 6" casing, 4" barrel (19'-115' bgs), Rotosonic

WATER LEVELS : 0.3 ft bgs      START : 1/4/2018      END : 1/21/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
61.0	2.0		<b>Clayey SAND (SC)</b> Dark Gray (GLE Y1 4/N) Sand, loose, saturated, fine to coarse grained, sub-angular to sub-rounded, well graded. Fines: medium plasticity. No cementation. Abundant pieces of wood from 0.5" to 3" diameter. No stain, fetid odor 70% Sand; 30% Fines			1/21/18 @ 1030 GW encountered from 60 to 62 ft bgs	
63.0	2.0						
65.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 12-60 ft bgs 95% Sand; 5% Fines				
67.0	2.0		<b>SILT with Sand (ML)</b> Gray (GLE Y1 5/N) Silt, stiff, damp, rapid dilatancy, low plasticity. Sand, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Weak cementation. No stain/odor 15% Sand; 85% Fines				
69.0	2.0		<b>Silty SAND (SM)</b> Gray (GLE Y1 5/N) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded, micaceous. Fines: low plasticity. Weak cementation. No stain/odor 65% Sand; 35% Fines				
71.0	2.0						
73.0	2.0						
75.0	2.0						
77.0	2.0						
79.0	2.0						
81.0	2.0						
83.0	2.0						
85.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Dark Gray (GLE Y1 4/N) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded, micaceous. Fines: low plasticity. Weak cementation. No stain/odor 90% Sand; 10% Fines				
87.0	2.0						
89.0	2.0						
90							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-606</b>	SHEET 4 OF 4
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496551.2 N, 1200406.0 E)

ELEVATION : 16.3 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-19' bgs); 6" casing, 4" barrel (19'-115' bgs), Rotasonic

WATER LEVELS : 0.3 ft bgs      START : 1/4/2018      END : 1/21/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
91.0	2.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 12-60 ft bgs but with fine to medium sand 95% Sand; 5% Fines		0.0		
93.0	2.0						
95.0	2.0						
97.0	2.0	2.0	<b>Silty SAND (SM)</b> Same description as 66 to 82 ft bgs but with isolated wood pieces up to 2" diameter 70% Sand; 30% Fines		0.0		
99.0	2.0						
101.0	2.0						
103.0	2.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Same description as 82-90 ft bgs 90% Sand; 10% Fines		0.0		
105.0	2.0						
107.0	2.0						
109.0	2.0	2.0	<b>SILT (ML)</b> Grayish Brown (10YR 5/2) Silt, stiff, damp, low plasticity, rapid dilatancy. Moderate cementation. Disseminated FeO staining, no odor 10% Sand; 90% Fines		0.0		
111.0	2.0						
113.0	2.0	2.0	<b>Lean CLAY (CL)</b> Dark Gray (GLE Y1 4/N) Clay, very stiff, dry, medium plasticity, no dilatancy, platy texture. Well cemented. No stain/odor 5% Sand; 95% Fines		0.0		
115.0	2.0						
			Bottom of Boring at 115.0 ft bgs on 1/21/2018			1/21/18 @ 1220 Boring terminated @ 115 ft bgs, construct monitoring well w/ 2" Sch 80 PVC & 0.010" slot screened from 90 to 100 ft bgs w/ a 5-ft sump to 105 ft bgs. Backfill from 115 to 106 ft bgs w/ time release 3/8" bentonite chips. #20/40 sand filter p	





PROJECT NUMBER:  
**695610.04.FI.WI**

BORING NUMBER:  
**WI-AF-MW-607** SHEET 1 OF 7

## SOIL BORING LOG

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA

LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft

DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs

START : 1/4/2018

END : 1/20/2018

LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>Sandy SILT with Gravel (ML)</b> Very Dark Gray (10YR 3/1) Silt, soft saturated, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 3" diameter, sub-rounded to rounded, well graded. No cementation. No stain/odor 20% Gravel; 25% Sand; 55% Fines		0.0	1/4/18 @ 0825 Begin clearing for utilities via 3-point hand auger to 7 ft x 12 in OD	
1.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Brown (10YR 5/3) Sand, dense, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 5" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. Moderate cementation. No stain/odor 20% Gravel; 50% Sand; 30% Fines		0.0	1/12/18 @ 1525 Collect soil sample WI-AF-SB607-000.5-0118 from 0-0.5 ft bgs 1/12/18 @ 1530 Collect soil sample WI-AF-SB607-0203-0118 from 2-3 ft bgs	
3.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Same description as 0.5-3 ft bgs but Gray (10YR 5/1), gravel up to 1" diameter, poorly graded, moderate cementation 20% Gravel; 60% Sand; 20% Fines		0.0	1/12/18 @ 1500 GW encountered from 0 to 4 ft bgs 1/12/18 @ 1545 Collect soil sample WI-AF-SB607-0405-0118 from 4-5 ft bgs	
5.0	2.0	2.0	<b>Sandy Lean CLAY with Gravel (CL)</b> Dark Gray (GLE Y1 4/N) Clay, stiff, dry, moderate plasticity, slow dilatancy. Sand, fine to medium grained, sub-rounded to sub-angular, poorly graded. Gravel up to 2" diameter, subrounded to rounded, well graded. Weak cementation. No stain/odor 15% Gravel; 35% Sands; 50% Fines		0.0	1/12/18 @ 1450 Begin drilling w/ 8-in OD x 10-ft casing & 7-in OD X 10-ft core-barrel	
7.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Same description as 4-9 ft bgs but moist 15% Gravel; 35% Sand; 50% Fines		0.0	1/12/18 @ 1555 Collect soil sample WI-AF-SB607-1011-0118 from 10-11 ft bgs	
9.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Same description as 4-9 ft bgs but saturated 15% Gravel; 35% Sand; 50% Fines		0.0		
10.0	2.0	2.0	<b>Sandy SILT (ML)</b> Gray (GLE Y1 5/N) Silt, soft, wet, low plasticity, rapid dilatancy. Sand, fine grained, subrounded, poorly graded. No cementation. No stain/odor 10% Gravel; 40% Sand; 50% Fines		0.0		
11.0	2.0	2.0	<b>Well Graded SAND with Clay and Gravel (SW-SC)</b> Grayish Brown (10YR 5/2) Sand, loose, saturated, fine to coarse grained, sub-rounded to sub-angular, well graded. Gravel up to 3.5" diameter, sub-rounded to rounded, well graded. No stain/odor 30% Gravel; 60% Sand; 10% Fines		0.0	1/12/18 @ 1545 GW encountered from 10 to 18.5 ft bgs 1/12/18 @ 1600 GW encountered from 19 to 22 ft bgs	
13.0	2.0	2.0	<b>SILT (ML)</b> Very Dark Gray (GLE Y1 3/N) Silt, dense, damp, low plasticity, rapid dilatancy. Weak cementation. No stain/odor 5% Sand; 95% Fines		0.0		
15.0	2.0	2.0	<b>Poorly Graded SAND (SP)</b> Dark Gray (GLE Y1 4/N) Sand, loose, saturated, fine to medium grained, sub-rounded to sub-angular, poorly graded. Fines: medium plasticity, clay stringers up to 2" thick. No stain/odor 10% Gravel; 80% Sand; 10% Fines		0.0		
17.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Dark Gray (GLE Y1 4/N) Sand, loose, saturated, fine to coarse grained, sub-rounded to sub-angular, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity, clay stringers. No cementation. No stain/odor 20% Gravel; 60% Sand; 20% Fines		0.0		
19.0	2.0	2.0			0.0		
21.0	2.0	2.0			0.0		
23.0	2.0	2.0			0.0		
25.0	2.0	2.0			0.0		
27.0	2.0	2.0			0.0		
29.0	2.0	2.0			0.0		
30							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 2 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	31.0	2.0	<b>SILT (ML)</b> Same description as 18.5-19 ft bgs 5% Sand; 95% Fines				
		2.0	<b>Poorly Graded SAND (SP)</b> Dark Gray (GLE Y1 4/N), loose, moist, very fine to fine sand, subrounded to subangular, poorly graded, isolated gravel up to 4" diameter, rounded, micaceous. Very weak cementation. No stain/odor				
	33.0	2.0	10% Gravel; 85% Sand; 5% Fines				
35	35.0	2.0	<b>Poorly Graded SAND (SP)</b> Dark Gray (GLE Y1 4/N), loose, moist, very fine to fine sand, subrounded to subangular, poorly graded, isolated gravel up to 4" diameter, rounded, micaceous. Very weak cementation. No stain/odor		0.0		
		2.0	10% Gravel; 85% Sand; 5% Fines				
	37.0	2.0					
	39.0	2.0				1/13/18 @ 0945 Heaving sands	
40	41.0	2.0				1/13/18 @ 1123 200 gallons water added to mitigate heaving sands	
	43.0	2.0					
	45.0	2.0					
45	47.0	2.0			0.0		
	49.0	2.0					
50	51.0	2.0				1/13/18 @ 1200 200 gallons water added to mitigate heaving sands	
	53.0	2.0					
55	55.0	2.0					
	57.0	2.0			0.3		
	59.0	2.0					
60							

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 3 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	61.0	2.0				1/13/18 @ 1300 150 gallons water added to mitigate heaving sands	
	63.0	2.0					
65	65.0	2.0				1/13/18 @ 1355 No Recovery from 65-69 ft bgs	
	67.0	2.0	<b>No Recovery</b>		0.2	1/13/18 @ 1400 Heaving sands are preventing additional casing advancement despite added water (550 gallons total). Prepare to add mud using slurry of water & cecto "Gel-X drilling fluid", mixed & recirculated through a mud puppy MP170-25C	
	69.0	2.0					
70	71.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 25-65 ft bgs 95% Sand; 5% Fines			1/13/18 @ 1500 Resume drilling w/ mud recirculation. Additional 9-in OD x 10-ft conductor casing advanced to 20 ft bgs & sealed at top with bentonite to close system & prevent spills	
	73.0	2.0					
	75.0	2.0					
75	77.0	2.0			0.0		
	79.0	2.0					
80	81.0	2.0					
	83.0	2.0					
85	85.0	2.0					
	87.0	2.0			0.2		
	89.0	2.0					
90							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 4 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
91.0	2.0						
93.0	2.0						
95.0	2.0						
97.0	2.0				0.0		3/8" Bentonite Chips
99.0	2.0						20/40 Sand
101.0	2.0						
103.0	2.0						
105.0	2.0						
107.0	2.0		<b>Poorly Graded SAND (SP)</b> Same description as 25-65 ft bgs but fine to medium sand 95% Sand; 5% Fines		0.1		2" Schedule 80 PVC - 0.010" Slot
109.0	2.0						
111.0	2.0						
113.0	2.0		<b>Silty SAND (SM)</b> Dark Gray (GLEY1 4/N) Sand, loose, very moist, very fine to fine grained, sub-orunded to sub-angular, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor 85% Sand; 15% Fines				Schedule 80 PVC Sump
115.0	2.0						
117.0	2.0		<b>Silty SAND (SM)</b> Same description as 111-116 ft bgs but moderate cementation 70% Sand; 30% Fines		0.0		
119.0	2.0		<b>Silty SAND (SM)</b> Same description as 111-116 ft bgs 85% Sand; 15% Fines				
120							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 5 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	121.0	2.0					
		2.0					
	123.0						
		2.0					
125	125.0		<b>Poorly Graded SAND (SM)</b> Same description as 25-65 ft bgs 95% Sand; 5% Fines		0.0		
		2.0					
	127.0						
		2.0					
	129.0						
130		2.0	<b>Lean CLAY (CL)</b> Gray (GLEY1 5/N) Clay, stiff, damp, medium plasticity, no dilatancy. Well cemented. No stain/odor 10% Sand; 90% Fines				
	131.0						
		2.0					
	133.0						
		2.0					
135	135.0						
		2.0			0.1		
	137.0						
		2.0					
	139.0						
140		2.0	<b>Sandy Lean CLAY (CL)</b> Gray (GLEY1 5/N) Clay, stiff, dry to damp, medium plasticity, slow dilatancy, platy texture. Sand, very fine to fine grained, sub-angular to sub-rounded, poorly graded, sands appear as continuous & discontinuous interbeds ~1/8" to 0.5" thick spaced every 0.25" to 6". Moderate cementation. 30% Sands; 70% Fines			1/14/18 @ 1530 Hard drilling	
	141.0					1/14/18 @ 1555 Switch to 10-ft x 6-in OD casing w/ 10-ft x 4-in core barrel	
		2.0					
	143.0						
		2.0					
145	145.0						
		2.0			0.0		
	147.0						
		2.0					
	149.0						
150							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 6 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	151.0	2.0					
		2.0					
	153.0	2.0					
155	155.0	2.0					
		2.0			0.1		
	157.0	2.0					
	159.0	2.0					
160	161.0	2.0					
		2.0					
	163.0	2.0					
		2.0					
165	165.0	2.0	Same description as above				
		2.0			0.2		
	167.0	2.0					
	169.0	2.0					
170	171.0	2.0					
		2.0					
	173.0	2.0					
		2.0					
175	175.0	2.0					
		2.0			0.0		
	177.0	2.0					
		2.0					
	179.0	2.0					
180							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-607</b>	SHEET 7 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (496664.6 N, 1200992.8 E)

ELEVATION : 19.2 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" casing, 7" barrel, Rotosonic

WATER LEVELS : 3.9 ft bgs      START : 1/4/2018      END : 1/20/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
181.0	2.0						
183.0	2.0						
185.0	2.0						
187.0	2.0				0.0		
189.0	2.0						
191.0	2.0						
193.0	2.0						
195.0	2.0						
197.0	2.0		<b>Clayey SAND (SC)</b> Gray (GLEY1 5/N) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: medium plasticity. No cementation. No stain/odor 60% Sand; 40% Fines		0.2		
199.0	2.0		<b>Sandy Lean CLAY (CL)</b> Same description as 139-195 ft bgs 30% Sand; 70% Fines				
			<b>Clayey SAND (SC)</b> Same description as 195.5-197.5 ft bgs 60% Sand; 40% Fines				
			<b>Sandy Lean CLAY (CL)</b> Same description as 139-195 ft bgs 30% Sand; 70% Fines Bottom of Boring at 199.0 ft bgs on 1/20/2018			1/15/18 @ 1150 Boring terminated @ 199 ft bgs 1/20/18 Complete well by backfilling from 116 to 199 ft bgs w/ time release 3/8" bentonite chips & installing a monitoring well constructed of 2" OD Sch. 80 PVC screened w/ 0.010" slot from 100 to 110 ft bgs w/ a 5-ft sump to 115 ft bgs & #20/40 filter pack sand from 98 to 116 ft bgs. See well completion diagram for details.	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-608</b>	SHEET 1 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494698.5 N, 1200421.1 E)

ELEVATION : 49.5 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 6" casing, 4" barrel, Rotasonic

WATER LEVELS : 31.7 ft bgs      START : 1/6/2018      END : 1/24/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>Sandy SILT with Gravel (ML)</b> Very Dark Grayish Brown (10YR 3/2) Silt, soft, wet, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 4" diameter, sub-angular to rounded, well graded. No cementation. No stain/odor 20% Gravel; 25% Sand; 55% Fines		0.0	1/6/18 @ 1505 Clear boring via 3-point hand auger to 7 ft x 12 inch OD	
1.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Dark Yellowish Brown (10YR 4/4) Sand, loose, moist, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1" diameter, sub-rounded to rounded, poorly graded. Fines: medium plasticity. Weak cementation. No stain/odor 15% Gravel; 65% Sand; 20% Fines		0.0	1/23/18 @1540 Collect soil sample WI-AF-SB608-0002-0118 from 0 to 2 ft bgs 1/23/18 @ 1530 GW encountered from 0 to 2 ft bgs	
3.0	5.0	2.0	<b>Sandy Lean CLAY (CL)</b> Pale Brown (10YR 6/3) Clay, stiff, moist, medium plasticity, slow dilatancy. Sand, fine to coarse grained, sub-angular to sub-round, well graded. Moderate cementation. Mottled FeO staining, no odor 30% Sand; 70% Fines		0.0	1/23/18 @ 1545 Collect soil sample WI-AF-SB608-03.504.5-0118 from 3.5 to 4.5 ft bgs	
5.0	7.0	2.0	<b>Sandy Lean CLAY (CL)</b> Gray (10YR 5/1) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 4" diameter, sub-angular to rounded, well graded. Moderate cementation. Disseminated, FeO staining, no odor 20% Gravel; 25% Sand; 55% Fines		0.0	1/23/18 @ 1555 Begin drilling w/ 10-ft x 8-in casing & 10-ft x 4-in core barrel	
7.0	9.0	2.0	<b>SILT with Sand (ML)</b> Dark Gray (GLE Y1 4/N) Silt, stiff, damp, low plasticity, rapid dilatancy. Sand, very fine grained, sub-rounded, poorly graded. Weak cementation. No stain/odor 20% Sand; 80% Fines		0.0	1/23/18 @ 1555 Collect soil sample WI-AF-SB608-08.509.5-0118 from 8.5 to 9.5 ft bgs	
9.0	11.0	2.0	<b>Fat CLAY (CH)</b> Very Dark Gray (GLE Y1 4/N) Clay, very stiff, dry, high plasticity, no dilatancy. Well cemented. No stain/odor 5% Sand; 95% Fines		0.0		
11.0	13.0	2.0	<b>Lean CLAY with Sand (CL)</b> Dark Gray (GLE Y1 4/N) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand very fine to fine grained, sub-rounded, poorly graded, sand stringers. Weak cementation. No stain/odor 20% Sand; 80% Fines		0.0		
13.0	15.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Very Dark Gray (GLE Y1 3/N) Sand, loose, very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor 90% Sand; 10% Fines		0.0		
15.0	17.0	2.0			0.0		
17.0	19.0	2.0			0.0		
19.0	21.0	2.0			0.0		
21.0	23.0	2.0			0.0		
23.0	25.0	2.0			0.0		
25.0	27.0	2.0			0.0		
27.0	29.0	2.0			0.0		
29.0							





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-608</b>	SHEET 2 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494698.5 N, 1200421.1 E)

ELEVATION : 49.5 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 6" casing, 4" barrel, Rotasonic

WATER LEVELS : 31.7 ft bgs      START : 1/6/2018      END : 1/24/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
31.0	2.0	2.0	<b>Silty SAND (SM)</b> Grayish Brown (10YR 5/2) Sand, dense, damp, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Moderate cementation. No stain/odor 85% Sand; 15% Fines				
33.0	2.0	2.0	<b>Silty SAND (SM)</b> Very Dark Gray (GLE Y1 3/N) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Shells up to 0.5" diameter. Weak cementation. No stain/odor 70% Sand; 30% Fines				
35.0	2.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Dark Gray (GLE Y1 4/N) Sand, loose, moist to very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor 90% Sand; 10% Fines		0.2		← 3/8" Bentonite Chips
37.0	2.0	2.0					
39.0	2.0	2.0	<b>Poorly Graded SAND (SP)</b> Dark Gray (GLE Y1 4/N) Sand, loose, wet, very fine to fine grained, sub-angular to sub-rounded, poorly graded. No cementation. No stain/odor 95% Sand; 5% Fines			1/24/18 @ 0820 GW encountered from 39 to 51.5 ft bgs. Core samples from 41 to 49 ft bgs fell from core barrel & were caught in a bucket. 1/24/18 @ 0910 Collect soil samples WI-AF-SB608-3940-0118, WI-AF-SB608-3940-0118-MS, WI-AF-SB608-3940-0118-SD from 39 to 40 ft bgs	← 20/40 Sand
40.0	2.0	2.0					
41.0	2.0	2.0					
43.0	2.0	2.0					
45.0	2.0	2.0					← 2" Schedule 80 PVC - 0.010" Slot
47.0	2.0	2.0			0.1		
49.0	2.0	2.0					
50.0	2.0	2.0					
51.0	2.0	2.0					
53.0	2.0	2.0	<b>Lean CLAY with Sand (CL)</b> Gray (GLE Y1 5/N) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand, very fine grained, sub-rounded, poorly graded. Moderate cementation. No stain/odor 15% Sand; 85% Fines			1/24/18 @ 0835 Boring terminated @ 59 ft bgs. Construct monitoring well; 2" OD Sch. 80 PVC w/ 0.010" slot screened from 40-50 ft bgs, 5-ft sump to 55 bgs. Backfill from 59-55 ft bgs w/ time release 3/8" bentonite chips, 20x40 filter pack sand from 55-38 ft bgs, 5-ft transition seal of time release 3/8" bentonite chips from 38-33 ft bgs. See well completion diagram for details	← Schedule 80 PVC Sump
55.0	2.0	2.0					
57.0	2.0	2.0	<b>Silty SAND (SM)</b> Dark Gray (GLE Y1 4/N) Sand, loose, very moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. No stain/odor 80% Sand; 20% Fines		0.1		
59.0	2.0	2.0					
			Bottom of Boring at 59.0 ft bgs on 1/24/2018				



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-609</b>	SHEET 1 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494571.9 N, 1200607.1 E)

ELEVATION : 53.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 6" casing, 4" barrel, Rotosonic

WATER LEVELS : 35.4 ft bgs      START : 1/5/2018      END : 1/25/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>Sandy SILT (ML)</b> Dark Grayish Brown (10YR 4/2) Silt, soft, saturated, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. No cementation. Roots & grass. No stain/odor 10% Gravel; 25% Sand; 65% Fines		0.4	1/5/18 @ 1450 Clear boring via 3-point hand auger to 7 ft x 12 in OD 1/24/18 @ 1320 GW encountered from 0 to 0.5 ft bgs 1/24/18 @ Collect soil sample WI-AF-SB209-00.501.5-0118 from 0.5 to 1.5 ft bgs 1/24/18 @ 1330 GW encountered from 1.5 to 6 ft bgs	
1.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Brown (10YR 5/3) Sand, dense, damp, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1" diameter, angular to rounded, poorly graded. Fines: medium plasticity. Weak cementation. No stain/odor 25% Gravel; 30% Sand; 45% Fines				
3.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Yellowish Brown (10YR 5/4) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 4" diameter, subangular to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 30% Gravel; 40% Sand; 30% Fines		0.0	1/24/18 @ 1350 Collect soil sample WI-AF-SB609-0607-0118 from 6 to 7 ft bgs; @1355 Collect soil sample WI-AF-SB609P-0607-0118 from 6 to 7 ft bgs 1/24/18 @1310 Begin drilling w/ 10-ft x 6-in casing & 10-ft x 4-in core barrel 1/24/18 @ 1405 Collect soil sample WI-AF-SB609-0708-0118 from 7 to 8 ft bgs	
5.0	2.0	2.0	<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Dark Yellowish Brown (10YR 4/4) Sand, loose, saturated, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 4" diameter, sub-angular to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 30% Gravel; 50% Sand; 10% Fines				
7.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Same description as 1.5-3.5 ft bgs 30% Gravel; 40% Sand; 30% Fines				
9.0	2.0	2.0	<b>SILT with Sand (ML)</b> Yellowish Brown (10YR 5/6) Silt, soft damp, low plasticity, rapid dilatancy. Sand, very fine to fine grained, subrounded, poorly graded. Moderate cementation. Mottled FeO staining, no odor 20% Sand; 80% Fines		0.1	1/24/18 @ 1340 GW encountered from 14 to 14.5 ft bgs	
10.0	2.0	2.0	<b>SILT with Sand (ML)</b> Gray (GLE Y1 5/N) Silt, stiff, moist, low, plasticity, rapid dilatancy. Sand, very fine to medium grained, sub-angular to sub-rounded, poorly graded. Moderate cementation. No stain/odor 20% Sand; 80% Fines				
11.0	2.0	2.0	<b>Silty SAND with Gravel (SM)</b> Gray (GLE Y1 5/N) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-angular to rounded, well graded. Fines: low plasticity. No cementation. No stain/odor 20% Gravel; 40% Sand; 40% Fines				
13.0	2.0	2.0	<b>SILT with Sand (ML)</b> Same as 7 -14 ft bgs but very moist 20% Sand; 80% Fines				
15.0	2.0	2.0	<b>Lean CLAY (CL)</b> Dark Gray (GLE Y1 4/N) Clay, stiff, moist, medium plasticity, slow dilatancy. Weak cementation. No stain/odor 5% Sand; 95% Fines		0.1		
17.0	2.0	2.0					
19.0	2.0	2.0					
20.0	2.0	2.0					
21.0	2.0	2.0					
23.0	2.0	2.0					
25.0	2.0	2.0					
27.0	2.0	2.0					
29.0	2.0	2.0					
30							

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-609</b>	SHEET <b>2</b> OF <b>3</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494571.9 N, 1200607.1 E)

ELEVATION : 53.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 6" casing, 4" barrel, Rotasonic

WATER LEVELS : 35.4 ft bgs      START : 1/5/2018      END : 1/25/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
31.0	2.0		<b>Silty SAND (SM)</b> Dark Gray (GLEY1 4/N) Sand, loose, moist, very fine to fine grained, sub-rounded, poorly graded, low plasticity. Weak cementation. No stain/odor 70% Sand; 30% Fines				
33.0	2.0		<b>Lean CLAY (CL)</b> Dark Gray (10YR 4/1) Clay, stiff, dry, medium plasticity, slow dilatancy. Moderate cementation. No stain/odor 10% Sand; 90% Fines				
35.0	2.0		<b>Lean CLAY (CL)</b> Black (GLEY1 2.5/N) Clay, very stiff, dry, medium plasticity, slow dilatancy. Well cemented. No stain/odor 10% Sand; 90% Fines		0.2		
37.0	2.0						
39.0	2.0						
40.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Dark Gray (GLEY1 4/N) Sand, loose wet, very fine to fine grained, sub-rounded, poorly graded, low plasticity. Weak cementation. No stain/odor 90% Sand; 10% Fines			1/24/18 @ 1515 Collect soil sample WI-AF-SB609-3940-0118 from 39 to 40 ft bgs 1/24/18 @ 1445 GW encountered from 40 to 57 ft bgs	← 3/8" Bentonite Chips
41.0	2.0						
43.0	2.0						
45.0	2.0						← 20/40 Sand
47.0	2.0				0.1		
49.0	2.0						
50.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Same as 40-49 ft bgs but more wet 90% Sand; 10% Fines				← 2" Schedule 80 PVC - 0.010" Slot
51.0	2.0						
53.0	2.0						
55.0	2.0						
57.0	2.0		<b>Silty SAND (SM)</b> Dark Gray (GLEY1 4/N) Sand, loose, wet, very fine to fine grained, sub-rounded, poorly graded, sand stringers. Fines: low plasticity. Weak cementation. No stain/odor 70% Sand; 30% Fines		0.2		← Schedule 80 PVC Sump
59.0	2.0						
60							





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 1 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	2.0	2.0	<b>Sandy SILT with Gravel (ML)</b> Dark Brown (10YR 3/3) Silt, soft, moist, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 3" diameter, subangular to rounded, well graded. No cementation. Roots & grass. No stain/odor 20% Gravel; 25% Sand; 55% Fines		0.0	1/5/18 @ 1320 Clear boring via 3-point hand auger to 7 ft x 12 in OD 1/25/18 @ 1550 Collect soil sample WI-AF-SB610-0001.5-0118 from 0 to 1.5 1/25/18 GW encountered from 1.5 to 7.5 ft bgs	
2.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Yellowish Brown (10YR 5/4) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 5" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No stain/odor 30% Gravel; 50% Sand; 20% Fines				
4.0	2.0	2.0	<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Dark Yellowish Brown (10YR 4/4) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 35% Gravel, 55% Sand; 10% Fines			1/25/18 @ 1540 Begin drilling w/ 10-ft x 8-in OD casing & 10-ft x 7-in OD core barrel 1/25/18 @ 1555 Collect soil sample WI-AF-SB610-07.508-0118 from 7.5 to 8 ft bgs	
6.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Same description as 1.5-6 ft bgs 30% Gravel; 50% Sand; 20% Fines		0.0		
8.0	2.0	2.0	<b>SILT with Sand (ML)</b> Grayish Brown (10YR 5/2) Silt, stiff, damp, low plasticity, rapid dilatancy. Sand, very fine to fine grained, sub-rounded, poorly graded, Moderate cementation. No stain/odor 20% Sand; 80% Fines				
10.0	2.0	2.0	<b>SILT with Sand (ML)</b> Same description as 7.5-8 ft bgs but Gray (GLE Y1 5/N) 20% Sand; 80% Fines				
12.0	2.0	2.0					
14.0	2.0	2.0					
16.0	2.0	2.0					
18.0	2.0	2.0					
20.0	2.0	2.0				1/25/18 @ 1610 Switch to 10-ft x 6-in OD casing and 10-ft x 4-in OD core barrel	
22.0	2.0	2.0	<b>Lean CLAY (CL)</b> Very Dark Gray (GLE Y1 3/N) Clay, stiff, damp, medium plasticity, slow dilatancy. Moderate cementation. No stain/odor 5% Sand; 95% Fines		0.0		
24.0	2.0	2.0					
26.0	2.0	2.0					
28.0	2.0	2.0					
30.0	2.0	2.0					

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET <b>2</b> OF <b>9</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
30.0	2.0				0.0		
32.0	2.0		<b>Sandy Lean CLAY (CL)</b> Dark Gray (GLE Y1 4/N) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand, very fine to fine grained, sub-rounded, poorly. Weak cementation. No stain/odor 40% Sand; 60% Fines				
34.0	2.0		<b>Lean CLAY with Sand (CL)</b> Black (GLE Y1 2.5/N) Clay, very stiff, dry, medium plasticity, slow dilatancy. Sand, very fine to fine grained, sub-rounded, poorly graded, shells. Well cemented. No stain/odor 20% Sand; 80% Fines				
35.0	2.0						
36.0	2.0						3/8" Bentonite Chips
38.0	2.0						
40.0	2.0		<b>Silty SAND (SM)</b> Dark Gray (GLE Y1 4/N) Sand, dense, moist, very fine to fine grained, sub-rounded, poorly graded, micaceous. Fines: low plasticity. Weak cementation. No stain/odor 60% Sand; 40% Fines		0.0		20/40 Sand
42.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Dark Gray (GLE Y1 4/N) Sand, loose, very moist, very fine to fine grained, sub-rounded, poorly graded, micaceous. Fines: low plasticity. Weak cementation. No stain/odor 90% Sand; 10% Fines				
44.0	2.0						
45.0	2.0						2" Schedule 80 PVC - 0.010" Slot
46.0	2.0						
48.0	2.0						
50.0	2.0						
52.0	2.0				0.0		
54.0	2.0						Schedule 80 PVC Sump
55.0	2.0						
56.0	2.0						
58.0	2.0		<b>Silty SAND (SM)</b> Same description as 39-40 ft bgs 60% Sand; 40% Fines				
60.0	2.0						



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 3 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotasonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
60.0	2.0	2.0	<b>Silty SAND (SM)</b> Same description as 56-60 ft bgs 80% Sand; 20% Fines		0.0		
62.0	2.0						
64.0	2.0						
65	2.0						
66.0	2.0						
68.0	2.0						
70	2.0						
70.0	2.0						
72.0	2.0						
74.0	2.0						
75	2.0						
76.0	2.0						
78.0	2.0						
80	2.0						
80.0	2.0						
82.0	2.0						
84.0	2.0						
85	2.0						
86.0	2.0						
88.0	2.0						
90	2.0						



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET <b>4</b> OF <b>9</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
90.0	2.0				0.0		
92.0	2.0						
94.0	2.0						
95	2.0						
96.0	2.0						
98.0	2.0						
100	2.0						
100.0	2.0		<b>Poorly Graded SAND with Silt (SP-SM)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines		0.0		
102.0	2.0						
104.0	2.0						
105	2.0		<b>Poorly Graded SAND (SP)</b> Dark Gray (GLEY1 4/N) Sand, wet, loost, fine to medium sand, sub-angular to sub-rounded, poorly graded, micaceous. No cementation. No stain/odor 95% Sand; 5% Fines			1/26/18 @ 1300 GW encountered from 104 to 109 ft bgs	
106.0	2.0						
108.0	2.0						
110	2.0		<b>Sandy SILT (ML)</b> Dark Gray (GLEY1 4/N) Silt, stiff, moist, low plasticity, rapid dilatancy. Sand, very fine to fine grained, subrounded, poorly graded. Moderate cementation. No stain/odor 30% Sand; 70% Fines		0.0		
112.0	2.0						
114.0	2.0						
115	2.0		<b>Silty SAND (SM)</b> Same description as 56-60 ft bgs 80% Sand; 20% Fines				
116.0	2.0						
118.0	2.0						
120	2.0						





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 5 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
120.0	120.0 - 122.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram Pattern]
122.0	122.0 - 124.0	2.0					
124.0	124.0 - 126.0	2.0					
125	126.0 - 128.0	2.0					
126.0	128.0 - 130.0	2.0	<b>Sandy SILT (ML)</b> Same description as 109-114 ft bgs 30% Sand; 70% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram Pattern]
128.0	130.0 - 132.0	2.0					
130	132.0 - 134.0	2.0	<b>Poorly graded SAND (SP)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram Pattern]
132.0	134.0 - 136.0	2.0					
135	136.0 - 138.0	2.0	<b>Sandy SILT (ML)</b> Same description as 109-114 ft bgs 30% Sand; 70% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram Pattern]
138.0	138.0 - 140.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 104-109 ft bgs 95% Sand; 5% Fines				
140	140.0 - 142.0	2.0					
142.0	142.0 - 144.0	2.0					
144.0	144.0 - 146.0	2.0					
145	146.0 - 148.0	2.0					
146.0	148.0 - 150.0	2.0	<b>Silty SAND (SM)</b> Same description as 56-60 ft bgs 80% Sand; 20% Fines	[Symbolic Log Pattern]	0.0		[Well Diagram Pattern]
148.0	150.0 - 152.0	2.0					
150							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 6 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
155	150.0 - 152.0	2.0			0.0		
	152.0 - 154.0	2.0					
	154.0 - 156.0	2.0					
	156.0 - 158.0	2.0					
160	158.0 - 160.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 104-109 ft bgs 95% Sand; 5% Fines				
	160.0 - 162.0	2.0	<b>Silty SAND (SM)</b> Same description as 56-60 ft bgs 80% Sand; 20% Fines		0.0		
	162.0 - 164.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines				
165	164.0 - 166.0	2.0					
	166.0 - 168.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 104-109 ft bgs 95% Sand; 5% Fines				
	168.0 - 170.0	2.0					
170	170.0 - 172.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines		0.0		
	172.0 - 174.0	2.0					
175	174.0 - 176.0	2.0					
	176.0 - 178.0	2.0	<b>Poorly Graded SAND (SP)</b> Same description as 104-109 ft bgs 95% Sand; 5% Fines				
	178.0 - 180.0	2.0	<b>Poorly Graded SAND with Silt (SP-SM)</b> Same description as 40-56 ft bgs 90% Sand; 10% Fines				



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 7 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
180.0	2.0	2.0	<b>Lean CLAY with Sand (CL)</b> Gray (GLEY1 5/N) Clay, very stiff, dry to damp, medium plasticity, slow dilatancy. Sand, very fine to medium grained, sub-angular to sub-rounded, poorly graded, platy, continuous & discontinuous sand stringers from <1/32" to 0.25" thick. Well cemented. No stain/odor 15% Sand; 85% Fines	[Hatched Pattern]	0.0		[Hatched Pattern]
182.0	2.0						
184.0	2.0						
186.0	2.0						
188.0	2.0						
190.0	2.0						
192.0	2.0						
194.0	2.0						
196.0	2.0						
198.0	2.0						
200.0	2.0	2.0	<b>Lean CLAY with Sand (CL)</b> Same description as 177.5-198 ft bgs 20% Sand; 80% Fines	[Hatched Pattern]	0.0	1/27/18 @ 1350 Continuous cores CC101-CC123 were collected in 2-foot intervals w/ 100% recovery, no VOC detected in BZ of HS from 200 to 245 ft bgs	[Hatched Pattern]
202.0	2.0						
204.0	2.0						
206.0	2.0						
208.0	2.0						
210.0	2.0						



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET 8 OF 9
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotasonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
210.0	2.0		Same description as above		0.0		
212.0	2.0						
214.0	2.0						
216.0	2.0						
218.0	2.0						
220.0	2.0						
222.0	2.0						
224.0	2.0						
226.0	2.0						
228.0	2.0						
230.0	2.0						
232.0	2.0						
234.0	2.0						
236.0	2.0						
238.0	2.0						
240							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-610</b>	SHEET <b>9</b> OF <b>9</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494401.1 N, 1200544.5 E)

ELEVATION : 57.0 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-18' bgs); 6" casing, 4" barrel (18'-248' bgs), Rotosonic

WATER LEVELS : 37.8 ft bgs      START : 1/5/2018      END : 1/29/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
240.0	2.0		Same description as above		0.0		
242.0	2.0						
244.0	2.0						
246.0	2.0						
248.0	2.0						
			Bottom of Boring at 248.0 ft bgs on 1/29/2018			1/27/18 @ 1455 Boring terminated @ 248 ft bgs. Backfill hole with grout via tremie pipe to ~67 ft bgs. Backfill w/ bentonite chips from ~67 ft bgs to 56 ft bgs. See well completion diagram for details	



<b>PROJECT NUMBER:</b> 695610.04.FI.WI	<b>BORING NUMBER:</b> WI-AF-MW-611	<b>SHEET</b> 1 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	2.0	2.0	<b>Silty SAND</b> Strong Brown (7.5YR 4/6) Sand, loose, damp, very fine to fine grained, sub-rounded, poorly graded. Fines: low plasticity. No cementation. Abundant roots. No stain/odor 5% Gravel; 60% Sand; 35% Fines		0.0	2/19/18 @ 1630 Begin potholing for utilities via 3-point hand auger to 7 ft x 16-in OD	<p>Stainless steel casing to 20 ft bgs Sch. 80 PVC casing to stainless steel screen</p>
2.0	2.0	2.0	<b>Silty SAND</b> Same description as 0-0.5 ft bgs but Yellowish Red (5YR 4/6), fewer roots 60% Sand; 40% Fines			2/20/18 @ 1055 Collect soil sample WI-AF-SB611-0H01-0218 from 0.5 to 1 ft bgs	
4.0	2.0	2.0	<b>Poorly Graded SAND</b> Dark Yellowish Brown (10YR 4/4) Sand, loose, moist, very fine to medium grained, sub-angular to sub-rounded, poorly graded. No stain/odor 95% Sand; 5% Fines			2/20/18 @ 1105 Collect soil sample WI-AF-SB611-0103-0218 from 1 to 3 ft bgs	
6.0	2.0	2.0	<b>Poorly Graded SAND</b> Same description as 2-10 ft bgs but Grayish Brown (10YR 5/2), trace gravel to 1" diameter 5% Gravel; 90% Sand; 5% Fines			2/20/18 @ 1110 Collect soil sample WI-AF-SB611P-0103-0218 from 1 to 3 ft bgs	
8.0	2.0	2.0	<b>Poorly Graded SAND</b> Same description as 2-10 ft bgs but Grayish Brown (10YR 5/2), trace gravel to 1" diameter 5% Gravel; 90% Sand; 5% Fines			2/19/18 @ 1710 3-point hand auger complete. No utilities encountered	
10.0	2.0	2.0	<b>Silty SAND</b> Grayish Brown (10YR 5/2) Sand, loose, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor 80% Sand; 20% Fines		0.0	2/20/18 @ 1025 Begin drilling w/ 10-ft x 8-in OD Core Barrel, 10-ft x 10" casing & 10-ft x 11" conductor casing	
12.0	2.0	2.0	<b>Well Graded SAND with Gravel</b> Grayish Brown (10YR 5/2) Sand, loose, moist, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1.5" diameter, subangular to subrounded, well graded. No cementation. No stain/odor. Becomes wet at 13 ft bgs 15% Gravel; 85% Sand			2/20/18 @ 1145 Collect soil sample WI-AF-SB611-1213-0218 from 12 to 13 ft bgs	
14.0	2.0	2.0	<b>Well Graded SAND with Gravel</b> Same description as 12-15 ft bgs but mottled FeO staining throughout, color is Yellowish Brown (5YR 4/6) 15% Gravel; 85% Sand			2/20/18 @ 1040 GW encountered @ 13 ft bgs	
16.0	2.0	2.0	<b>Well Graded SAND</b> Same description as 15-16 ft bgs but Dark Yellowish Brown (10YR 4/4), no FeO staining 10% Gravel; 90% Sand			2/20/18 @ 1055 11" x 10-ft conductor casing terminated @ 10 ft bgs, continue drilling w/ 10-ft x 8" OD core barrel & 10-ft x 10" OD casing	
18.0	2.0	2.0	<b>Well Graded SAND</b> Same description as 16-19 ft bgs but Dark Gray (10YR 4/1) 95% Sand; 5% Fines		0.0		
20.0	2.0	2.0	<b>Poorly Graded SAND</b> Gray (10YR 5/1) Sand, loose, wet, fine to medium grained, sub-angular sub-rounded, poorly graded. No stain/odor 5% Gravel; 90% Sand; 5% Fines				
22.0	2.0	2.0					
24.0	2.0	2.0					
26.0	2.0	2.0					
28.0	2.0	2.0					
30.0	2.0	2.0					



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-611</b>	SHEET 2 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
30.0	2.0		<b>Sandy SILT</b> Gray (GLEY1 5/N) Silt, stiff, moist, low plasticity, rapid dilatancy. Sand, very fine to fine grained, sub-angular to sub-rounded, poorly graded, micaceous, Weak cementation. No stain/odor 45% Sand; 55% Fines		0.0		
32.0	2.0		<b>Silty SAND</b> Grayish Brown (10YR 5/2) Sand, loose wet, fine to medium grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. No stain/odor 80% Sand; 20% Fines				
34.0	2.0		<b>Silty SAND</b> Gray (GLEY1 5/N) Sand, loose, wet, fine to medium sand, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Weak cementation. No stain/odor. Discontinuous silt stringers up to 3" thick 70% Sand; 30% Fines				
36.0	2.0		<b>Poorly Graded SAND with Silt</b> Gray (GLEY1 5/N) Sand, loose, wet, fine to medium sand, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. No cementation. No stain/odor 90% Sand; 10% Fines				
38.0	2.0		<b>Silty SAND</b> Gray (GLEY1 5/N) Sand, dense, moist, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Medium cementation. No stain/odor 60% Sand; 40% Fines		0.0		
40.0	2.0		<b>SILT</b> Gray (GLEY1 5/N) Silt, stiff, moist, low plasticity, rapid dilatancy. Weak cementation. No stain/odor 10% Sand; 90% Fines				
42.0	2.0		<b>Lean CLAY</b> Gray (GLEY1 5/N) Clay, stiff, damp, medium plasticity, slow dilatancy, laminations across core. Medium cementation. No stain/odor 10% Sand; 90% Fines		0.0		
44.0	2.0		<b>Silty SAND</b> Same description as 41-48 ft bgs 60% Sand; 40% Fines				
46.0	2.0		<b>Lean CLAY</b> Same description as 51-55 ft bgs but Dark Gray (GLEY1 4/N), very stiff 5% Sand; 95% Fines				
48.0	2.0						
50.0	2.0						
52.0	2.0						
54.0	2.0						
56.0	2.0						
58.0	2.0						
60							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-611</b>	SHEET 3 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
60.0	2.0				0.0		
62.0	2.0						
64.0	2.0						
65.0	2.0		<b>Lean CLAY</b> Same description as 56-65 ft bgs but Black (GLEY1 2.5/N), very stiff, fetid odor, organic pieces 5% Sand; 95% Fines				
66.0	2.0						
68.0	2.0		<b>Lean CLAY</b> Gray (GLEY1 5/N) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand, very fine to fine grained, sub-angular, poorly graded. Moderate cementation. No stain/odor 20% Sand; 80% Fines				
70.0	2.0						
72.0	2.0				0.0		
74.0	2.0		<b>Lean CLAY</b> Same as 67-72 ft bgs but with silty sand stringers up to 3" thick, continuous across core 20% Sand; 80% Fines				
75.0	2.0						
76.0	2.0						
78.0	2.0		<b>Lean CLAY</b> Very Dark Gray (GLEY1 3/N) Clay, very stiff, dry, medium plasticity, no dilatancy. Well cemented. Fetid odor, no stain, pulverized 5% Sand; 95% Fines				
80.0	2.0						
82.0	2.0				0.0		
84.0	2.0						
85.0	2.0						
86.0	2.0						
88.0	2.0						
90.0	2.0						

← Grout





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-611</b>	SHEET 4 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM		
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
90.0	2.0		<b>Lean CLAY</b> Same description as 76-90 ft bgs but Black (GLEY1 2.5/N), abundant iridescent shells & fragments up to 1.5" diameter 5% Sand; 95% Fines		0.0				
92.0	2.0		<b>Lean CLAY</b> Same description as 76-90 ft bgs but Dark Gray (GLEY1 4/N), damp, no odor 5% Sand; 95% Fines						
94.0	2.0		<b>Lean CLAY</b> Same description as 76-90 ft bgs but not pulverized 5% Sand; 95% Fines						
96.0	2.0								
98.0	2.0								
100.0	2.0								
102.0	2.0		<b>Silty SAND</b> Gray (GLEY1 5/N) Sand, dense, damp, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Moderate cementation. No stain/odor 65% Sand; 35% Fines		0.0			2/20/18 @ 1645 No Recovery from 111-116 ft bgs, core dropped out of core barrel 2/21/18 @ 0840 Begin new 20-ft runs from 111 ft bgs	
104.0	2.0								
106.0	2.0								
108.0	2.0								
110.0	2.0								
112.0	1.0		<b>No Recovery</b>	0.0					
114.0	2.0								
116.0	2.0								
118.0	2.0		<b>Sandy SILT</b> Gray (GLEY1 5/N) Silt, soft, very moist, low plasticity, rapid dilatancy. Sand, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Weak cementation. No stain/odor 40% Sand; 60% Fines						
120.0	2.0								



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-611</b>	SHEET 5 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotasonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
120.0		2.0			0.0		
122.0							
124.0		2.0					
125		2.0	<b>Silty SAND</b> Same description as 100-111 ft bgs but loose, very moist 65% Sand; 35% Fines				
126.0							
128.0		2.0	<b>Sandy SILT</b> Same description as 116-124 ft bgs but wet 40% Sand; 60% Fines			2/21/18 @ 1330 GW encountered @ 128 ft bgs	
130		2.0					
132.0		2.0	<b>Sandy SILT</b> Same description as 128-131 ft bgs but Dary Gray (GLE Y1 4/N), stiff, damp 35% Sand; 65% Fines		0.0		
134.0							
135		2.0					
136.0							
138.0		2.0					
140		2.0	<b>Silty SAND</b> Dary Gray (GLE Y1 4/N) Sand, loose, wet, very fine to medium grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity, micaceous, trace silt, rip-up clasts up to 2" diameter. Weak cementation. No stain/odor 80% Sand; 20% Fines			2/21/18 @ 1550 GW encountered @ 138 ft bgs	
142.0		2.0			0.0		← 3/8" Bentonite Chips
144.0		2.0					← 8/16 Sand
145		2.0					
146.0							
148.0		2.0					
150		1.0	<b>No Recovery</b>			2/22/18 @ 1440 No Recovery from 149-151 ft bgs	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-611</b>	SHEET 6 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (494569.6 N, 1203630.0 E)

ELEVATION : 101.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 11" cond. casing, 10" outer casing, 8" barrel (0'-18' bgs); 6" outer casing, 4" barrel (18'-128' bgs), Rotosonic

WATER LEVELS : 59.3 ft bgs      START : 2/19/2018      END : 2/22/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
150.0	1.0		<b>Silty SAND</b> Same description as 138-149 ft bgs but no silt rip-up clasts 80% Sand; 20% Fines	-	0.0	2/22/18 @ 1530 GW encountered @ 151 ft bgs	<p>6" Stainless Steel - 0.010" Slot</p>
152.0	2.0						
154.0	2.0						
155	2.0						
156.0	2.0						
158.0	2.0						
160	2.0		<b>Poorly Graded SAND with Silt</b> Dark Gray (GLE Y1 4/N) Sand, loose, wet, very fine to medium grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity, micaceous. Weak cementation. No stain/odor 90% Sand; 10% Fines	-		2/22/18 @ 1600 Hard drilling @ 175 ft bgs	<p>Schedule 80 PVC Sump</p>
160.0	2.0						
162.0	2.0						
164.0	2.0		<b>Sandy SILT</b> Dark Gray (GLE Y1 4/N) Silt, very stiff, damp, low plasticity, rapid dilatancy. Sand, very fine to fine grained, sub-angular to sub-rounded, poorly graded. Moderate cementation. No stain/odor 35% Sand; 65% Fines	-		2/22/18 @ 1630 Boring terminated @ 180 ft bgs. Backfill with TR 3/8" bentonite chips from 170-180 ft bgs. Set 6" OD stainless steel screen w/ 0.010" slot 145 165 ft bgs, Sch 80 PVC sump 165-170 ft bgs. 8/16 sand filter pack to 143-170 ft bgs	
165	2.0						
166.0	2.0						
168.0	2.0						
170	2.0		Bottom of Boring at 180.0 ft bgs on 2/22/2018	-			
170.0	2.0						
172.0	2.0						
174.0	2.0						
175	2.0						
176.0	2.0						
178.0	2.0						
180	180.0						



<b>PROJECT NUMBER:</b> 695610.04.FI.WI	<b>BORING NUMBER:</b> WI-AF-MW-612	<b>SHEET 1 OF 4</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490240.1 N, 1189445.2 E)

ELEVATION : 87.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-29' bgs); 6" casing, 4" barrel (29'-89' bgs), Rotasonic

WATER LEVELS : 50.3 ft bgs      START : 1/3/2018      END : 1/9/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>SILT with Sand (ML)</b> Black (10YR 2.5/1) Silt, soft, saturated, low plasticity, medium dilatancy. Sand, very fine to fine grained, sub-rounded, poorly graded. Grass & roots present. No cementation. No stain/odor 15% Sand; 85% Fines		0.0	1/3/18 @ 1320 Clear boring via 3-point HA to 7 ft x 12" OD	
1.0	2.0	2.0	<b>Silty SAND (SM)</b> Strong Brown (7.5YR 5/6) Sand, loose, saturated, fine to medium grained, sub-angular to sub-rounded, poorly graded. Fines: low plasticity. Isolated gravel up to 1" diameter. No cementation. Mottled FeO staining 5% Gravel; 65% Sand; 30% Fines		0.0	1/7/18 @ 0855 Collect soil sample WI-AF-SB612-0001-0118 from 0-1 ft bgs	
3.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Light Brownish Gray (10YR 6/2) Clay, soft, moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-angular to sub-rounded, poorly graded. Isolated gravel up to 1" diameter. Moderate cementation. Mottled FeO staining, isolated MnO staining. No odor 5% Gravel; 40% Sand; 55% Fines		0.0	1/7/18 @ 0830 GW encountered from 0-2 ft bgs	
5.0	2.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Light Brownish Gray (10YR 6/2) Sand, loose, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1.5" diameter, sub-angular to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 15% Gravel; 50% Sand; 35% Fines		0.0	1/7/18 @ 0900 Collect soil sample WI-AF-SB612-0204-0118 from 2-4 ft bgs	
7.0	2.0	2.0	<b>Lean CLAY with Sand (CL)</b> Gray (10YR 5/1) Clay, moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-angular to sub-rounded, poorly graded. Moderate cementation. Mottled FeO staining, no odor 25% Sand; 75% Fines		0.0	1/7/18 @ GW encountered from 4-4.5 ft bgs	
9.0	2.0	2.0	<b>Lean CLAY (CL)</b> Gray (GLEY1 6/N) Clay, moist, medium plasticity, no dilatancy. Well cemented. No stain/odor 10% Sand; 90% Fines		0.0	1/7/18 @ 0920 Collect soil sample WI-AF-SB612-04.505.5-0118 & MS/MSD samples WI-AF-SB612-04.505.5-0118-MS & WI-AF-SB612-04.505.5-0118-SD from 4.5-5.5 ft bgs	
11.0	2.0	2.0	<b>Lean CLAY (CL)</b> Gray (GLEY1 6/N) Clay, stiff, very moist, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-rounded to rounded, poorly graded. Gravel, up to 1.5" diameter, isolated, rounded, well graded, sands appear in 1" to ~4" thick seams, some penetrate across the core, others do not. Moderate cementation. No stain/odor 5% Gravel; 15% Sand; 80% Fines		0.0	1/7/18 @ 0815 Begin drilling w/ 10-ft x 8-inch OD casing & 10ft x 7-inch core barrel	
13.0	2.0	2.0	<b>Sandy Lean CLAY (CL)</b> Gray (GLEY1 5/N) Clay, wet, medium plasticity, slow dilatancy. Sand, fine to medium grained, sub-rounded to rounded, poorly graded. Gravel up to 1.5" diameter, rounded, well graded. Moderate cementation. No stain/odor 15% Gravel; 15% Sand; 70% Fines		0.0		
15.0	2.0	2.0			0.0		
17.0	2.0	2.0			0.0		
19.0	2.0	2.0			0.0		
21.0	2.0	2.0			0.0		
23.0	2.0	2.0			0.0		
25.0	2.0	2.0			0.0		
27.0	2.0	2.0			0.0		
29.0	2.0	2.0			0.0	1/7/18 @ 0855 GW encountered from 27-27.5 ft bgs	
30							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-612</b>	SHEET <b>2</b> OF <b>4</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490240.1 N, 1189445.2 E)

ELEVATION : 87.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-29' bgs); 6" casing, 4" barrel (29'-89' bgs), Rotosonic

WATER LEVELS : 50.3 ft bgs      START : 1/3/2018      END : 1/9/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	31.0	2.0	<b>Lean CLAY with Sand (CL)</b> Same description as 18-27 ft bgs 5% Gravel; 15% Sand; 80% Fines		0.0	1/7/18 @ 0900 Switch to 10-ft x 6" diam casing & 10-ft x 4-inch core barrel, 8" conductor casing left in hole to 29 ft bgs. 6" diam. Cobble @ bottom of cc-15 interval 1/7/18 @ 0950 GW encountered from 32.5 to 33 ft bgs	
	33.0	2.0	<b>Sandy Lean CLAY (CL)</b> Same description as 27-27.5 ft bgs 15% Gravel; 30% Sand; 55% Fines				
35	35.0	2.0	<b>Lean CLAY with Sand (CL)</b> Same description as 18-27 ft bgs 5% Gravel; 15% Sand; 80% Fines				
	37.0	2.0					
	39.0	2.0					
40	41.0	2.0					
	43.0	2.0					
45	45.0	2.0					
	47.0	2.0					
	49.0	2.0	<b>Sandy Lean CLAY (CL)</b> Same description as 27-27.5 ft bgs but moist 15% Gravel; 20% Sand; 65% Fines				
50	51.0	2.0	<b>Lean CLAY with Sand (CL)</b> Same description as 18-27 ft bgs 5% Gravel; 15% Sand; 80% Fines				
	53.0	2.0	<b>Clayey SAND with Gravel (SC)</b> Gray (GLEYS 1 5/N) Sand, dense, wet, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1.5" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. Moderate cementation. No stain/odor 15% Gravel; 40% Sand; 45% Fines				
55	55.0	2.0	<b>Lean CLAY with Sand (CL)</b> Same description as 18-27 ft bgs 5% Gravel; 15% Sand; 80% Fines				
	57.0	2.0					
	59.0	2.0					
60							

1/7/18 @ 1040 GW encountered from 52.5-53.5 ft bgs

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-612</b>	SHEET <b>3</b> OF <b>4</b>
<b>SOIL BORING LOG</b>		

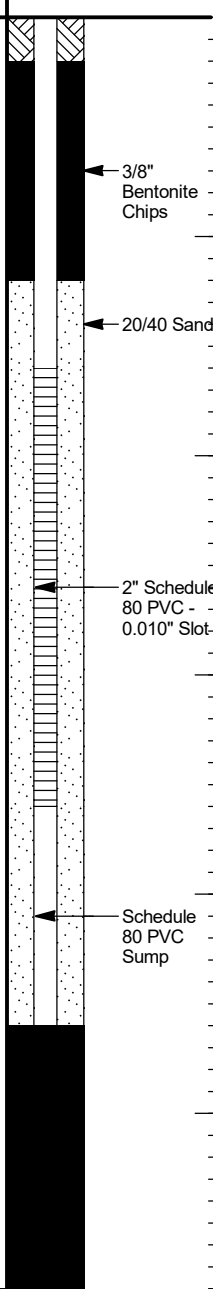
PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490240.1 N, 1189445.2 E)

ELEVATION : 87.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-29' bgs); 6" casing, 4" barrel (29'-89' bgs), Rotasonic

WATER LEVELS : 50.3 ft bgs      START : 1/3/2018      END : 1/9/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
61.0	2.0						
63.0	2.0						
65.0	2.0						
67.0	2.0				0.0		
69.0	2.0		<b>Clayey SAND with Gravel (SC)</b> Same description as 52.5-53.5 ft bgs but moist, well cemented 15% Gravel; 40% Sand; 45% Fines			1/7/18 @ 1300 Collect soil sample WI-AF-SB612-6870-0118 from 68-70 ft bgs	
71.0	2.0		<b>Gravelly Lean CLAY (CL)</b> Gray (GLE Y1 5/N) Clay, very stiff, moist, medium plasticity, no dilatancy. Gravel up to 1.5" diameter, rounded, well graded. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Well cemented. No stain/odor 30% Gravel; 10% Sand; 60% Fines			1/7/18 @ 1135 GW encountered from 70 to 78 ft bgs	
73.0	2.0		<b>Clayey SAND with Gravel (SC)</b> Gray (GLE Y1 5/N) Sand, loose, saturated, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 25% Gravel; 50% Sand; 25% Fines				
75.0	2.0				0.0		
77.0	2.0						
79.0	2.0		<b>Gravelly Lean CLAY (CL)</b> Same description as 69-70 ft bgs 30% Gravel; 10% Sand; 60% Fines				
81.0	2.0						
83.0	2.0		<b>Clayey SAND with Gravel (SC)</b> Dark Gray (GLE Y1 4/N) Sand, loose, saturated, fine to medium grained, sub-angular to sub-rounded, poorly graded. Gravel up to 2.5" diameter, sub-rounded to rounded, well graded. No cementation. No stain/odor 20% Gravel; 60% Sand; 20% Fines			1/7/18 @ 1210 GW encountered from 81 to 84 ft bgs	
85.0	2.0		<b>Gravelly Lean CLAY (CL)</b> Gray (GLE Y1 5/N) Clay, very stiff, moist, medium plasticity, no dilatancy. Gravel up to 1.5" diameter, rounded to sub-rounded, well graded. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Well cemented. No stain/odor 30% Gravel; 20% Sand; 50% Fines			1/7/18 @ 1215 GW encountered from 85 to 88 ft bgs	
87.0	2.0				0.0		
89.0	2.0		<b>Clayey SAND with Gravel (SC)</b> Same description as 81-84 ft bgs 20% Gravel; 60% Sand; 20% Fines				







PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-613</b>	SHEET 1 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490272.5 N, 118887.7 E)

ELEVATION : 92.9 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-20' bgs); 6" casing, 4" barrel (20'-79' bgs), Rotasonic

WATER LEVELS : 55.8 ft bgs      START : 1/3/2018      END : 1/11/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>Sandy SILT (ML)</b> Very Dark Grayish Brown (10YR 3/2) Silt, very soft, saturated, low plasticity, rapid dilatancy. Sand, fine to coarse grained, sub-rounded to rounded, well graded. Organic roots throughout core. No cementation. No stain/odor 5% Gravel; 30% Sand; 65% Fines		0.0	1/3/18 @ 1215 Clear boring via 3-point hand auger to 7 ft x 12-inch OD	
	2.0	2.0				1/10/18 @ 1130 GW encountered from 0-0.5 ft bgs	
	3.0					1/10/18 @ 1155 Collect soil sample WI-AF-SB613-000.5-0118 from 0-0.5 ft bgs	
5	5.0	2.0	<b>Lean CLAY with Sand (CL)</b> Brown, (10YR 5/3) Clay, stiff damp, medium plasticity, slow dilatancy. Sand, fine grained, sub-angular to sub-rounded, poorly graded. Moderate cementation. Mottled FeO staining, isolated MnO staining. No odor, poorly graded. 20% Sand; 80% Fines		0.0	1/10/18 @ 1200 Collect soil sample WI-AF-SB613-0.502-0118 from 0.5-2 ft bgs	
	7.0	2.0			0.0	1/10/18 @ 1210 Collect soil sample WI-AF-SB613-03.5-04.5-0118 from 3.5-4.5 ft bgs	
	9.0	2.0	<b>Sandy Lean CLAY (CL)</b> Light Brownish Gray (10YR 6/2) Clay, stiff, damp, medium plasticity, slow dilatancy. Sand, fine grained, sub-angular to sub-rounded, poorly graded. Moderate cementation. No stain/odor 35% Sand; 65% Fines			1/10/18 @ 1115 Begin drilling w/ 10-ft x 8-in casing & 10-ft x 7-in core barrel	
10	11.0	2.0	<b>Lean CLAY with Sand (CL)</b> Gray (10YR 5/1) Clay, very stiff, damp, medium plasticity, no dilatancy. Sand, fine to medium grained, sub-angular to sub-rounded, poorly graded, sands occur as discontinuous 0.5" thick seams. Gravel up to 3" diameter, sub-angular to rounded, well graded, gravels are isolated. Well cemented. No stain/odor 5% Gravel; 10% Sand; 85% Fines				
	13.0	2.0					
15	15.0	2.0					
	17.0	2.0			0.0		
	19.0	2.0					
20	21.0	2.0	<b>Lean CLAY with Gravel (CL)</b> Dark Gray (GLE1 4/N) Clay, very moist, soft, medium plasticity, slow dilatancy, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 1" diameter, angular to rounded, poorly graded, isolated gravel throughout core, occasionally occurs in 1"-4" continuous seams with sands, seams are more like gravelly/sandy clays. Well cemented. No stain/odor 15% Gravel; 10% Sand; 75% Fines			1/10/18 @ 1200 Switch to 6-inch OD x 10-ft casing & 10-ft x 4-inch OD core barrel, 8-inch casings left in ground from 0-24 ft bgs to act as isolation casings	
	23.0	2.0					
25	25.0	2.0					
	27.0	2.0			0.0		
	29.0	2.0					
30							

← Grout





PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-613</b>	SHEET 2 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490272.5 N, 118887.7 E)

ELEVATION : 92.9 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-20' bgs); 6" casing, 4" barrel (20'-79' bgs), Rotasonic

WATER LEVELS : 55.8 ft bgs      START : 1/3/2018      END : 1/11/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
	31.0	2.0					
		2.0					
	33.0						
		2.0					
35	35.0						
		2.0					
	37.0				0.0		
		2.0					
	39.0						
40		2.0					
	41.0		<b>Gravelly Lean CLAY (CL)</b> Dark Gray (GLE Y1 4/N) Clay, very moist, soft, medium plasticity, slow dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-angular to round, well graded. Moderate cementation. No stain/odor				
		2.0	30% Gravel; 10% Sand; 60% Fines				
	43.0		<b>Gravelly Lean CLAY with Sand (CL)</b> Grayish Brown (10YR 5/2) Clay, moist, soft, medium plasticity, slow dilatancy. Sand, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 3" diameter, sub-angular to rounded, well graded. Moderately cemented. No stain/odor				
45		2.0	25% Gravel; 20% Sand; 55% Fines				
	45.0		<b>Poorly Graded SAND (SP)</b> Olive Gray (5Y 5/2) Sand, loose, damp, very fine to fine grained, sub-rounded, poorly graded. No cementation. No stain/odor				
		2.0	95% Sand; 5% Fines				
	47.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Gray (10YR 5/1) Sand, loose, dry, fine to coarse grained, sub-angular to sub-rounded, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor				
		2.0	20% Gravel; 70% Sand; 10% Fines				
	49.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 48-49 ft bgs but Dark Gray (10YR 4/1), moist & subrounded to rounded sand				
50		2.0	35% Gravel; 55% Sand; 10% Fines			1/10/18 @ 1415 hard drilling	
	51.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 48-49 ft bgs				
		2.0	20% Gravel; 70% Sand; 10% Fines				
	53.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 49-55 ft bgs but very moist				
		2.0	30% Gravel; 60% Sand; 10% Fines			1/10/18 @ 1515 Collect soil sample WI-AF-SB613-5657.5-0118 from 56-57.5 ft bgs	
	55.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 48-49 ft bgs				
55		2.0	20% Gravel; 70% Sand; 10% Fines			1/10/18 @ 1440 GW encountered from 57.5 to 58.5 ft bgs	
	57.0		<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 48-49 ft bgs				
		2.0	20% Gravel; 70% Sand; 10% Fines			1/10/18 @ 1430 hard drilling, large rock at bottom of run	
	59.0						3/8" Bentonite Chips
60							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-613</b>	SHEET 3 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (490272.5 N, 118887.7 E)

ELEVATION : 92.9 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-20' bgs); 6" casing, 4" barrel (20'-79' bgs), Rotasonic

WATER LEVELS : 55.8 ft bgs      START : 1/3/2018      END : 1/11/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
61.0	2.0	2.0	<b>Clayey SAND (SC)</b> Dark Gray (10YR 4/1) Sand, loose, wet, fine to coarse grained, subrounded to rounded sand, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 10% Gravel; 60% Sand; 30% Fines	[Symbolic Log Pattern]	0.0	1/10/18 @ 1500 GW encountered from 59.5-79 ft bgs	<p>← 20/40 Sand</p> <p>← 2" Schedule 80 PVC - 0.010" Slot</p> <p>← Schedule 80 PVC Sump</p>
63.0	2.0	<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Same description as 48-49 ft bgs 20% Gravel; 70% Sand; 10% Fines					
65.0	2.0	<b>Clayey SAND (SC)</b> Same description as 57.5-58.5 ft bgs but dry and dense 10% Gravel; 60% Sand; 30% Fines					
67.0	2.0	<b>Clayey SAND (SC)</b> Same description as 57.5-58.5 ft bgs but saturated 10% Gravel; 60% Sand; 30% Fines					
69.0	2.0	<b>Well Graded SAND with Clay &amp; Gravel (SW-SC)</b> Dark Gray (10YR 4/1) Sand, loose, saturated, fine to coarse, sub-rounded to rounded, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 20% Gravel; 70% Sand; 10% Fines					
71.0	2.0						
73.0	2.0						
75.0	2.0						
77.0	2.0						
79.0	2.0						
			<b>Clayey SAND with Gravel (SC)</b> Dark Gray (10YR 4/1) Sand, loose, saturated, fine to coarse grained, sub-rounded to rounded, well graded. Gravel up to 2" diameter, sub-rounded to rounded, well graded. Fines: medium plasticity. No cementation. No stain/odor 20% Gravel; 60% Sand; 20% Fines Bottom of Boring at 79.0 ft bgs on 1/11/2018			1/10/18 @ 1545 Boring terminated @ 79 ft bgs. Prepare to install monitoring well construction w/ 2" OD Sch. 80 PVC screened w/ 0.010" slot between 64-74 ft bgs w/ a 5-ft sump below. #20x40 sand filter pack from 62-79 ft bgs w/ a 5-ft bgs. See well completion diagram for details	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-614</b>	SHEET 1 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (489730.1 N, 1189249.0 E)

ELEVATION : 89.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-40' bgs); 6" casing, 4" barrel (40'-69' bgs), Rotasonic

WATER LEVELS : 52.8 ft bgs      START : 1/3/2018      END : 1/6/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	1.0	1.0	<b>SILT with Sand (ML)</b> Black (10YR 2.5/1) Silt, soft saturated, low plasticity, medium dilatancy. Sand, very fine to fine grained, poorly graded, sub-rounded. No cementation. Roots & grass present. No stain/odor 15% Sand; 85% Fines  <b>Lean CLAY (CL)</b> Grayish Brown (10YR 5/2) Clay, dense, moist, medium plasticity, no dilatancy. Well cemented. FeO mottling, no odor 10% Sand; 90% Fines	[Symbolic Log Pattern]	0.1	1/3/18 @ 0930 Clear boring to 7 ft x 12 in OD via 3-point HA 1/5/18 @ 0915 Collect soil sample WI-AF-SB614-0001-0118 from 0-1 ft bgs 1/5/18 @ 0918 Collect soil sample WI-AF-SB614-0102-0118 from 1-2 ft bgs	[Well Diagram Pattern]
1.0	2.0						
3.0	2.0						
5	5.0	2.0	<b>Lean CLAY (CL)</b> Gray (GLE Y1 5/N) Clay, dense, moist, medium plasticity, no dilatancy. Well cemented. No stain/odor 10% Sand; 90% Fines	[Symbolic Log Pattern]	0.0	1/5/18 @ 0900 Begin drilling w/ 10-ft x 8-in OD outer casing & 10-ft x 7-inch OD core barrel 1/5/18 @ 0920 Collect soil sample FD WI-AF-SB614P-0102-0118 from 1-2 ft bgs	[Well Diagram Pattern]
7.0	2.0						
9.0	2.0						
10	11.0	2.0	<b>Lean CLAY (CL)</b> Same description as 9-14 ft bgs, but saturated 10% Sand; 90% Fines  <b>Lean CLAY with Sand (CL)</b> Gray (GLE Y1 5/N) Clay, dense, moist, medium plasticity, no dilatancy. Sand, fine to coarse grained, sub-angular to angular, well graded, sands are concentrated in seams ~0.5-2 ft apart, some penetrate core, others do not. Gravel up to 2" diameter, isolated, sub-rounded to rounded, well graded. Well cemented. No stain/odor 10% Gravel; 10% Sand; 80% Fines	[Symbolic Log Pattern]	0.0	1/5/18 @ 0930 GW encountered from 14-14.5 ft bgs	[Well Diagram Pattern]
13.0	2.0						
15	15.0	2.0					
17.0	2.0	2.0	[Symbolic Log Pattern]	0.0	[Well Diagram Pattern]		
19.0	2.0						
20	21.0	2.0					
23.0	2.0	2.0	[Symbolic Log Pattern]	0.0	[Well Diagram Pattern]		
25	25.0	2.0					
27.0	2.0	2.0					
29.0	2.0	2.0	[Symbolic Log Pattern]	0.0	[Well Diagram Pattern]		
30							

← Grout



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-614</b>	SHEET 2 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (489730.1 N, 1189249.0 E)

ELEVATION : 89.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-40' bgs); 6" casing, 4" barrel (40'-69' bgs), Rotasonic

WATER LEVELS : 52.8 ft bgs      START : 1/3/2018      END : 1/6/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
31.0	2.0						
33.0	2.0						
35.0	2.0						
37.0	2.0				0.0		
39.0	2.0						
41.0	2.0					1/5/18 @ 1000 Switch to 10-ft x 6-inch OD outer casing & 10-ft x 4-inch OD core barrel	
43.0	2.0		<b>Sandy Lean CLAY (CL)</b> Gray (10YR 6/1) Clay, moist, dense, medium plasticity, slow dilatancy. Sand, fine to coarse grained, sub-rounded to rounded, well graded, sands appear in 0.25" seams, spaced ~0.5"-1" apart, seams penetrate across core. Well cemented. No stain/odor 30% Sand; 70% Fines			1/5/18 @ 1025 GW encountered from 43-48 ft bgs	
45.0	2.0		<b>Clayey GRAVEL with Sand (GC)</b> Gray (10YR 5/1) Gravel, wet, loose, up to 2" diameter, rounded, well graded. Sand, fine to coarse grained, sub-round to round, well graded. Fines: medium plasticity. No stain/odor 50% Gravel; 20% Sand; 30% Fines		0.0		
47.0	2.0		<b>Well Graded GRAVEL with Clay &amp; Sand (GW-GC)</b> Gray (10YR 5/1) Gravel, wet, loose, up to 3" diameter, rounded, well graded. Sand, fine to coarse grained, sub-rounded to rounded, well graded. Fines: medium plasticity. No stain/odor 60% Gravel; 30% Sand; 10% Fines			1/5/18 @ 1030 Hard drilling	
49.0	2.0		<b>Well Graded GRAVEL with Clay &amp; Sand (GW-GC)</b> Light Gray (10YR 7/1) Gravel, dry, loose, up to 1.5" diameter, sub-angular to rounded, well graded. Sand, very fine to coarse grained, sub-angular to sub-rounded, well graded. Fines: medium plasticity. No stain/odor 60% Gravel 30% Sand; 10% Fines			1/5/18 @ 1035 GW encountered from 40-54 ft bgs	
51.0	2.0		<b>Clayey GRAVEL with Sand (GC)</b> Same description as 43-46 ft bgs 50% Gravel; 20% Sand; 30% Fines			1/5/18 @ 1055 No recovery from 54-59 ft bgs	
53.0	1.0		<b>Clayey GRAVEL with Sand (GC)</b> Same description as 43-46 ft bgs, but saturated 50% Gravel; 20% Sand; 30% Fines				
55.0	0.0		<b>No Recovery</b>		0.0		← 3/8" Bentonite Chips
57.0	0.0						
59.0	0.0					1/5/18 @ 1100 Hard drilling	← 20/40 Sand
60						1/5/18 @ 1110 GW encountered from 59-68 ft bgs	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-614</b>	SHEET 3 OF 3
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (489730.1 N, 1189249.0 E)

ELEVATION : 89.4 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC; 8" surface casing, 7" barrel (0'-40' bgs); 6" casing, 4" barrel (40'-69' bgs), Rotasonic

WATER LEVELS : 52.8 ft bgs      START : 1/3/2018      END : 1/6/2018      LOGGER : M. Green

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
65	61.0	2.0	<b>Clayey GRAVEL with Sand (GC)</b> Same description as 43-46 ft bgs but saturated & gravel up to 4" diameter 50% Gravel; 20% Sand; 30% Fines		0.0	1/5/18 @ 1125 No recovery from 68-69 ft bgs 1/5/18 @ 1130 Boring terminated @ 69 ft bgs, hole covered until materials delivered to build well 1/6/18 @ 0915 Construct monitoring well screened from 59-69 ft bgs w/ 0.010" slot screen Sch. 80 PVC 2" OD w/ #20x40 sand filter pack from 57-69 ft bgs. Flush mount completion @ surface. See well construction diagram for more details	
	63.0	2.0	<b>Well Graded GRAVEL with Clay &amp; Sand (GW-GC)</b> Gray (10YR 5/1) Gravel, saturated, loose, up to 3.5" diameter, rounded, well graded. Sand, fine to coarse grained, sub-rounded to rounded, well graded. Fines: medium plasticity. No stain/odor 65% Gravel; 25% Sand; 10% Fines				
	65.0	2.0					
	67.0	2.0					
	69.0	1.0	<b>No Recovery</b>				
			Bottom of Boring at 69.0 ft bgs on 1/6/2018				

2" Schedule 80 PVC - 0.010" Slot



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET 1 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
0.0	0.0		<b>Sandy SILT</b> Dark Brown Silt, moist. Sand, fine grained. Abundant organics 30% Sand; 70% Fines		0.0	2/13/18 Clear boring to 3-point hand auger to 7 ft x 12-in OD; 1418 Start drilling 1430 Collect soil sample WI-AF-SB615-0001-0218 from 0-1 ft bgs	<p>Stainless steel casing to 20 ft bgs Sch. 80 PVC casing to stainless steel screen</p>
5.0	5.0		<b>Silty SAND with Gravel</b> Light Brown Sand, moist, well graded, fine to coarse grained, rounded to sub-rounded. Gravel up to 0.5" diameter 10% Gravel; 60% Sand; 30% Fines		0.0	1445 Collect soil sample WI-AF-SB615-0506-0218 from 5-6 ft bgs	
5.0	5.0		<b>Clayey SAND with Gravel</b> Light Brown Sand, fine to coarse grained, well graded. Gravel up to 0.25" diameter. Fe staining, reddish brown 10% Gravel; 50% Sand; 40% Fines		0.0		
10.0	10.0		<b>Lean CLAY</b> Grayish Brown Clay, very stiff, medium to low plasticity. No sand. No gravel. Becomes sandy from 5.5-7.75 ft bgs 100% Fines		0.0		
10.0	10.0		<b>Lean CLAY</b> Same description as 4.5-6 ft bgs but trace gravel, root casts apparent, mottled reddish brown 100% Fines		0.0		
10.0	10.0		<b>Lean CLAY</b> Same description as 4.5-6 ft bgs 100% Fines		0.0		
10.0	10.0		<b>Lean CLAY</b> Same description as 6-6.5 ft bgs, but no gravel, increased moisture 100% Fines		0.0		
15.0	15.0		<b>Clayey SAND with Gravel</b> Grayish Brown Sand, well graded, fine to medium grained. Gravel sub-rounded to rounded up to 1.75" diameter. Trace cobbles, rounded up to 3" diameter 15% Gravel; 60% Sand; 25% Fines		0.0		
20.0	10.0		<b>Lean CLAY</b> Gray Clay, stiff, moist, medium to high plasticity. No sand. No gravel. No mottling 100% Fines		0.0		
25.0	25.0		<b>Lean CLAY</b> Same description as 16-23 ft bgs, but trace rounded gravel up to 1" diameter 100% Fines		0.0	1520 Drillers pause to plug mud tub; 1545 Issues resarting mud puppy (battery needed charging); Resume drilling @ 1640	
25.0	25.0		<b>Lean CLAY</b> Same description as 23-23.5 but no gravel 100% Fines		0.0		
25.0	25.0		<b>Lean CLAY</b> Same description as 23.5-25 ft bgs, but trace gravel up to 0.75" diameter 100% Fines		0.0		
30.0					0.0		



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET 2 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			
		10.0	<b>Lean CLAY with Gravel</b> Dark Gray Clay, stiff, moderate plasticity, low dilatancy. Gravel up to 2" diameter, subrounded 10% Gravel; 90% Fines			<p style="text-align: right;">← Grout</p>
35	35.0		<b>Lean CLAY with Gravel</b> Same description as 26.75-32 ft bgs but becomes trace subangular, coarse sand, gravel up to 1.5" diameter 10% Gravel; 90% Fines		2/13/18 @ 1730 Stop drilling 0840 Resume drilling	
40			<b>Lean CLAY with Gravel</b> Same description as 32-38 ft bgs, but trace gravel, subrounded, gravel up to 3.75" diameter 10% Gravel; 90% Fines			
45		22.5	<b>Lean CLAY with Gravel</b> Same description as 38-43 ft bgs, but decreased stiffness, becomes stiff, medium plasticity, medium dilatancy 10% Gravel; 90% Fines			
50			<b>Lean CLAY with Gravel</b> Same description as 43-48 ft bgs, but decreased gravel 10% Gravel; 90% Fines			
55	55.0		<b>Lean CLAY with Sand, Silt, &amp; Gravel</b> Dark Gray Clay, medium stiff, moist, medium plasticity, low dilatancy. Sand, fine grained. Gravel up to 0.75" diameter, sub-rounded 5% Gravel; 10% Sand; 80% Fines			
			<b>Lean CLAY with Sand, Silt, &amp; Gravel</b> Same description as 50-52.5 ft bgs but decreases sand and gravel 5% Gravel; 10% Sand; 85% Fines			
60			<b>Lean CLAY</b> Dark Gray Clay, stiff, moist, medium to low plasticity, low dilatancy. No sand. No gravel 100% Fines			
			<b>Silty SAND with Clay</b> Sharp Contact @ 55.5 ft bgs Grayish Brown Sand, medium dense, moist, well graded, normal grading, fine to coarse grained. Thick laminations of silt and sand from 56.5 ft bgs 30% Sand; 70% Fines			



PROJECT NUMBER:  
**695610.04.FI.WI**

BORING NUMBER:  
**WI-AF-MW-615** SHEET 3 OF 7

# SOIL BORING LOG

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA

LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft

DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

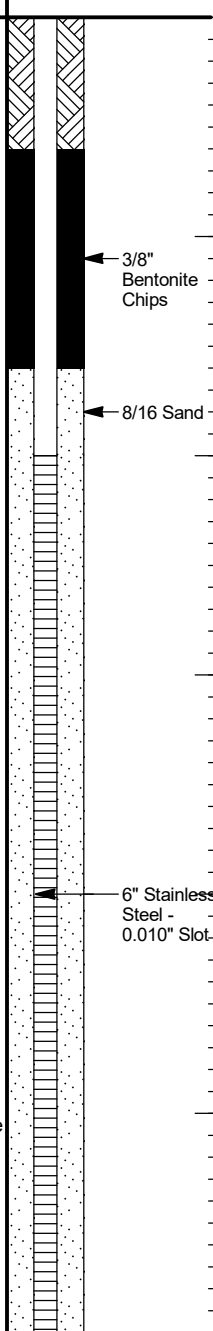
WATER LEVELS : 54.6 ft bgs

START : 2/13/2018

END : 2/15/2018

LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
		11.5	<b>Silty SAND with Clay</b> Same description as 55.5-57.5 ft bgs, but gravelly, Light Gray, dense 30% Sand; 70% Fines			Driller notes harder drilling @ 61' bgs	
			<b>Silty GRAVEL with Sand</b> Dark Gray Gravel, dense, decreased moisture, angular to sub-rounded. Sand, fine grained. Gravel up to 2" diameter 60% Gravel; 5% Sand; 35% Fines				
65	65.0		<b>Silty GRAVEL with Sand</b> Same description as 58.75-60 ft bgs but decreased fines 60% Gravel; 5% Sand; 35% Fines			1015 Drillers stop to work on rig control box; 1030 Resume drilling; 1100 pause drilling for drill head maintenance; 1110 Resume drilling 1130 Collect soil sample WI-AF-SB615-6768-0218 & MS/MSD from 67-68 ft bgs	
			<b>Silty GRAVEL with Sand</b> Same description as 60-62.5 ft bgs but loose, decreased cohesion, no clay, trace cobbles, subangular to angular gravel up to 1.25" diameter 60% Gravel; 5% Sand; 35% Fines				
			<b>Silty SAND with Gravel</b> Dark Gray Sand, loose, poorly graded, fine sand, angular to sub-rounded. Gravel up to 1.5" diameter. No clay 10% Gravel; 50% Sand; 40% Fines				
70			<b>Silty SAND with Gravel</b> Same description as 63.75-65.5 ft bgs but dense, increased gravel, trace cobbles 10% Gravel; 50% Sand; 40% Fines				
			<b>Silty SAND with Gravel</b> Same description as 65.5-67 ft bgs but increased moisture 10% Gravel; 50% Sand; 40% Fines				
		19.5	<b>Well Graded GRAVEL with Sand &amp; Silt</b> Dark Gray Gravel, loose, well graded, cobbles up to 2.75" diameter. Sand, sub-angular. Saturated at 69.5 ft bgs 70% Gravel; 20% Sand; 10% Fines				
			<b>Well Graded GRAVEL with Sand &amp; Silt</b> Same description as 68-74.5 ft bgs but medium to coarse sand 70% Gravel; 20% Sand; 10% Fines				
			<b>Well Graded GRAVEL with Sand &amp; Silt</b> Same description as 74.5-75.5 ft bgs but gravel subangular to subrounded up to 2" diameter 70% Gravel; 20% Sand; 10% Fines				
80			<b>Well Graded GRAVEL with Sand &amp; Silt</b> Same description as 75.5-81 ft bgs but with trace cobbles 70% Gravel; 20% Sand; 10% Fines				
			<b>Well Graded GRAVEL with Sand</b> Gravel, up to 2" diameter, loose, saturated, well graded. Sand, coarse grained, rounded. Trace cobbles 90% Gravel; 10% Sand				
85	85.0		<b>Well Graded GRAVEL with Sand</b> Same as 85.5-87.5 ft bgs but large cobbles up to 6" diameter, little to no fines 90% Gravel; 10% Sand			1220 Stop drilling for lunch; Resume drilling @ 1300	
90							







PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET 4 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
95	19.5		<p><b>Well Graded GRAVEL with Sand</b> Same as 87.5-89.5 ft bgs but well graded gravel 90% Gravel; 10% Sand</p> <p><b>Well Graded GRAVEL with Sand and Silt</b> Dark Gray Gravel, dense, sub-angular to rounded, up to 1.75" diameter. Sand, medium to coarse grained. Fines increase with depth 70% Gravel; 20% Sand; 10% Fines</p>				
100			<p><b>Lean CLAY</b> Sharp contact at 97 ft bgs Dark Gray Clay, stiff, moist, low plasticity. No gravel. No sand. Increased moisture at 98.5 ft bgs 100% Fines</p>				
105	105.0		<p><b>Clayey SAND</b> Dark Gray Sand, fine grained, coarser with depth, poorly graded, moist, cohesive 70% Sand; 30% Fines</p> <p><b>Poorly Graded SAND with Clay</b> Dark Gray Sand, medium grained, coarser with depth, poorly graded, moist, non-cohesive 95% Sand; 5% Fines</p>				<p>Hard drilling from 109-114 ft bgs</p>
110		9.0	<p><b>Well Graded SAND with Gravel</b> Dark Gray Sand, fine to coarse grained, wet, angular to sub-rounded sand, Gravel up to 1.25" diameter 10% Gravel; 85% Sand; 5% Fines</p> <p><b>Clayey SAND with Silt</b> Light Gray Sand, dense, saturated. Increased clay with depth 60% Sand; 40% Fines</p>				
115			<p><b>Clayey SAND with Silt</b> Same description as 105.75-108 ft bgs but trace gravel 60% Sand; 40% Fines</p> <p><b>Clayey SAND with Silt</b> Same description as 108-108.5 ft bgs but decreased moisture 60% Sand; 40% Fines</p>				
120	114.0	18.0	<p><b>Clayey SAND with Silt and Gravel</b> Dark Gray Sand, very dense, slightly moist, poorly graded sand, subangular. Gravel up to 1.5" diameter. Decreased moisture with depth. Boulder from 114-115.5. Increasing density with depth. Fine sand at 118 ft bgs 10% Gravel; 50% Sand; 40% Fines</p>			<p>Extremely hard drilling to 125 ft bgs</p>	



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET 5 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
125	125.0		<b>Lean CLAY with Sand and Gravel</b> Dark Gray Clay, hard, medium plasticity. Sand, coarse grained, angular. Gravel up to 0.75" diameter, cohesive, slightly moist 5% Gravel; 5% Sand; 90% Fines	[Diagonal Hatching]		Extremely hard drilling	[Diagonal Hatching]
130		6.5	<b>Well Graded SAND with Gravel</b> Dark Gray Sand, fine to coarse grained, angular. Gravel up to 0.5" diameter 5% Gravel; 95% Sand <b>Lean CLAY with Sand</b> Dark Gray Clay, hard, medium plasticity, slightly moist. Sand, coarse grained. No gravel 5% Sand; 95% Fines	[Dotted]		hard drilling	[Diagonal Hatching]
135						Lost bottom ~ft of run	[Diagonal Hatching]
138.0			<b>Lean CLAY with Sand and Gravel</b> Dark Gray Clay, hard, low plasticity. Sand, coarse grained, sub-angular. Gravel, sub-angular 10% Gravel; 10% Sand; 80% Fines	[Diagonal Hatching]		Large amount of sand going through mud puppy from formation Stop drilling @ 1715 on 2/14/18; Start drilling @ 0850 on 2/15/18; Additional runto recover bottom ~5 ft of run + 2 additional ft to 140' bgs	[Diagonal Hatching]
140	140.0	11.0	<b>Well Graded SAND with Clay</b> Dark Gray Sand, loose, wet. Sand, medium to coarse grained, sub-angular to angular 95% Sand; 5% Fines <b>Lean CLAY with Sand</b> Same description as 126-136.25 ft bgs 5% Sand; 95% Fines	[Dotted]		Came out of core hot	[Diagonal Hatching]
145			<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Dark Gray Clay, hard, moist. Sand, angular to sub-angular sand. Gravel, trace cobbles, gravel up to 2" diameter 20% Gravel; 15% Sand; 65% Fines <b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 140-143.5 ft bgs but with weathered granite gravels and cobbles; large cobble at 151.5 ft bgs 20% Gravel; 15% Sand; 65% Fines	[Diagonal Hatching]			[Diagonal Hatching]
150		27.0					[Diagonal Hatching]



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET 6 OF 7
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotasonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
155	155.0						
160		18.0	<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 143.5-157 ft bgs, but hard, phenocrysts of olivine, quartz, and feldspar apparent; large cobbles at 161.5 20% Gravel; 15% Sand; 65% Fines			Hard drilling Cores come out in long, unbroken sections	
165			<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 157-165 ft bgs, but angular to rounded gravel up to 2" diameter 20% Gravel; 15% Sand; 65% Fines			Cores come out hot; Hard drilling	
170	167.0		<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 165-169.5 ft bgs but Dark Grayish Brown 20% Gravel; 15% Sand; 65% Fines				
175		25.0	<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 169.5-174 ft bgs, but increased gravel with depth, hard, low plasticity 20% Gravel; 15% Sand; 65% Fines			Extremely hard drilling	
180							



PROJECT NUMBER: <b>695610.04.FI.WI</b>	BORING NUMBER: <b>WI-AF-MW-615</b>	SHEET <b>7</b> OF <b>7</b>
<b>SOIL BORING LOG</b>		

PROJECT : NAS Whidbey Island Ault Field, Oak Harbor, WA      LOCATION : Oak Harbor, WA (488678.1 N, 1189640.4 E)

ELEVATION : 92.1 ft      DRILLING CONTRACTOR : Yellow Jacket

DRILLING METHOD AND EQUIPMENT : Terrasonic 150CC, 11" cond. casing, 10" outer casing, 8" barrel (0'-20' bgs); 6" outer casing, 4" barrel (20'-210' bgs), Rotosonic

WATER LEVELS : 54.6 ft bgs      START : 2/13/2018      END : 2/15/2018      LOGGER : E. Cutler

DEPTH BELOW SURFACE (FT)	INTERVAL (FT)	RECOVERY (FT)	SOIL DESCRIPTION	SYMBOLIC LOG	PID READING HEADSPACE	COMMENTS	WELL DIAGRAM
			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
182.0			<b>Gravelly Lean CLAY with Sand &amp; Silt</b> Same description as 174-180 ft bgs, but abundant shale fragments (green), shale fragments increase with depth 20% Gravel; 15% Sand; 65% Fines				
185		12.0	<b>SHALE</b> Sharp contact at 184.5 ft bgs Pale Green, thinly bedded (1/8"), weak, dry, platy texture; slight increase in moisture on fresh surfaces at 188.5 ft bgs			Shale completely pulverized; not able to determine whether fractured due to pulverization from drill	
190	190.0					Extremely hard drilling	
195	195.0	9.5				1230 Stop drilling for lunch; 1305 Resume drilling 1330 Stopped drilling for rig maintenance; 1345 Resume drilling Intact shale segment from 195-197.5 ft bgs Used water to drill from 195-207 ft bgs	
200		11.0	<b>SHALE</b> Same description as 184.5-195 ft bgs; intact 2.5-ft section, one clear fracture, no evidence of groundwater flow through fracture, no staining of secondary mineralization; Fe staining along cleavage surfaces at 201.5 ft bgs			1440 Stopped drilling @ 210 ft bgs on 2/15/18; Backfill with bentonite grout from 210-95 ft bgs; 6" OD Sch. 80 PVC sump 95-90 ft bgs, 6" OD stainless steel screen w/ 0.010" slot 90-70 ft bgs, 6" OD well casing 90-20 ft bgs, 6" stainless steel casing 20-0 ft bgs, flush mount completion.	
210	210.0		Bottom of Boring at 210.0 ft bgs on 2/15/2018				

# WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. 39963

UNIQUE WELL I.D. # \_\_\_\_\_

Water Right Permit No. 33/1/13P

(1) OWNER: Name \_\_\_\_\_ Address \_\_\_\_\_

(2) LOCATION OF WELL: County ISLAND SE 1/4 SW 1/4 Sec 13 T. 33 N. R. 1E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) SLEEPER RD, OAK HARBOR WA.

(3) PROPOSED USE:  Domestic  Industrial  Municipal   
 Irrigation  Test Well  Other   
 DeWater

**(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION**

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

(4) TYPE OF WORK: Owner's number of well (if more than one) 1  
 Abandoned  New well  Method: Dug  Bored   
 Deepened  Cable  Driven   
 Reconditioned  Rotary  Jetted

MATERIAL	FROM	TO
SANDY	0	12
HARD PAN	12	23
DIRTY SAND	23	29
WATER SAND	29	36

(5) DIMENSIONS: Diameter of well 6 inches.  
 Drilled 35 feet. Depth of completed well 35 ft.

(6) CONSTRUCTION DETAILS:  
 Casing installed: 6 ft. Diam. from 0 ft. to 30 ft.  
 Welded  Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 Liner installed  Threaded  Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

WELL HAS 100' RADIUS -  
 WELL DRILLED TO ISLAND  
 COUNTY B.O. REGS  
 Rennie John 129

**RECEIVED**  
**APR - 6 1994**  
 DEPT. OF ECOLOGY

Perforations: Yes  No   
 Type of perforator used \_\_\_\_\_  
 SIZE of perforations \_\_\_\_\_ in. by \_\_\_\_\_ in.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Screens: Yes  No   
 Manufacturer's Name Cook  
 Type STAINLESS Model No. \_\_\_\_\_  
 Diam. 6 Slot size 12 from 30 ft. to 35 ft.  
 Diam. \_\_\_\_\_ Slot size \_\_\_\_\_ from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Gravel packed:  No  Size of gravel \_\_\_\_\_  
 Gravel placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Surface seal: Yes  No  To what depth? 18 ft.  
 Material used in seal BENTONITE  
 Did any strata contain unusable water? Yes  No   
 Type of water? \_\_\_\_\_ Depth of strata \_\_\_\_\_  
 Method of sealing strata off \_\_\_\_\_

(7) PUMP: Manufacturer's Name \_\_\_\_\_  
 Type: \_\_\_\_\_ H.P. \_\_\_\_\_

(8) WATER LEVELS: Land-surface elevation above mean sea level 90 ft.  
 Static level 15 ft. below top of well Date 4-94  
 Artesian pressure \_\_\_\_\_ lbs per square inch Date \_\_\_\_\_  
 Artesian water is controlled by \_\_\_\_\_ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level  
 Was a pump test made? Yes  No  If yes, by whom? \_\_\_\_\_  
 Yield \_\_\_\_\_ gal./min. with \_\_\_\_\_ ft. drawdown after \_\_\_\_\_ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test \_\_\_\_\_  
 Bailor test 10 gal./min. with 10 ft. drawdown after 4 hrs.  
 Airtest \_\_\_\_\_ gal./min. with stem set at \_\_\_\_\_ ft. for \_\_\_\_\_ hrs.  
 Artesian flow \_\_\_\_\_ g.p.m. Date \_\_\_\_\_  
 Temperature of water \_\_\_\_\_ Was a chemical analysis made? Yes  No

**WELL CONSTRUCTOR CERTIFICATION:**

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME WHIDDEY DRILL  
(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)

Address OAK HARBOR WA

(Signed) Rennie John License No. 129  
(WELL DRILLER)

Contractor's Registration No. WHD0209 MM Date APR 1994

(USE ADDITIONAL SHEETS IF NECESSARY)



**WATER WELL REPORT**  
**STATE OF WASHINGTON**

6962  
Application No. **3301-13N**  
Permit No. \_\_\_\_\_

(1) OWNER: Name [Redacted] Address [Redacted]

(2) LOCATION OF WELL: County **ISLAND** — SW ¼ SW ¼ Sec 13 T.33 N. R.1E W.M.  
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic  Industrial  Municipal   
Irrigation  Test Well  Other

(4) TYPE OF WORK: Owner's number of well (if more than one) **3**  
New well  Method: Dug  Bored   
Deepened  Cable  Driven   
Reconditioned  Rotary  Jetted

(5) DIMENSIONS: Diameter of well **6** inches.  
Drilled **33 40** ft. Depth of completed well **40** ft.

(6) CONSTRUCTION DETAILS:  
Casing installed: **6** " Diam. from **0** ft. to **35 1/2** ft.  
Threaded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Welded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Perforations: Yes  No   
Type of perforator used \_\_\_\_\_  
SIZE of perforations \_\_\_\_\_ in. by \_\_\_\_\_ in.  
\_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
\_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
\_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Screens: Yes  No   
Manufacturer's Name **COOK**  
Type **STAINLESS** Model No. **304**  
Diam. **6** Slot size **10** from **35** ft. to **40** ft.  
Diam. \_\_\_\_\_ Slot size \_\_\_\_\_ from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Gravel packed: Yes  No  Size of gravel: \_\_\_\_\_  
Gravel placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Surface seal: Yes  No  To what depth? **18 +** ft.  
Material used in seal **BENTONITE**  
Did any strata contain unusable water? Yes  No   
Type of water? \_\_\_\_\_ Depth of strata \_\_\_\_\_  
Method of sealing strata off \_\_\_\_\_

(7) PUMP: Manufacturer's Name \_\_\_\_\_  
Type: \_\_\_\_\_ H.P. \_\_\_\_\_

(8) WATER LEVELS: Land-surface elevation above mean sea level **50 +** ft.  
Static level **13** ft. below top of well Date **SEPT 88**  
Artesian pressure \_\_\_\_\_ lbs. per square inch Date \_\_\_\_\_  
Artesian water is controlled by \_\_\_\_\_ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level  
Was a pump test made? Yes  No  If yes, by whom? \_\_\_\_\_  
Yield: **10** gal./min. with **10** ft. drawdown after **4** hrs.  
" " " " "  
" " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test \_\_\_\_\_  
Bailer test **1.5** gal./min. with **1.5** ft. drawdown after **2** hrs.  
Artesian flow \_\_\_\_\_ g.p.m. Date \_\_\_\_\_  
Temperature of water \_\_\_\_\_ Was a chemical analysis made? Yes  No

(10) WELL LOG:  
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
<b>GRAVELLY HARD PAN</b>	<b>0</b>	<b>18</b>
<b>FINE SOOPY SAND</b>	<b>18</b>	<b>25</b>
<b>WATER IN SAND</b>	<b>25</b>	<b>40</b>
<b>WATER SAND (FINER)</b>	<b>40</b>	

Work started **SEPT 88** Completed **SEPT 88**

WELL DRILLER'S STATEMENT:  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME **WHIDBEY DRILLERS** (Type or print)  
Address **OAK HARBOR WA 98271**  
[Signed] **Perrisa Jala** (Well Driller)  
License No. **129** Date **SEPT 19 88**

Table 8 - Well records, Whidbey Island - Cont.

Well no.	Owner or tenant	Well			Water level below land surface		Pump		Use	Remarks	
		Alt. (feet)	Depth (feet)	Diam. (in.)	Feet	Date	Yield (gpm)	Draw-down (feet)			
T. 33 N., R. 1 E. - Continued											
12M1	[REDACTED]	220	9	48	4.32	7-15-64	--	--	DS	Supplies 10 cattle, 3 horses.	
12M2		113	48	6	26	8- 1-60	16	16	D	Supplies 2 families. L.	
						26.52	7-15-64				
12N1		38	46	6	21	8- 2-60	10b	12.5	D	Supplies 3 families. L.	
12N2		45	55	6	29	9-20-58	15b	10	D	Noticeable iron. L, P.	
13M1		20	15+	--	Dry	1953	--	--	D		
						14.80	7-16-64				
13Q1		125	165	6	92	5- 1-61	4	1	C	Used to wash sand and gravel. L, P.	
						91.60	7-15-64				
14D1		U. S. Naval Air Sta., Ault Field (well 6)	34	156	8-6	--	--	50	--	X	L.
14M1	U. S. Naval Air Sta., Ault Field (well 2)	28	182	--	--	--	100	--	X	Aquifer from 148 to 165 ft. L.	
15Q1	U. S. Naval Air Sta., Ault Field (well 1)	42	445	--	--	--	30	--	X	Aquifer from 34 to 40 ft, from 67 to 130 ft, and from 165 to 172 ft. L.	

Table 11 - Drillers' logs of representative wells, Whidbey Island - Cont.

Materials	Thickness (feet)	Depth (feet)
33/1-12H2 - Continued		
Hardpan, soft -----	3	131
Sand and gravel, water-bearing -----	24	155
33/1-12J1. John Van Every. Altitude 205 ft. Drilled by Lambert Vander Sloep, 1962.		
Gravel -----	46	46
Clay with gravel -----	8	54
Clay, sandy -----	36	90
Sand and gravel -----	4	94
Gravel -----	5	99
Hardpan, gravelly -----	13	112
Gravel, water-bearing -----	6	118
33/1-12M2. Andy Kammenga. Altitude 113 ft. Drilled by Lambert Vander Sloep, 1960.		
Gravel -----	33	33
Sand, red to brown -----	15	48
Clay -----	--	48+
33/1-12N1. Mrs. M. Prothero. Altitude 38 ft. Drilled by Lambert Vander Sloep, 1960. Screen, 10-slot, 41-46 ft.		
Topsoil -----	--	--
Clay, brown -----	--	18
Clay, sandy -----	10	28
Sand, water-bearing -----	18	46
33/1-12N2. Ida Jenkins. Altitude 45 ft. Drilled by Lambert Vander Sloep, 1958. Screen, 14-slot, 50-55 ft.		
Topsoil -----	3	3
Hardpan -----	21	24
Clay, sandy -----	11	35
Sand, gravelly near bottom -----	20	55
33/1-13Q1. Everett Bros. Const. Co. Altitude 125 ft. Drilled by Lambert Vander Sloep, 1961. Screen, 10-slot, 150-155 ft; 14-slot, 155-165 ft.		
Gravel -----	4	4
Clay, sandy -----	10	14



Table 11 - Drillers' logs of representative wells, Whidbey Island - Cont.

Materials	Thickness (feet)	Depth (feet)
33/1-13Q1 - Continued		
Gravel-----	2	16
Hardpan-----	13	29
Clay, sandy-----	3	32
Sand, water-bearing-----	6	38
Clay, sandy, gray clay streaks-----	34	72
Clay, black-----	15	87
Clay, sandy-----	18	105
Sand, clayey-----	10	115
Sand, water-bearing-----	50	165
33/1-14D1. U. S. Naval Air Sta., Ault Field (well 6). Altitude 34 ft. Drilled by J. J. Bell. Screen, 146-156 ft.		
Topsoil-----	2	2
Sand, fine, brown, and clay, water-bearing-----	32	34
Sand, fine, blue, and clay, to very fine blue sand, to sand with wood, to coarser sand (less wood), to medium sand; water-bearing-----	122	156
33/1-14M1. U. S. Naval Air Sta., Ault Field (well 2) Altitude 28 ft. Drilled in 1942.		
Clay-----	23	23
Sand-----	11	34
"Quicksand"-----	22	56
Clay, sandy-----	24	80
"Quicksand"-----	68	148
Sand, coarse, and gravel, to coarse sand; water-bearing-----	17	165
Sand, fine-----	17	182
33/1-15Q1. U. S. Naval Air Sta., Ault Field (well 1). Altitude 42 ft.		
Gravel and boulders-----	34	34
Sand, water-bearing (15 gpm)-----	6	40
"Quicksand"-----	27	67
Gravel to sandy clay, water-bearing (30 gpm)-----	63	130
Gravel-----	5	135
Clay and gravel-----	30	165
Gravel and boulders, water-bearing (12 gpm)-----	7	172
Clay and gravel-----	63	235
Clay, sandy-----	90	325
Clay, to clay and gravel-----	23	348
"Sandstone"-----	3	351
Clay, sandy-----	7	358
Clay "shale"-----	22	380
Clay and "shale," cemented sand and gravel with marine fossils-----	35	415
Clay-----	30	445

# WATER WELL REPORT

STATE OF WASHINGTON

33/01-13R  
 Application No.

Permit No. \_\_\_\_\_

(1) OWNER: Name \_\_\_\_\_ Address \_\_\_\_\_

(2) LOCATION OF WELL: County ISLAND SE 1/4 SE 1/4 Sec. 13 T.33 N. R.1E W.M.

Bearing and distance from section or subdivision corner \_\_\_\_\_

(3) PROPOSED USE: Domestic  Industrial  Municipal   
 Irrigation  Test Well  Other

(4) TYPE OF WORK: Owner's number of well (if more than one) 2  
 New well  Method: Dug  Bored   
 Deepened  Cable  Driven   
 Reconditioned  Rotary  Jetted

(5) DIMENSIONS: Diameter of well 6 inches.  
 Drilled 176 ft. Depth of completed well 176 ft.

(6) CONSTRUCTION DETAILS:  
 Casing installed: 6" Diam. from 0 ft. to 166 1/2 ft.  
 Threaded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 Welded  " Diam. from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Perforations: Yes  No   
 Type of perforator used \_\_\_\_\_  
 SIZE of perforations \_\_\_\_\_ in. by \_\_\_\_\_ in.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
 \_\_\_\_\_ perforations from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Screens: Yes  No   
 Manufacturer's Name Johnson  
 Type STAINLESS Model No. \_\_\_\_\_  
 Diam. 6 Slot size 15 from 166 ft. to 171 ft.  
 Diam. 6 Slot size 20 from 171 ft. to 176 ft.

Gravel packed: Yes  No  Size of gravel: \_\_\_\_\_  
 Gravel placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft.

Surface seal: Yes  No  To what depth? 16 ft.  
 Material used in seal CLAY  
 Did any strata contain unusable water? Yes  No   
 Type of water? \_\_\_\_\_ Depth of strata \_\_\_\_\_  
 Method of sealing strata off \_\_\_\_\_

(7) PUMP: Manufacturer's Name \_\_\_\_\_  
 Type: Sub H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level 150 + ft.  
 Static level 136 1/2 ft. below top of well Date MAY 87  
 Artesian pressure \_\_\_\_\_ lbs. per square inch Date \_\_\_\_\_  
 Artesian water is controlled by \_\_\_\_\_ (Cap. valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level  
 Was a pump test made? Yes  No  If yes, by whom? \_\_\_\_\_  
 Yield: \_\_\_\_\_ gal./min. with \_\_\_\_\_ ft. drawdown after \_\_\_\_\_ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test \_\_\_\_\_  
 Bailor test 20 gal./min. with 10 - ft. drawdown after 4 hrs.  
 Artesian flow \_\_\_\_\_ g.p.m. Date \_\_\_\_\_  
 Temperature of water \_\_\_\_\_ Was a chemical analysis made? Yes  No

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
GRAVEL	0'	11'
GRAVELY HARD SAND + GRAVEL	11'	28'
SAND IN FINE SAND	28'	60'
CLAY - C. I. A. Y. MIX FINE SAND	60'	76'
WATER (GRAVEL) MIX	76'	151'
CLAY	151'	176'

50 + G.P.M.

RECEIVED  
 MAY 21 1987  
 DEPARTMENT OF ECOLOGY  
 NORTHWEST REGION

Work started MAY, 1987. Completed MAY 11, 1987.

WELL DRILLER'S STATEMENT:  
 This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME WHISBEY WELL DRILLERS  
 (Person, firm, or corporation) (Type or print)

Address CAK HARBOUR WASH.

[Signed] Rennis Fisher  
 (Well Driller)

License No. 129 Date MAY, 1987

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-1

Sheet 1 of 2

Date(s) Drilled	7/9/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	50 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level	43.2 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Well Installed	Location	N 492334.45, E 1201493.2		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
		Type Number	Blows/6in.	Recovery (%)	PID/OVM (ppm)					
0							GRAVEL		Start: 1415 Finish: 1545	
							<1' concrete at ~4' (driller interpretation)			
	5	RR-MW-1-5	13 15 18	100	0.0		GM Brown and gray silty sandy GRAVEL			
							SP 2 x 3" lenses, 1 gray 1 brown (bottom) Fine SAND (medium dense) (dry) (no odor, no staining) (fill)			
	10	RR-MW-1-10 Retained for Lab	14 16 9	100	0.0		SP Grading dark grayish brown silty fine SAND (medium dense) (damp) (no odor, no staining) (fill)			
	15	RR-MW-1-15	11 5 7	100	0.0		SP Same as above (no odor, no staining) (fill)			
	20	RR-MW-1-20	7 7 10	100	0.0		ML Dark gray with brown mottling SILT, trace fine sand, trace shell fragments (non-plastic) (stiff) (very moist) (no odor, no staining) (fill)			
	25	RR-MW-1-25	16 21 19	100	0.0		CL Dark gray, light gray, brown, tan mottled CLAY (non-plastic) (hard) (damp) (no odor, no staining) (fill)			
	30									

ENV2 WITH WELL. J:\PROJECTS\IGRFX\AECOM\PROJECTS\60419897\NASWI\OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B\AECOM.GLB\_URSSEA3.GDT 11/21/15



Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-2

Sheet 1 of 2

Date(s) Drilled: 7/9/15	Logged By: E. Lillywhite	Checked By:
Drilling Method: Hollow Stem Auger	Drilling Contractor: Cascade Drilling	Total Depth of Borehole: 50 feet bgs
Drill Rig Type: CME75	Drill Bit Size/Type: 9" O.D.	Ground Surface Elevation (feet MSL):
Groundwater Level: 42.5 ft bgs ATD	Sampling Method: D&M	Hammer Data: 140 lb wireline
Borehole Backfill: Well Installed	Location: N 492179.74, E 1201516.51	

ENV2 WITH WELL. J:\PROJECTS\IGRFX\AECOM\PROJECTS\60419897\NASWI OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B.AECOM.GLB\_URSSEA3.GDT\_11/21/15

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)					
0						ML	GRAVEL		Start: 1000 Finish:	
5	5.6	RR-MW-2-5	56	100	0.0		Dark gray gravelly SILT, shell fragments (non-plastic) (medium soft) (damp) (no odor, no staining) (marine deposit fill)			
10	10.7	RR-MW-2-10 Retained for Lab	76	100	0.0		Grading dark gray and dark brown mottled gravelly SILT, little fine sand, shell fragments, root organics and trace native grass (non plastic) (medium soft) (damp) (no odor, no staining) (marine deposit fill)			
15	10.7	RR-MW-2-15	107	100	0.0		Grading dark grayish brown SILT, root organics and likely native grass fragments (low plasticity) (soft) (no odor, no staining) (fill)			
20	10.7	RR-MW-2-20	107	33	0.0		Same as above (medium plasticity) (no odor, no staining)			
25	10.12	RR-MW-2-25 Retained for Lab	1012	45		SP	Same as above Gray fine SAND (damp) (no odor, no sheen) (fill)			
30										

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-2

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number	Blows/6in.	Recovery (%)				
30	30	RR-MW-2-30	31	66	0.0		Grading gray very fine to fine SAND, trace medium sand, little fine gravel, cobble in shoe (density unknown due to cobble) (dry) (no odor, no staining) (native)		
35	35	RR-MW-2-35	29	75	0.0				Same as above
40	40	RR-MW-2-40 Retained for Lab	33	66	0.0				Same as above (dense) (moist)
45	45	RR-MW-2-45	33	100	0.0				Same as above (wet to saturated)
50	50	RR-MW-2-50	75	100	0.0				Same as above (saturated)
55	55						<p>Boring was completed to 50' bgs.            Groundwater was encountered at 42.5 ft bgs.            Boring was completed as monitoring well:            +3-40 ft bgs Schedule 40 PVC casing            40-50 ft bgs Schedule 40 PVC 0.010 slot screen            0-3 ft bgs Concrete            3-35 ft bgs Bentonite backfill            35-38 ft bgs Bentonite chips 3/8"            38-50 ft bgs 2/12 Monterrey sand            Aboveground monument</p>		
60	60								
65	65								

ENV2 WITH WELL. J:\PROJECTS\GREFX\AECOM\PROJECTS\60419897\NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B.AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-3

Sheet 1 of 2

Date(s) Drilled: 7/16/15	Logged By: D. Hose	Checked By:
Drilling Method: Hollow Stem Auger	Drilling Contractor: Cascade Drilling	Total Depth of Borehole: 37 feet bgs
Drill Rig Type: CME75	Drill Bit Size/Type: 9" O.D.	Ground Surface Elevation (feet MSL):
Groundwater Level: 30 ft bgs ATD	Sampling Method: D&M	Hammer Data: 140 lb wireline
Borehole Backfill: Well Installed	Location: N 492538.65, E 1201475.33	

ENV2 WITH WELL. J:\PROJECTS\IGRFX\AECOM\PROJECTS\60419897\NASWI\OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B\AECOM\GLB\_URSSEA3.GDT\_11/2/15

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)					
0						SP	Native vegetation Brown fine SAND with gravel, poorly sorted, rounded gravel to 2" (moist) (native)		Start: 0830 Finish: 1000	
5		RR-MW-3-5 Retained for Lab	13 21 22	83	0.0		Brown fine SAND, poorly sorted, no gravel, rounded (no odor)			
10			8 12 13	100	0.0		Same as above			
15		RR-MW-3-15 Retained for Lab	15 15 16	100	0.0		Same as above			
20			21 30 30	100	0.0		Same as above			
25		RR-MW-3-25 Retained for Lab	23 30 29	100	0.0		Same as above (increasing moisture but not saturated)			
30										

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-3

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND WELL DETAILS
		Type	Number	Blows/ 6in.	Recovery (%)				
30	19 21 23		100	0.0		SP	Same as above, medium SAND (wet, saturated at 30')		
35	14 21 40		100	0.0					
	50 50 50		100	0.0					
40							<p>Boring was completed to 37.0' bgs.            Groundwater was encountered at 30.0 ft bgs.            Boring was completed as monitoring well:            +2.75-27 ft bgs Schedule 40 PVC casing            27-37 ft bgs Schedule 40 PVC 0.010 slot screen            0-3 ft bgs Concrete            3-25 ft bgs Bentonite chips 3/8"            25-37 ft bgs 2/12 Monterrey sand            Aboveground monument</p>		
45									
50									
55									
60									
65									

ENV2 WITH WELL. J:\PROJECTS\GREFX\AECOM\PROJECTS\60419897\NASWI OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT 11/2/15



Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-4

Sheet 1 of 1

Date(s) Drilled	7/16/15	Logged By	D. Hose	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	27 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level	20.5 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Well Installed	Location	N 492447.82, E 1201306.4		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)					
0							Native vegetation Brown fine SAND with gravel to 2", some silt (loose) (moist) (native)		Start: 1245 Finish: 1330	
5	5	RR-MW-4-5 Retained for Lab	6 5 6	100	0.0		Grading brown fine SAND, no gravel, poorly sorted (moist) (no odor)			
10	10		13 15 20	100	0.0		Same as above			
15	15	RR-MW-4-15 MS/MSD Retained for Lab	15 20 20	100	0.0		Same as above			
20	20	RR-MW-4-20 Retained for Lab	20 20 20	100	0.0		Grading coarse SAND with gravel to 1" (wet)	20.5 ft ▼		
25	25		13 14 50	100	0.0		Same as above (saturated)			
30							Boring was completed to 27.0' bgs. Groundwater was encountered at 20.5 ft bgs. Boring was completed as monitoring well: +2.9-17 ft bgs Schedule 40 PVC casing 17-27 ft bgs Schedule 40 PVC 0.010 slot screen 0-3 ft bgs Concrete 3-15 ft bgs Bentonite chips 3/8" 15-27 ft bgs 2/12 Monterrey sand Aboveground monument			

ENV2 WITH WELL. J:\PROJECTS\GREFX\AECOM\PROJECTS\60419897\NASWI OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B.AECOM.GLB\_URSSEA3.GDT\_11/2/15

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Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-MW-5

Sheet 1 of 1

Date(s) Drilled: 7/17/15	Logged By: D. Hose	Checked By:
Drilling Method: Hollow Stem Auger	Drilling Contractor: Cascade Drilling	Total Depth of Borehole: 26.5 feet bgs
Drill Rig Type: CME75	Drill Bit Size/Type: 9" O.D.	Ground Surface Elevation (feet MSL):
Groundwater Level: 19 ft bgs ATD	Sampling Method: D&M	Hammer Data: 140 lb wireline
Borehole Backfill: Well Installed	Location: N 492248.19, E 1201292.06	

ENV2 WITH WELL. J:\PROJECTS\GRI\XAE\COM\PROJECTS\60419897\NASWI\OAK HARBOR\60419897\_ROTBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B.AECOM.GLB\_URSSEA3.GDT\_11/21/15

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	Well Completion Schematic	REMARKS AND WELL DETAILS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)					
0						SP	Native vegetation Brown fine SAND and GRAVEL, gravel to 2", subrounded (loose) (native)		Start: 0905 Finish: 1000	
5			12 11 12	100	0.0		Grading dark brown to gray fine SAND, minor rounded gravel to 1/4", poorly graded (dry to moist)			
10			12 14 15	100	0.0		Same as above, brown, no gravel			
15			13 15 15	100	0.0		Same as above (increasing moisture)			
20			15 16 15	100	0.0		Same as above (saturated)	19 ft ▼		
25			19 50 50	100	0.0	SM	Brown silty fine SAND, silt 50% (non-plastic) (no odor, no staining)			
30							Boring was completed to 26.5' bgs. Groundwater was encountered at 19.0 ft bgs. Boring was completed as monitoring well: +2.9-16 ft bgs Schedule 40 PVC casing 16-26 ft bgs Schedule 40 PVC 0.010 slot screen 0-3 ft bgs Concrete 3-14 ft bgs Bentonite chips 3/8" 14-26 ft bgs 2/12 Monterrey sand Aboveground monument			

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Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-1

Sheet 1 of 2

Date(s) Drilled	7/8/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	60 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	41 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492466.8, E 1201599.42		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)				
0						GM		Start: 1125 Finish: 1325	
5	5	RR-SB-1-5 Retained for Lab & DUP	6 4 5	33	0.0		Brown gravelly SAND, some silt (loose) (dry) (non-recognized odor, black staining) (fill)		
10	10	RR-SB-1-10 Retained for Lab	6 5 7	30	0.0	SP	Gray fine SAND (loose) (dry) (unknown cleaner-like odor) (fill)		
15	15	RR-SB-1-15	16 21 20	80	0.0		Gray very fine SAND, wood - milled and round ~3" (medium dense) (dry) (no odor) (fill)		
20	20	RR-SB-1-20	30 30 20	100	0.0		Gray very fine to medium SAND (dense) (dry) (no odor, no stain)		
25	25	RR-SB-1-25	33 50/6"	100	0.0		Same as above, trace light gray to white concrete dust, powdery at 25.5' (very dense) (no odor, no stain) (probable fill/native interface)		
30	30								

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-1

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type	Number	Blows/6in.	Recovery (%)				
30		RR-SB-1-30	29	100	0.0		SP	Gray very fine to medium SAND, trace gravel (very dense) (dry) (no odor, no staining) (native)	
35		RR-SB-1-35	34	100	0.0			Gray fine to coarse SAND, little gravel (very dense) (dry) (no odor, no staining)	
40		RR-SB-1-40 Retained for Lab	26	100	0.0			Same as above (grades to wet)	41 ft ▼
45		RR-SB-1-45	40	100	0.0			Same as above (saturated)	
50		RR-SB-1-50	42	100	0.0			Same as above	
55		RR-SB-1-55	50/6"	100	0.0			Heave, same as above	
60		RR-SB-1-60	50/6"	100	0.0			Heave	
65								Boring was completed to 60' bgs. Groundwater was encountered at 41.0' bgs. Boring was backfilled with bentonite.	

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM\PROJECTS\60419897\NAWI OAK HARBOR\60419897\ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-2

Sheet 1 of 2

Date(s) Drilled	7/20/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	41.5 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	41 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492359.04, E 1201631.06		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)				
0						CL		Start: 1012 Finish:	
5		RR-SB-2-5 Retained for Lab	3 3 3	100	0.0		Gray CLAY, trace peat, little fine shell fragments (non-plastic) (soft) (dry) (no odor, no staining) (fill)		
10		RR-SB-2-10 Retained for Lab	8 9 10	60	0.0	SP	Gray fine SAND, cobble in shoe (medium dense) (damp to dry) (no odor, no staining) Grading brown Grading gray		
15		RR-SB-2-15	12 15 23	100	0.0		Light gray very fine to fine SAND (dense) (no odor, no staining) (native)		
20		RR-SB-2-20	14 21 35	100	0.0		Same as above (no odor, no staining)		
25		RR-SB-2-25	14 22 30	100	0.0		Gray very fine to fine gravelly SAND (dense) (no odor, no staining) (native)		
30									

ENV2\_W/O WELL\_J:\PROJECTS\GRFX\AECOM\PROJECTS\60419897\_NASWI\_OAK\_HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSA3B\_AECOM.GLB\_URSSA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-2

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type	Number	Blows/6in.	Recovery (%)				
	30	RR-SB-2-30	24	50/6"	100	0.0		Same as above (very dense) (moist)	
	35	RR-SB-2-35	33	50/6"	100	0.0		Same as above	
	40	RR-SB-2-40		50/6"	100	0.0		Gray fine SAND (very dense) (very moist, grading to saturated at 41') (no odor, no staining) 41 ft ▼	
	41.5	Retained for Lab						Boring was completed to 41.5' bgs. Groundwater was encountered at 41' bgs. Boring was backfilled with bentonite.	
	45								
	50								
	55								
	60								
	65								

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM\PROJECTS\60419897\NAWSI OAK HARBOR\60419897\ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B.AECOM.GLB\_URSSEA3.GDT\_11/2/15



Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-3

Sheet 1 of 2

Date(s) Drilled	7/17/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	48 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	~43 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492443.93, E 1201506.56		


Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/ 6in.	Recovery (%)	PID/OVM (ppm)				
0						GM		Start: 1250 Finish:	
5		RR-SB-3-5 Retained for Lab	10 14 15	60	0.0		Brown, dark brown and gray SILT/SAND/GRAVEL (dense) (dry) (no odor, no stain) (fill)		
10		RR-SB-3-10	5 3 3	100		GC	Dark gray gravelly CLAY, shell fragments (non-plastic) (soft) (dry) (no odor, no staining) (fill) (marine deposit)		
15			5 6 6	100		CL	Dark brownish gray CLAY (medium plastic) (soft) (moist) (no odor, no staining) (fill)		
20		RR-SB-3-20	5 4 3	100	0.0	SP	Medium gray fine SAND, trace gravel (loose) (moist) (no odor, no staining) (fill), possibly reworked till from former borrow area		
25		RR-SB-3-25 Retained for Lab	5 4 4	100	0.0		Same as above		
30									

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897 ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-3

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS	
		Type	Number	Blows/6in.	Recovery (%)					PID/OVM (ppm)
	30	RR-SB-3-30	24	50/6"	100	0.0		SP	Medium gray very fine to fine SAND, little gravel (very dense) (moist) (no odor, no staining) (native)	
	35	RR-SB-3-35	29	50/6"	100	0.0		Same as above		
	40	RR-SB-3-40 Retained for Lab		50/6"	100	0.0		Same as above		
	45	RR-SB-3-45	46	50/6"	100	0.0		Same as above (saturated)		
	50								Boring was completed to 48' bgs. Groundwater was encountered at ~43' bgs. Boring was backfilled with bentonite.	
	55									
	60									
	65									

43 ft ▼

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM\PROJECTS\60419897\NAWSI\_OAK\_HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B\_AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-4

Sheet 1 of 2

Date(s) Drilled	7/20/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	40 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	~40 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492277.89, E 1201582.15		


Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/6in.	Recovery (%)	PID/OVM (ppm)				
0						CL		Start: 1145 Finish:	
5		RR-SB-4-5 Retained for Lab	6 7 7	100	0.0	GM	Gray CLAY (soft) (dry) (non-plastic)		
						SM	Brown SILT/SAND/GRAVEL, root organics (medium dense) (damp) (no odor, no staining) (fill)		
							Brown SILT/SAND, little gravel, highly organic with roots, small twigs, grasses (loose) (damp) (organic odor, no staining) (fill)		
10		RR-SB-4-10	4 4 4	100	0.0				
15		RR-SB-4-15	7 7 8	100	0.0	GC	Same as above mixed with gray clay, very disturbed (non-plastic) (medium soft) (organic odor, no staining) (fill)		
20		RR-SB-4-20 Retained for Lab	16 21 20	100	0.0	SP	Mostly gray fine SAND with balls of gray clay and brown clay (dense) (no odor, no staining) (fill)		
25		RR-SB-4-25	22 30 30	100	0.0		Gray fine SAND (very dense) (damp) (no odor, no staining) (native)		
30									

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897 ROTHBECK\_RAVINE\_LOGS.GPJ\_URSS3A3B AECOM.GLB\_URSS3A3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-4

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS		
		Type	Number	Blows/6in.	Recovery (%)					PID/OVM (ppm)	
	30	RR-SB-4-30	22	50/6"	100	0.0		Gray very fine to fine SAND, trace gravel (very dense) (damp) (no odor, no staining) (native)			
	35	RR-SB-4-35	12	20/30	100					Gray fine SAND, trace gravel (very dense) (damp to moist) (no odor, no staining) (native)	
	40	RR-SB-4-40	27	50/6"	100	0.0				Same as above (very moist grading to wet)	40 ft ▼
		Retained for Lab						Boring was completed to 40' bgs. Groundwater was encountered at ~40' bgs. Boring was backfilled with bentonite.			
	45										
	50										
	55										
	60										
	65										

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM\PROJECTS\60419897\NAWI OAK HARBOR\60419897\ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-5

Sheet 1 of 2

Date(s) Drilled	7/12/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	60 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	~45 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492371.27, E 1201390.27		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/6in.	Recovery (%)	PID/OVM (ppm)				
0						GM		Start: 1025 Finish:	
5	4 4 4	RR-SB-5-5	4 4 4	30	0.0		Light brown gravelly sandy fine SILT (dry) (no odor, no staining) (fill)		
10	5 6 5	RR-SB-5-10 Retained for Lab	5 6 5	100	0.0	CL	Gray with brown mottling gravelly CLAY (damp to moist) (no odor, no staining) (fill)		
15	8 8 10	RR-SB-5-15	8 8 10	0					
20	8 9 12	RR-SB-5-20	8 9 12	30	0.0	SM	Gray fine sandy SILT, trace brown mottling (medium dense) (moist) (no odor, no staining) (fill)  Boulder or concrete at 22.5' during drilling per driller		
25	20 22 2	RR-SB-5-25 Retained for Lab	20 22 2	100	0.0	SP	Gray very fine to fine SAND (medium dense) (moist) (no odor, no staining) (probable fill due to blow counts and surrounding borings)		
30									

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSS3A3B AECOM.GLB\_URSS3A3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-5

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type	Number	Blows/6in.	Recovery (%)				
30		RR-SB-5-30	36	50/6"	100	0.0		Gray fine SAND (very dense) (damp) (no odor, no staining) (native)	
35		RR-SB-5-35	41	50/6"	100	0.0		Gray very fine to fine SAND (very dense) (damp) (no stain, no odor) (native)	
40		RR-SB-5-40 Retained for Lab	43	50/6"	100	0.0		Gray fine SAND (very dense) (very moist) (no odor, no staining) (native)	
45		RR-SB-5-45	39	50/6"	100	0.0		Grayish brown very fine to fine SAND (very dense) (wet) (no odor, no staining) (native)	45 ft ▼
50		RR-SB-5-50		50/6"	100	0.0		Gray fine SAND (very dense) (no odor, no staining) (saturated) (native)	
55		RR-SB-5-55		50/6"	100	0.0		Same as above	
60		RR-SB-5-60		50/6"	100			Same as above	
65								Boring was completed to 60' bgs. Groundwater was encountered at ~45' bgs. Boring was backfilled with bentonite.	

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-6

Sheet 1 of 2

Date(s) Drilled	7/8/15	Logged By	E. Lillywhite	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling	Total Depth of Borehole	60 feet bgs
Drill Rig Type	CME75	Drill Bit Size/Type	9" O.D.	Ground Surface Elevation (feet MSL)	
Groundwater Level (feet bgs)	~45 ft bgs ATD	Sampling Method	D&M	Hammer Data	140 lb wireline
Borehole Backfill	Bentonite Chips	Location	N 492260.22, E 1201431.84		

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type Number	Blows/6in.	Recovery (%)	PID/OVM (ppm)				
0						SM/GM		Start: 1505 Finish:	
5		RR-SB-6-5	4 4 4	50	0.0		Light gray sandy SILT, some fine gravel (loose) (dry) (no odor, no staining) (fill)		
10		RR-SB-6-10 Retained for Lab	4 6 7	100	0.0	SM/SC	Light-medium GRAY silty clayey fine SAND (slightly plastic) (loose) (moist) (no odor, no staining) (fill)		
15		RR-SB-6-15	7 7 7	100	0.0	CL	Light brown gravelly CLAY (medium plastic) (soft) (moist) (no odor, no staining) (fill)		
20		RR-SB-6-20	4 10 10	100	0.0	GC	Light brown clayey GRAVEL, some sand (non-plastic) (dense) (moist) (no odor, no staining) (fill)		
25		RR-SB-6-25	14 16 21	100	0.0	SP	Gray fine to medium SAND, trace fine gravel (medium dense) (dry) (no odor, no staining) (fill)		
30									

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSSEA3B AECOM.GLB\_URSSSEA3.GDT\_11/2/15

Project: Rothbeck Ravine  
 Project Location: NAWSI  
 Project Number: 60419897

# Log of Boring RR-SB-6

Sheet 2 of 2

Elevation, feet	Downhole Depth, feet	SAMPLES				Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
		Type	Number	Blows/6in.	Recovery (%)				
	30	RR-SB-6-30	30	100	0.0		SP	Same as above with little coarse sand, 2" silt lense, gray/brown and plastic at 31.25' (dense) (dry [sand], very moist [silt]) (fill) (no odor, no staining) (fill)	
	35	RR-SB-6-35	36	100	0.0				
	40	RR-SB-6-40	37	100	0.0				
	45	RR-SB-6-45	27	100	0.0				
	50	RR-SB-6-50	50/6"	100	0.0				
	55	RR-SB-6-55	50/6"	100	0.0				
	60	RR-SB-6-60	50/6"	100	0.0				
	65							Boring was completed to 60' bgs. Groundwater was encountered at ~45' bgs. Boring was backfilled with bentonite.	

ENV2 W/O WELL J:\PROJECTS\GRFX\AECOM PROJECTS\60419897 NAWSI OAK HARBOR\60419897\_ROTHBECK\_RAVINE\_LOGS.GPJ\_URSSEA3B AECOM.GLB\_URSSEA3.GDT\_11/2/15



# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-I-8

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Mobile 880  
 DRILLING METHOD: Hollow Stem Auger  
 WEATHER: Sunny, warm  
 FIELD PARTY: Robbi Mills, Steve Drown  
 GEOLOGIST: Tom Dube, Pam Jenkins  
 DATE BEGUN: 09/12/91      DATE COMPLETED: 09/12/91

FIELD BOOK NO: HS-1  
 TOTAL DEPTH: 50.0  
 GROUND SURFACE ELEVATION: 154.6  
 SHEET OF:

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	92.00 AB	90.62 AB
Time		
Date	10/18/91	11/13/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
1.0								
0.0		H	1			Riser pipe/well casing 2.4 ft above ground surface Protective casing & lockable cap 3.0 ft above ground elevation		
1.0		SI	2			Upper few inches of sample - dark brown gravelly silt w/ some fine sand, some roots, typical weathered soil; ML Lower (most of sample) - yellowish olive gray (2.5Y 4.5/4) fine SAND (clean) w/ some fine gravel (15%); loose; unconsolidated; dry; SP (Vashon Advance Outwash)		
2.0								
3.0								
4.0								
5.0		SI	3			Clean fine sand with some fine gravel (15%); same as above, yellow olive gray; SP (Vashon Advance Outwash)		
6.0								
7.0								
8.0								
9.0								
10.0								
11.0						Sharp color change to greener olive and less yellow, sand is slightly coarser (medium to fine) w/ some gravel (20%) that is coarser than above		
12.0								
13.0								
14.0								
15.0		SI	4			Same as previous sample, gravel up to 1.5" (15%); olive gray (5Y 4/3); SP-SW (Vashon Advance Outwash)		
16.0								
17.0								
18.0								

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-I-8.

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Mobile 880  
 DRILLING METHOD: Hollow Stem Auger  
 WEATHER: Sunny, warm  
 FIELD PARTY: Robbi Mills, Steve Drown  
 GEOLOGIST: Tom Dube, Pam Jenkins  
 DATE BEGUN: 09/12/91

FIELD BOOK NO: HS-1  
 TOTAL DEPTH: 50.0  
 GROUND SURFACE ELEVATION: 154.6  
 SHEET: \_\_\_\_\_ OF: \_\_\_\_\_

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	92.00 AB	90.62 AB
Time		
Date:	10/18/91	11/13/91

DATE COMPLETED: 09/12/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
19.0								
20.0	■	D				Same as previous samples, gravel content decreasing; SP (Vashon Advance Outwash)		
21.0								
22.0								
23.0								
24.0								
25.0						Same as previous samples		
26.0								
27.0								
28.0								
29.0								
30.0	■	D						
31.0								
32.0								
33.0								
34.0								
35.0								
36.0								
37.0								
38.0								



# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-I-8

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Reich 650  
 DRILLING METHOD: Air Rotary with casing advance  
 WEATHER: Cool, overcast  
 FIELD PARTY: Mike Robinson, Todd Lively  
 GEOLOGIST: Vickie Metcalft  
 DATE BEGUN: 09/19/91

FIELD BOOK NO: AR-1  
 TOTAL DEPTH: 159.5  
 GROUND SURFACE ELEVATION: 154.6  
 SHEET: \_\_\_\_\_ OF: \_\_\_\_\_

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth(ft)	92.00 AB	90.62 AB
Time		
Date:	10/18/91	11/13/91

DATE COMPLETED: 10/01/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CSI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
50.0 51.0 52.0 53.0 54.0 55.0 56.0 57.0 58.0 59.0 60.0 61.0 62.0 63.0 64.0 65.0 66.0 67.0 68.0 69.0 70.0						<p style="text-align: center;">SAND                      Note - first 50 ft drilled with hollow stem auger rig, see original borehole log</p> <hr/> <p style="text-align: center;">Sand (medium to coarse) w/ little gravel (10-15% sub-rounded) dark olive gray (5Y 3/2). SP (Vashon Advance Outwash)</p>		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-I-8

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Reich 650  
 DRILLING METHOD: Air Rotary with casing advance  
 WEATHER: Cool, overcast  
 FIELD PARTY: Mike Robinson, Todd Lively  
 GEOLOGIST: Vickie Metcalf  
 DATE BEGUN: 09/19/91

FIELD BOOK NO AR-1  
 TOTAL DEPTH: 159.5  
 GROUND SURFACE ELEVATION: 154.6  
 SHEET: OF

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth(ft)	92.00 AB	90.62 AB
Time		
Date	10/18/91	11/13/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
70.0 71.0 72.0 73.0 74.0 75.0 76.0 77.0 78.0 79.0 80.0 81.0 82.0 83.0 84.0 85.0 86.0 87.0 88.0 89.0 90.0	<div style="background-color: black; width: 100%; height: 10px; margin-bottom: 10px;"></div> <div style="background-color: black; width: 100%; height: 10px; margin-bottom: 10px;"></div>	D				<p>Fine sand w/ little silt (10-15%), very little gravel (less than 10%); wet: olive gray (5Y 4/2), SM (Vashon Advance Outwash)</p> <hr/> <p>Medium sand w/ some gravel (15%) and trace fines, olive gray (5Y 4/2); SM (Vashon Advance Outwash)</p>	<div style="background-color: #cccccc; width: 100%; height: 100%;"></div>	<div style="background-color: #cccccc; width: 100%; height: 100%;"></div>











# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

**PROJECT NUMBER** 5330860.30  
**PROJECT NAME** CTO 0086, Whidbey Area 6 Landfill  
**LOCATION** NAS Whidbey Island, WA  
**DRILLING COMPANY** Soil Sampling Service  
**RIG TYPE & NUMBER** Reverse Air Rotary  
**DRILLING METHOD** Percussion  
**WEATHER** Rainy, Cold  
**FIELD PARTY** Rob Rau, Soil Sampling Service  
**GEOLOGIST** Rob Rau  
**DATE BEGUN** 12/2/93

**TOTAL DEPTH** 220 feet  
**GROUND SURFACE ELEVATION** Approx. 171 feet  
**SHEET** 1 OF 12

STATIC WATER LEVEL (BLS)		
WD=While Drilling		AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">1 0</div> <div style="margin-bottom: 5px;">0 0</div> <div style="margin-bottom: 5px;">1 0</div> <div style="margin-bottom: 5px;">2 0</div> <div style="margin-bottom: 5px;">3 0</div> <div style="margin-bottom: 5px;">4 0</div> <div style="margin-bottom: 5px;">5 0</div> <div style="margin-bottom: 5px;">6 0</div> <div style="margin-bottom: 5px;">7 0</div> <div style="margin-bottom: 5px;">8 0</div> <div style="margin-bottom: 5px;">9 0</div> <div style="margin-bottom: 5px;">10 0</div> <div style="margin-bottom: 5px;">11 0</div> <div style="margin-bottom: 5px;">12 0</div> <div style="margin-bottom: 5px;">13 0</div> <div style="margin-bottom: 5px;">14 0</div> <div style="margin-bottom: 5px;">15 0</div> <div style="margin-bottom: 5px;">16 0</div> <div style="margin-bottom: 5px;">17 0</div> <div style="margin-bottom: 5px;">18 0</div> </div>						<p>Riser pipe/well casing 1.8 ft above ground surface. Protective casing &amp; lockable cap 2.5 ft above ground surface.</p> <p>SAND, SILT AND GRAVEL. Sand w/ some silt, some gravel and cobbles, sand is medium to coarse, brown, dense, dry. SH-GH (Vashon Advance Outwash, weathered)</p> <p>GRAVEL AND SAND - No sample recovered at 5 ft due to rocks (cobbles or boulders), sand, gravel, and cobbles below. SH-GH (Vashon Advanced Outwash)</p> <p>Sand w/ some cobbles (up to 75mm), medium to coarse, dark brown-gray, moderately dense. SH-GH (Vashon Advance Outwash)</p>		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
19.0 20.0 21.0 22.0 23.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0 31.0 32.0 33.0 34.0 35.0 36.0 37.0 38.0						Same as above - Sand w/ some gravel. SU-GU (Vashon Advance Outwash)		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58	AB
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
39.0						Same as above - Sand w/ some gravel. SU-GU (Yashon Advance Outwash)		
40.0								
41.0								
42.0								
43.0								
44.0								
45.0								
46.0								
47.0								
48.0								
49.0					Sand w/ some gravel, trace silt: SU-GU (Yashon Advance Outwash) Hru = 30 ppm in hole, 10 ppm on sample CGI = Background			
50.0								
51.0								
52.0								
53.0								
54.0								
55.0								
56.0								
57.0								
58.0								

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Island, WA  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/92

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (SLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">79.0</div> <div style="margin-bottom: 5px;">80.0</div> <div style="margin-bottom: 5px;">81.0</div> <div style="margin-bottom: 5px;">82.0</div> <div style="margin-bottom: 5px;">83.0</div> <div style="margin-bottom: 5px;">84.0</div> <div style="margin-bottom: 5px;">85.0</div> <div style="margin-bottom: 5px;">86.0</div> <div style="margin-bottom: 5px;">87.0</div> <div style="margin-bottom: 5px;">88.0</div> <div style="margin-bottom: 5px;">89.0</div> <div style="margin-bottom: 5px;">90.0</div> <div style="margin-bottom: 5px;">91.0</div> <div style="margin-bottom: 5px;">92.0</div> <div style="margin-bottom: 5px;">93.0</div> <div style="margin-bottom: 5px;">94.0</div> <div style="margin-bottom: 5px;">95.0</div> <div style="margin-bottom: 5px;">96.0</div> <div style="margin-bottom: 5px;">97.0</div> <div style="margin-bottom: 5px;">98.0</div> </div>						<p style="margin-bottom: 100px;">Sand w/ trace or less gravel (to 10mm). SP (Vashon Advance Outwash)</p> <p>Fine sand w/ trace silt. olive gray. moderately dense. wet. SP-SM (Vashon Advance Outwash)</p>		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

**STATIC WATER LEVEL (BLS)**

WD=White Drilling AB=After Boring

Depth (ft)	WD	AB
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
59.0 60.0 61.0 62.0 63.0 64.0 65.0 66.0 67.0 68.0 69.0 70.0 71.0 72.0 73.0 74.0 75.0 76.0 77.0 78.0						<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>SAND (medium to fine) w/ trace fine gravel, medium dark olive gray (SY 4/1). SP-GP. (Vashon Advance Outwash)</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Similar to above - fine sand w/ trace or less fine gravel. SP-GP (Vashon Advance Outwash)</p> </div>	<div style="border: 1px solid black; width: 100px; height: 50px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); margin: 0 auto;"></div>	<div style="border: 1px solid black; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div>

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

### STATIC WATER LEVEL (BLS)

WD=While Drilling    AB=After Boring

Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
99.0 100.0 101.0 102.0 103.0 104.0 105.0 106.0 107.0 108.0 109.0 110.0 111.0 112.0 113.0 114.0 115.0 116.0 117.0 118.0						Sand, fine to very fine, medium dark olive gray (ST 4/11, dense, very wet; SP (Vashon Advance Outwash)		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
119.0 120.0 121.0 122.0 123.0 124.0 125.0 126.0 127.0 128.0 129.0 130.0 131.0 132.0 133.0 134.0 135.0 136.0 137.0 138.0						Same as above - very fine Sand (Yashon Advance Outwash)		



# FIELD BOREHOLE LOG

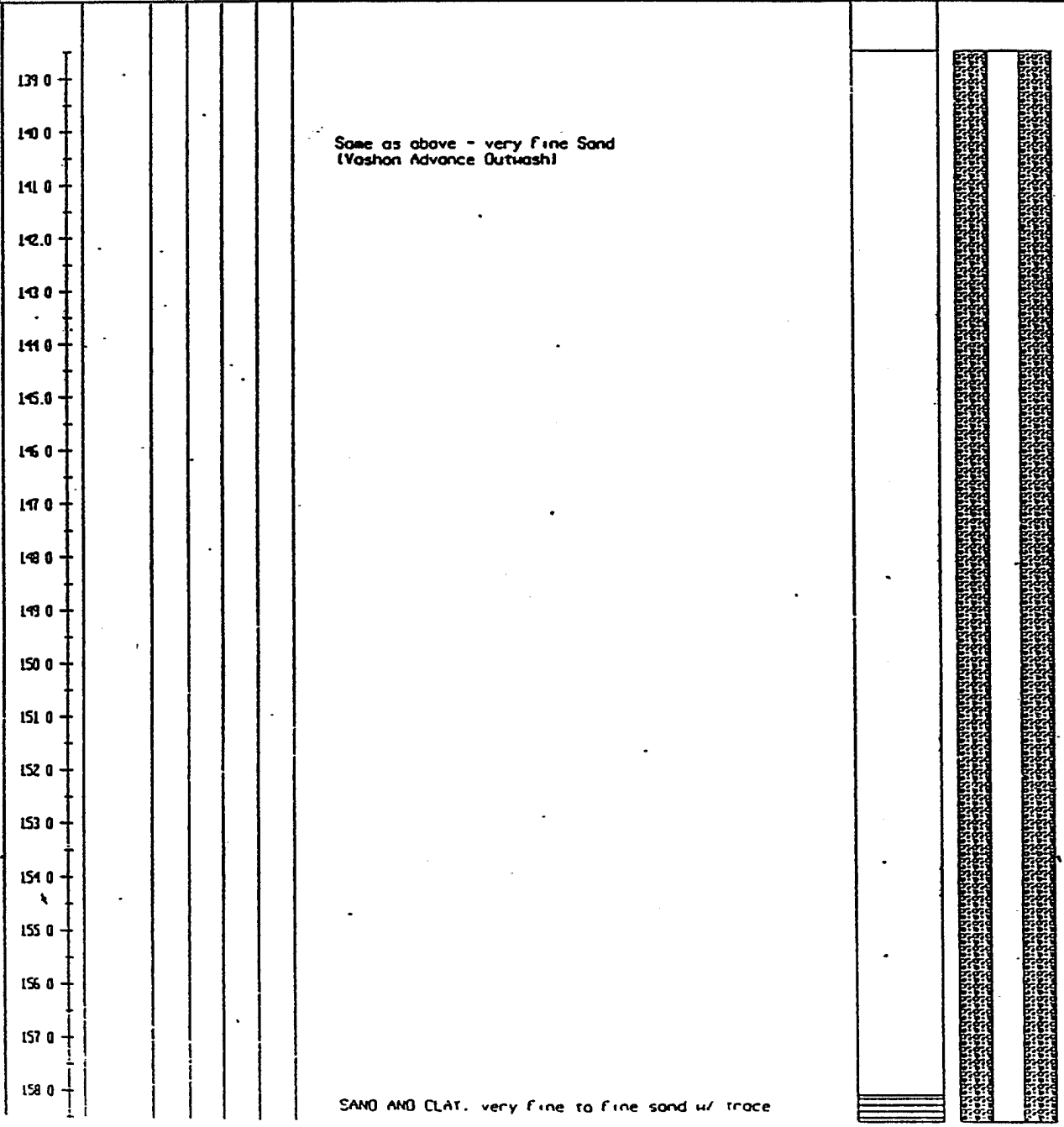
BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	



# FIELD BOREHOLE LOG



BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
159.0 160.0 161.0 162.0 163.0 164.0 165.0 166.0 167.0 168.0 169.0 170.0 171.0 172.0 173.0 174.0 175.0 176.0 177.0 178.0						<p>clay (10%), medium dark olive gray (SY 4/1) sand, and gray (N 4/0) clay, dense, wet. SP-SC (Whidbey Formation - Unit 2)</p> <p>Similar to above - Sand w/ trace clay and trace silt. sand is fine grained. SP-SC (Whidbey Formation - Unit 2)</p> <p>CLAY, olive gray (SY 4/1), very dense, dry. CL (Whidbey Formation - Unit 3)</p>		



# FIELD BOREHOLE LOG

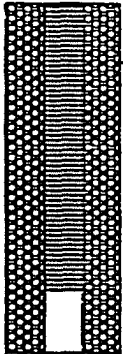
BOREHOLE NUMBER

6-D-5

PROJECT NUMBER 5330660.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58 AB	
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
199.0 200.0 201.0 202.0 203.0 204.0 205.0 206.0 207.0 208.0 209.0 210.0 211.0 212.0 213.0 214.0 215.0 216.0 217.0 218.0						Similar to above - medium to coarse Sand w/ minor gravel, minor wood, very wet. SP (Whidbey Formation - Unit 4)	L	
						No split-spoon sample recovered due to wet "soupy" heaving sands		

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-0-5

PROJECT NUMBER 5330860.30  
 PROJECT NAME CTO 0086, Whidbey Area 6 Landfill  
 LOCATION NAS Whidbey Island, WA  
 DRILLING COMPANY Soil Sampling Service  
 RIG TYPE & NUMBER Reverse Air Rotary  
 DRILLING METHOD Percussion  
 WEATHER Rainy, Cold  
 FIELD PARTY Rob Rau, Soil Sampling Service  
 GEOLOGIST Rob Rau  
 DATE BEGUN 12/2/93

TOTAL DEPTH 220 feet  
 GROUND SURFACE ELEVATION Approx. 171 feet  
 SHEET 1 OF 12

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth (ft)	158.58	AB
Time	0800	
Date	12/7/92	

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
219 0 220 0 221 0 222 0 223 0 224 0 225 0 226 0 227 0 228 0 229 0 230 0 231 0 232 0 233 0 234 0 235 0 236 0 237 0 238 0								

# FIELD BOREHOLE LOG

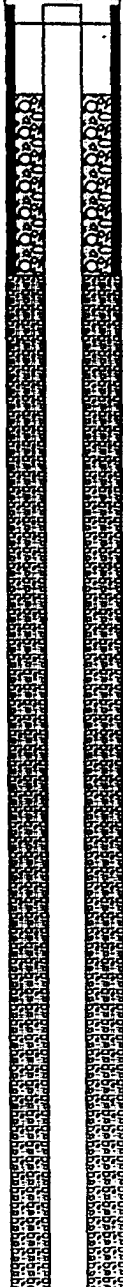





BOREHOLE NUMBER

6-S-26

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Mobile 880  
 DRILLING METHOD: Hollow Stem Auger  
 WEATHER: Sunny, warm  
 FIELD PARTY: Robbi Mills, Ron Bogenreif  
 GEOLOGIST: Anne Exe  
 DATE BEGUN: 08/22/91

FIELD BOOK NO HS-1  
 TOTAL DEPTH: 76.5  
 GROUND SURFACE ELEVATION: 125.7  
 SHEET OF:

STATIC WATER LEVEL (BLS)		
	HD-While Drilling	AB-After Boring
Depth(Ft)	39.00 AB	41.67 AB
Time		
Date:	09/27/91	11/13/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	OGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
1.0						Riser pipe/well casing 2.8 ft above ground surface Protective casing & lockable cap 3.0 ft above ground elevation		
0.0		H	1					
1.0		S1	2			SAND, SILT, AND GRAVEL; gravel (35-40%, up to 1.5"), sand (40%, medium), silt (20-25%); olive gray (5Y 4/2); SP-GP (Vashon Advance Outwash)		
2.0								
3.0								
4.0						SAND (90% Fine to medium, rounded) w/ little gravel (10%); olive gray (5Y 4/2); SP (Vashon Advance Outwash)		
5.0		S1	3					
6.0						Sand, predominantly medium grains; dark olive gray to olive gray (5Y 3 5/2); SP (Vashon Advance Outwash)		
7.0								
8.0								
9.0						Sand (90-95%, Fine to coarse) w/ trace gravel (5-10%, rounded, to 1"); damp, firm; SH (Vashon Advance Outwash)		
10.0		S1	4					
11.0						Sand (90-95%, Fine to coarse) w/ trace gravel (5-10%, rounded, to 1"); damp, firm; SH (Vashon Advance Outwash)		
12.0								
13.0								
14.0						Sand (90-95%, Fine to coarse) w/ trace gravel (5-10%, rounded, to 1"); damp, firm; SH (Vashon Advance Outwash)		
15.0		S1	5					
16.0						Sand (90-95%, Fine to coarse) w/ trace gravel (5-10%, rounded, to 1"); damp, firm; SH (Vashon Advance Outwash)		
17.0								
18.0								

# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-S-26

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Mobile 880  
 DRILLING METHOD: Hollow Stem Auger  
 WEATHER: Sunny, warm  
 FIELD PARTY: Robbi Mills, Ron Bogenreif  
 GEOLOGIST: Anne Exe  
 DATE BEGUN: 08/22/91

FIELD BOOK NO : HS-1  
 TOTAL DEPTH: 76.5  
 GROUND SURFACE ELEVATION: 125.7  
 SHEET: OF

STATIC WATER LEVEL (BLS)		
	WD=While Drilling	AB=After Boring
Depth(ft)	39.00 AB	41.67 AB
Time		
Date:	09/27/91	11/13/91

DATE COMPLETED: 08/23/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 10px;">19.0</div> <div style="margin-bottom: 10px;">20.0</div> <div style="margin-bottom: 10px;">21.0</div> <div style="margin-bottom: 10px;">22.0</div> <div style="margin-bottom: 10px;">23.0</div> <div style="margin-bottom: 10px;">24.0</div> <div style="margin-bottom: 10px;">25.0</div> <div style="margin-bottom: 10px;">26.0</div> <div style="margin-bottom: 10px;">27.0</div> <div style="margin-bottom: 10px;">28.0</div> <div style="margin-bottom: 10px;">29.0</div> <div style="margin-bottom: 10px;">30.0</div> <div style="margin-bottom: 10px;">31.0</div> <div style="margin-bottom: 10px;">32.0</div> <div style="margin-bottom: 10px;">33.0</div> <div style="margin-bottom: 10px;">34.0</div> <div style="margin-bottom: 10px;">35.0</div> <div style="margin-bottom: 10px;">36.0</div> <div style="margin-bottom: 10px;">37.0</div> <div style="margin-bottom: 10px;">38.0</div> </div>	<div style="background-color: black; width: 10px; height: 10px; margin-bottom: 10px;"></div> <div style="background-color: black; width: 10px; height: 10px; margin-bottom: 10px;"></div> <div style="background-color: black; width: 10px; height: 10px; margin-bottom: 10px;"></div> <div style="background-color: black; width: 10px; height: 10px; margin-bottom: 10px;"></div>	<div style="margin-bottom: 10px;">S1</div> <div style="margin-bottom: 10px;">S1</div> <div style="margin-bottom: 10px;">S1</div> <div style="margin-bottom: 10px;">S1</div>	<div style="margin-bottom: 10px;">6</div> <div style="margin-bottom: 10px;">7</div> <div style="margin-bottom: 10px;">8</div> <div style="margin-bottom: 10px;">9</div>			<p style="margin-bottom: 20px;">Sand, fine to medium, occasional coarse, slightly damp; olive gray (SY 4/2); SP (Vashon Advance Outwash)</p> <p style="margin-bottom: 20px;">Same as previous sample</p> <p style="margin-bottom: 20px;">Sand, decrease in grain size to fine grains, olive gray (SY 4 5/2); SP (Vashon Advance Outwash)</p> <p style="margin-bottom: 20px;">Sand (85-90%, fine to coarse) w/ little gravel (10-15%, rounded, to 1"). SW (Vashon Advance Outwash)</p>	<div style="background-color: #cccccc; width: 100%; height: 100%;"></div>	<div style="background-color: #cccccc; width: 100%; height: 100%;"></div> <div style="background-color: #cccccc; width: 100%; height: 100%;"></div>
							<p>P.V.C. →</p> <p>Stainless Steel →</p>	





# FIELD BOREHOLE LOG

BOREHOLE NUMBER

6-S-26

PROJECT NUMBER: 01-0817-07-0571-043  
 PROJECT NAME: NAS Whidbey Operable Unit 1  
 LOCATION: Oak Harbor, Washington  
 DRILLING COMPANY: Ponderosa Drilling  
 RIG TYPE & NUMBER: Mobile 880  
 DRILLING METHOD: Hollow Stem Auger  
 WEATHER: Sunny, warm  
 FIELD PARTY: Robbi Mills, Ron Bogenreif  
 GEOLOGIST: Anne Exe  
 DATE BEGUN: 08/22/91

FIELD BOOK NO HS-1  
 TOTAL DEPTH 76.5  
 GROUND SURFACE ELEVATION 125.7  
 SHEET: OF

STATIC WATER LEVEL (BLS)		
	WD-While Drilling	AB-After Boring
Depth (ft)	39.00 AB	41.67 AB
Time		
Date:	09/27/91	11/13/91

DATE COMPLETED: 08/23/91

DEPTH	SOIL SAMPLES	SAMPLING METHOD	SAMPLE NUMBER	ORGANIC VAPOR	CGI	LOCATION DIAGRAM	LITHOLOGY	WELL INSTALLATION
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">59.0</div> <div style="margin-bottom: 5px;">60.0</div> <div style="margin-bottom: 5px;">61.0</div> <div style="margin-bottom: 5px;">62.0</div> <div style="margin-bottom: 5px;">63.0</div> <div style="margin-bottom: 5px;">64.0</div> <div style="margin-bottom: 5px;">65.0</div> <div style="margin-bottom: 5px;">66.0</div> <div style="margin-bottom: 5px;">67.0</div> <div style="margin-bottom: 5px;">68.0</div> <div style="margin-bottom: 5px;">69.0</div> <div style="margin-bottom: 5px;">70.0</div> <div style="margin-bottom: 5px;">71.0</div> <div style="margin-bottom: 5px;">72.0</div> <div style="margin-bottom: 5px;">73.0</div> <div style="margin-bottom: 5px;">74.0</div> <div style="margin-bottom: 5px;">75.0</div> <div style="margin-bottom: 5px;">76.0</div> <div style="margin-bottom: 5px;">77.0</div> <div style="margin-bottom: 5px;">78.0</div> </div>						<p>CLAY, very sticky clay mixed with silt; dark gray (2 5YR 4/0), CL (Whidbey Formation Unit 1)</p>		

RECEIVED

SEP 21 1993

RESOURCE PROTECTION WELL REPORT

33/1E/20A

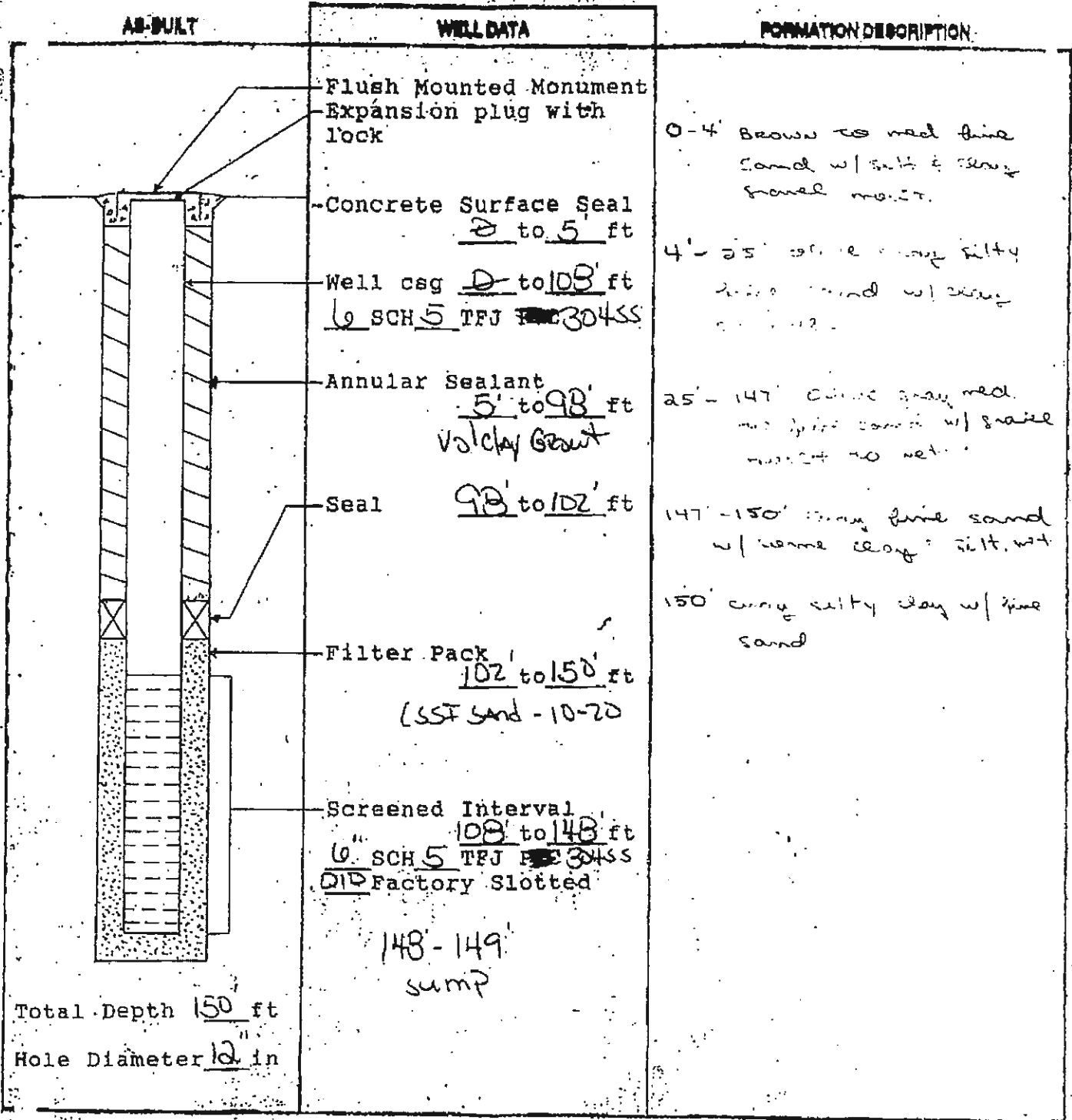
DEPT. OF ECOLOGY

START CARD NO. 12949

PROJECT NAME: NAVAL Air Station, Whidbey Island  
 WELL IDENTIFICATION NO. PW-3  
 DRILLING METHOD: Perusson/Lomax-Reverse Air  
 DRILLER: Richard L. MAGEE  
 FIRM: Layne Environmental Services, Inc.  
 SIGNATURE: [Signature]  
 CONSULTING FIRM: JIT Corporation  
 REPRESENTATIVE: DAVE ANDRUSE

COUNTY: Island County  
 LOCATION: SE 1/4 NE 1/4 Sec 26 Twp 33N R 1E Wm  
 STREET ADDRESS OF WELL: NAS OAK HARBOR WA 98278  
 WATER LEVEL ELEVATION: 113.7'  
 GROUND SURFACE ELEVATION: \_\_\_\_\_  
 INSTALLED: 8-12-93  
 DEVELOPED: \_\_\_\_\_

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.



Attachment 2  
Well Development Logs



# Ch2m

Client: NAVFAC  
 Lc En: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/1/18  
 Weather: Rain ~50°F

## WELL DEVELOPMENT DATA SHEET

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW-605  
 Sample ID: NA  
 Sampling Team: M. Green/SAC, M. Brund/ANL

	Before	After	
Total Depth:	120.5	120.6	FT.(BTOC)
Depth to water:	(-) 13.7	13.75	FT.(BTOC)
Water Column:	106.8	106.85	FT.
	(x) 0.163	0.163	GAL/FT.
Well Volume:	17.5	17.5	GAL.
Total Purge Vol.:	-	155	GAL.

HORIBA U5006 Q well meter  
 Measuring Device: Solinst Model 101 WL meter  
 Date and Time: 2/1/18

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Purge Device: Mini Monsoon

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW / KPCOL	Color / Odor / Comments
Stabilization Criteria		constant	± 3%	± 10%	± 0.1	± 10 mV	<10		
1518	0								Start
1520	4	9.3	0.160	1.93	10.08	-7	-	15.7	
1523	30	9.41	0.228	0.77	9.47	-71	206	15.8	
1548	60	9.29	0.237	0.55	8.11	-70	116.8	15.8	
1558	80	9.07	0.242	0.40	7.84	-93	56.2	15.8	
1603	90	9.61	0.241	1.47	7.92	-88	40.4	15.8	
1608	100	9.89	0.244	1.93	7.87	-92	27.4	15.8	
1613	110	9.36	0.243	1.31	7.95	-83	24.3	15.8	
1618	120	9.64	0.245	0.36	7.90	-85	13.7	15.8	
1623	130	9.65	0.246	3.84	7.81	-87	18.5	15.8	
1628	140	9.66	0.248	5.98	7.8	-87	11.5	5.8	
1633	150	9.68	0.217	1.27	7.84	-82	4.1	15.8	END

Observations/Notes: Purge Start Time: 1518 Purge Rate: 2 GPM

Bailed ~5 gallons  
 Total purge vol. - 155 gallons

Signature(s): *[Handwritten Signature]*



WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/2/18  
 Weather: Overcast

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW -606  
 Sample ID: NA  
 Sampling Team: M-Grun/SAC, M. Bruno/ANG

	Before	After	
Total Depth:	103.95	103.74	FT.(BTOC)
Depth to water:	102.25		FT.(BTOC)
Water Column:	102.7		FT.
	(x) 163		GAL/FT.
Well Volume:	169		GAL.
Total Purge Vol.:	-		GAL.

Measuring Device: HORIBA USEDOQ WQ meter  
 Date and Time: 2/2/18

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Minimonson

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW ft. BTOC	Color / Odor / Comments
Stabilization Criteria		constant	± 3%	± 10%	± 0.1	± 10 mV	<10	Constant	
1212	0	-	-	-	-	-	-	0.25	Start
1217	10	10.7	0.299	1.62	5.97	86	63.5	13.2	
1232	40	10.98	0.275	2.02	7.25	-31	113	12.8	
1247	70	11.11	0.273	1.06	7.69	-74	79.6	12.6	
1257	90	11.44	0.274	1.73	7.69	-81	64.2	12.65	
1307	110	11.10	0.275	0.61	7.84	-80	63.3	12.65	
1317	130	11.17	0.277	1.94	7.76	-80	32.4	11.1	Engine turned off, battery still running, still ~2 GPM
1327	150	11.21	0.277	1.86	7.77	-80	48.8	10.9	
1332	160	11.13	0.276	1.92	7.76	-85	38.9	10.85	
1337	170	10.94	0.276	1.92	7.76	-86	30.9	11.8	
1342	180	10.81	0.277	1.92	6.93	-88	38.5	11.66	
1347	190	10.62	0.269	1.57	7.64	-70	11.0	11.72	
1352	200	10.64	0.274	0.75	7.66	-85	35.0	11.73	
1357	210	10.62	0.275	1.76	7.64	-86	35.0	11.66	
1402	220	10.55	0.274	0.57	7.64	-85	36.0	11.72	
1407								11.61	(MIS)

Observations/Notes: Purge Start Time: 1212 Purge Rate: ~ 2 GPM

No surging or building because surge block/builer could not be inserted past ~20 ft BTOC  
 TURBIDITY STABLE @ 36 NTU

Signature(s): [Handwritten Signature]



Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/2/18  
 Weather: Overcast

WELL DEVELOPMENT DATA SHEET

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW - 607  
 Sample ID: NA  
 Sampling Team: M. Green/SAC, M. Brand/ANC

	Before	After	
Total Depth:	104.8		FT.(BTOC)
Depth to water:	(+) 5.85		FT.(BTOC)
Water Column:	100.95		FT.
Well Volume:	(X) @ 163	@ 163	GAL/FT.
Total Purge Vol.:	16.5		GAL.
Purge Device:		436	GAL.

Purge Device: minimoon

Measuring Device: HORIBA U5000G W0 user  
501.1st model lot nr meter  
 Date and Time: 2/2/18

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
<u>2</u>	0.163
4	0.653

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW FT BTOC	Color / Odor / Comments
Stabilization Criteria		constant	± 3%	± 10%	± 0.1	± 10 mV	< 10	constant	
1610	0	-	-	-	-	-	-	-	Start on 2/2/18
1615	10	9.85	0.374	1.38	9.37	40	-	14.2	
1630	40	9.49	0.337	2.05	8.83	45	-	13.9	
0729	46	-	-	-	-	-	-	-	Start on 2/3/18
0746	80	8.33	0.355	1.02	6.24	150	814	12.6	
0801	110 (ML)	7.35	0.191	10.63	7.38	-29	358	12.7	
0816	140	9.60	0.315	8.11	7.74	-53	205	12.6	
0831	170	9.8	0.299	8.47	7.96	-88	140	12.5	
0846	200	9.85	0.304	6.24	8.60	-92	105	12.45	
0901	230	9.80	0.299	1.90	8.03	-97	111	12.47	
0906	240	-	-	-	-	-	-	-	take full, get another hole
0956	278	9.94	0.299	12.53	8.25	5	201	13.15	Resume Pumping @
1013	320.5	10.05	0.181	10.06	7.62	-77	102	13.70	0941 @ ~2.56pm
1028	358	10.21	0.150	10.18	7.48	-77	66.8	13.72	
1045	390.5	10.31	0.262	9.21	7.83	-92	59.6	12.38	
1100	428.5	10.21	0.179	10.17	7.47	-75	67.2	12.50	
1104	435	-	-	-	-	-	-	-	END

Observations/Notes: Purge Start Time: 2/2/18 1610 Purge Rate: ~ 2 GPM

- Ended @ 1633 w/ 46 Gallons purged on 2/2/18
- 0729 2/3/18 begin pumping @ ~ 2 GPM
- Bailed 1cm
- On 2/3/18 at ~ 1041 flow rate dropped to ~ 2 gpm
- Total: 436 purged

Signature(s): [Signature]





WELL DEVELOPMENT DATA SHEET

Client: NAVFAC
Location: Ault Field, Oak Harbor, WA
Event: Well development
Date: 1/30/18
Weather: 56°F, partly cloudy

Project Number: 695610.04.FI.WI
Well ID: WI-AF-MW-603
Sample ID: NA
Sampling Team: M. Green/SAC

Table with 3 columns: Parameter, Before, After, Unit. Rows include Total Depth, Depth to water, Water Column, Well Volume, and Total Purge Vol.

Measuring Device: HORIBA U-50000 WQ meter #021995
Date and Time: 1/30/18

Table with 2 columns: Well Dia. (inches), Volume (gallons/foot). Rows for diameters 1, 1.25, 2, and 4.

Purge Device: Mini monsoon

FIELD PARAMETERS table with columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, Other: DTW Ft. Proc., Color / Odor / Comments. Includes data rows from 1532 to 1622.

Observations/Notes: Purge Start Time: 1532 Purge Rate: 2.3 GPM

Total: 130 Gallons pumped & bailed

Signature(s): [Handwritten signature]





WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 1/29/18  
 Weather: Raining

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW - 609  
 Sample ID: NA  
 Sampling Team: M. Green/SAU

	Before	After	
Total Depth:	59.7	59.7	FT.(BTOC)
Depth to water:	(-) 35.05	35.4	FT.(BTOC)
Water Column:	24.65	24.3	FT.
	(x) 0.163	0.163	GAL/FT.
Well Volume:	4.02	~4	GAL.
Total Purge Vol.:		133	GAL.

Measuring Device: HORIBA U-5000G #021995 WQ meter  
 Date and Time: 1/29/18

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Mini Monsoon  
 2.2 GPM pump

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW ft Bgs	Color / Odor / Comments
Stabilization Criteria		constant	± 3%	± 10%	± 0.1	± 10 mV	<10		
0940	0	-	0.245	-	-	-	-	35.4 ft Bgs	Start
0945	10 Gal	7.17	0.245	1.25	7.07	-94	---	<	
0956	30 Gal	9.77	0.240	0.00	7.77	-115	105	-	
1000	40 Gal	9.74	0.239	0.47	7.74	-107	66.7	-	
1005	50 Gal	9.86	0.236	0.00	7.84	-113	47.3	-	
1015	70 Gal	9.85	0.234	0.12	7.92	-105	33.4	-	
1025	90 Gal	10.72	0.238	0.40	7.89	-107	19.3	38 ft Bgs	D
1035	110 Gal	10.49	0.235	0.26	7.98	-101	10.5	38	
1040	120 Gal	10.55	0.235	0.14	7.91	-103	9.06	38	

Observations/Notes: Purge Start Time: 0940 Purge Rate: 2.2 GPM

1/29/18 1600 surge block was too tight & would not drain water above shopvac was used to remove water as surge block was removed, ~3 gallons removed  
 DTW: 35.2 ft BTOC / 54. DTB: 59.9 ft BTOC at end of 1/29/18

Signature(s):





**WELL DEVELOPMENT DATA SHEET**

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 1/31/18  
 Weather: partly cloudy/overcast

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW-610  
 Sample ID: NA  
 Sampling Team: M. Green/SAC, M. Bruno/ANC

	Before	After	
Total Depth:	55.1		FT.(BTOC)
Depth to water:	(+) 25.1		FT.(BTOC)
Water Column:	30		FT.
Well Volume:	(x) 0.163		GAL/FT.
Total Purge Vol.:	4.4		GAL.

Measuring Device: HORIBA - U-5000a # W2 new  
 Solinst model 101 # W2 new  
 Date and Time: 1/31/18

Well Dia. (Inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Mini Monsoon Geotech Geosquirt

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW ft BTOC	Color / Odor / Comments
Stabilization Criteria		constant	± 3%	± 10%	± 0.1	± 10 mV	<10	Constant	
0824	0	-	-	-	-	-	-	37.7	Start
0825	1	9.4	0.775	2.5	7.75	133	-	-	
0826	2	-	-	-	-	-	-	DTW	

Observations/Notes: Purge Start Time: Purge Rate: ~ 1 GPM  
 (M) 10x well volume = 14 gal + 220 ft x 1.47 gal/ft = 323 gal  
 220 gallons (M) 44 + 323 + 47 = 414 Gallons to Purge  
 44 Gallons = 10x Well Volume  
 Well pressurized when first opened, let sit for 15 minutes

Signature(s):





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field Purple Log  
 Event: February 2018 Groundwater Sampling  
 Date: 2/17/18  
 Weather: drizzly, windy, 41°F

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF- MW-610  
 Sample ID: WI-AF- NA  
 Sampling Team: J. Schriau, G. Crandner, S. Fitzsimmons

Total Depth: ~55 FT.(BTOC)  
 Depth to water: (-)38.97 FT.(BTOC)  
 Water Column: 16.03 FT.  
 Well Volume: (x) 0.163 GAL/FT.  
 Total Purge Vol.: 2.61 GAL.

*with pump in well (37.95 ft before pump in well)*

Measuring Device: NA

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
<u>2</u>	0.163
4	0.653

Purge Device: Bladder Pump: Grotech #1478  
Controller: Geocontrol Pro #C-03138

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Discharge (S)	Fill (S)
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)		

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color/Odor	Comments
1020	Pump on							38.97	7	15
1025	0.5	228						38.52	7	15
1045	1.5	240						41.40	7	15
1105	2.75	240						42.21	7	15
1125	4.0	240						42.42	7	15
1145	5.25	240						42.45	7	15
1205	10.50	240						42.50	7	15
1225	7.75	240						42.61	7	15
1245	9.085								7	15
1310	9.25	240							7	15
1325	10.5	240							7	15
1330	10.75	240						42.10	7	15

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers

Observations/Notes:  
 1230: Shannon / Gerrit Team took the water level meter.  
 1240: Spoke to Jenn Ulrich - since I don't have an Horiaba shooting for 10 x water well volume (16 gal) with a DTW of 42 ft.  
 Pump Start Time:  
 Initial Fill Time(FT; sec): 15 Final Fill Time: 15  
 Initial Discharge Time(DT; sec): 7 Final Discharge Time: 7  
 Pump End Time: 1330 Purge Rate: 240 mL/min  
 Pump Depth: 48'  
 Sample /Time: NA  
 MS/MSD Duplicate ID:  
 Signature(s): Jenn

Air Monitoring: HS BZ  
 VOC (ppm)=  
 H2S (ppm)  
 LEL (%)=  
 CO (ppm)=  
 O2 (%)=



## WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Project: Well development  
 Date: 2/27/18  
 Weather: Cloudy, 40's, wind

Project Number: 605610 04 F1 W1

Well ID: WI-AF-MW-611

Sample ID: NA

Sampling Team: D. Butler  
 S. Fitzsimmons

	Before	After	
Total Depth:	169.74	170.20	FT.(BTOC)
Depth to water:	(+) 59.27	81.75	FT.(BTOC)
Water Column:	110.47	88.45	FT.
Well Volume:	(x) 1.469	1.469	GAL/FT.
Total Purge Vol.:	162.28	129.93	GAL.
Purge Device:	Grundfos, SQ15-290		

Measuring Device: Horiba U-53  
 Date and Time: 2/27/18 1142

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

6 in 1.469 gal/foot

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW Other ft bTOC	Color / Odor / Comments
Stabilization Criteria		constant	±3%	±10%	±0.1	±10 mV	<10		
1011	Begin surging		15.5-16.5	ft bTOC @		145-155	ft bTOC		
1026	Stop surging		14.5-15.5	begin surging		155-165	ft bTOC		
1041	Stop surging		15.5-16.5	ft bTOC, DTW=59.62			ft bTOC		
1047	Begin bailing								
1055	Stop bailing, bailing								
1140	start pumping								
1150	48	12.29	0.122	7.59	5.68	179	848	64.60	
1200	108	12.53	0.197	6.82	6.02	135	00R	96.10	Murky. No odor
1210	168	13.22	0.362	6.26	7.05	26	00R	94.40	" "
1220	228	13.41	0.424	6.23	7.57	-29	733	93.97	" "
1230	288	13.61	0.372	7.23	7.23	-82	467	93.90	" "
1240	348	13.72	0.466	6.76	7.48	-90	331	93.82	" "
1250	408	13.64	0.466	6.83	7.50	-87	265	93.79	" "
13:00	468	13.51	0.469	6.82	7.51	-97	102	93.75	" "
13:10	528	13.33	0.479	6.01	7.50	-100	114	93.75	slightly cloudy, "
1320	588	13.29	0.333	7.17	7.31	-111	101	93.74	" "
1330	648	13.23	0.255	7.27	7.10	-100	82.1	93.70	" "
1340	708	13.26	0.484	6.99	7.51	-102	58.7	93.68	" "
1350	1342	turn off pump							to empty full temp. storage tanks.

Observations/Notes: Purge Start Time: 1142 Purge Rate: ~6 gpm

BZ and HS = normal

00R = Out of Range

Signature(s): David Butler

Time	DTW
1143	84.10
1145	91.00
1147	96.50
1149	96.57
1156	95.72



**WELL DEVELOPMENT DATA SHEET**

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/27/18  
 Weather: Partly cloudy, 40°, wind

Project Number: 695610 04 F1 W6  
 Well ID: WI-AF-MW-611  
 Sample ID: NA  
 Sampling Team: D. Butler  
 S. Fitzsimmons

	Before	After	
Total Depth:	169.74		FT.(BTOC)
Depth to water:	(-) 59.27		FT.(BTOC)
Water Column:	110.47		FT.
Well Volume:	(x) 1.469	1.469	GAL/FT.
Total Purge Vol.:	162.28		GAL.
	1300	NA	GAL.

Purge Device: Grundfos SQ15-290

Measuring Device: Horiba U-53  
 Date and Time: 2/27/18 11:42

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW Other: ft btoC	Color / Odor / Comments
Stabilization Criteria		constant	±3%	±10%	±0.1	±10 mV	<10		
1439	Restart pump.			Flow rate = 6 gpm	6 gpm				
1445	756	12.71	0.381	14.02	7.36	26	265	91.25	Slightly cloudy
1455	816	13.24	0.490	6.67	7.64	-105	64.6	92.33	Less cloudy.
1505	876	13.20	0.478	7.26	7.61	-86	40.0	92.47	"
1515	936	13.24	0.487	6.76	7.65	-93	25.3	92.51	clear
1525	996	12.92	0.479	6.93	7.44	-78	36.9	92.74	" "
1535	1056	12.64	0.440	7.27	7.39	-77	32.0	92.70	" "
1545	1116	12.42	0.425	7.28	7.33	-67	38.1	92.74	" "
1555	1176	12.92	0.486	6.66	7.59	-89	25.0	92.77	" "
1605	1236	12.97	0.488	6.36	7.62	-97	19.6	92.82	" "
1615	1296	12.96	0.489	6.27	7.62	-112	24.9	92.84	" "
1616	Turn off pump.	Need to empty temp. storage.							
	End of development.								

Observations/Notes: Purge Start Time: 1142 Purge Rate: ~6 gpm

Recovery Test		Time DTW		Time DTW	
Time	DTW	Time	DTW	Time	DTW
16:14	92.84	16:15	89.20	16:20	83.05
16:14:30	91.00	16:15:30	88.40	16:25	82.42
		16:16	86.89		
		16:17	85.12		

Signature(s): David Butler



WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/5/18 & 2/6/18  
 Weather: Cloudy, 40° breeze, showers

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW-612  
 Sample ID: NA  
 Sampling Team: Mark Green  
 David Butler

Before completion Installed  
 After completion Installed

Total Depth:	76.1	84.45	FT.(BTOC)
Depth to water:	(+) 50.85	50.30	FT.(BTOC)
Water Column:	25.25	34.15	FT.
	(x) 0.163	0.163	GAL/FT.
Well Volume:	4.16	5.57	GAL.
Total Purge Vol.:	<del>106.25</del>	NA	GAL.
	112.5		
Purge Device:	Mini Monsoon		

Measuring Device: Horiba U-53  
 Date and Time: 2/5/18 1600

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

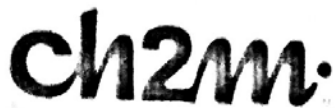
FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW Other: $\pm$ 6 toe	Color / Odor / Comments
Stabilization Criteria		constant	$\pm$ 3%	$\pm$ 10%	$\pm$ 0.1	$\pm$ 10 mV	<10		
1425	Begin	surging							
1435	Stop	surging, DTW = 42.25 ft, btoC TD = 84.7 ft, 6 toe							
1445	Begin	bailing, water very silty							
1540	Stop	bailing, bailed ~ 6.5 gal, DTW = 51.4, TD = 85.2							
1600	6	4.07	0.533	11.95	8.43	140	00R	60.75	
1615	21	9.20	0.341	11.17	8.60	-72	981	61.00	
1630	36	9.64	0.544	6.83	8.70	-91	364	60.75	
1645	51	9.70	0.543	9.81	8.64	-94	361	60.75	
2/6 1705	60	9.05	0.619	20.81	5.79	235	92.3	58.77	
0820	75	9.30	0.398	12.18	7.79	-47	24.5	58.72	
0835	90	9.62	0.489	10.59	8.45	-88	14.0	58.77	
0840	95	9.74	0.557	8.91	8.56	-93	15.0	58.77	
0845	100	9.81	0.390	11.42	8.32	-84	4.80	58.77	
0850	105	9.88	0.557	9.91	8.57	-97	3.46	58.77	

Observations/Notes: Purge Start Time: 1554 on 2/5/18 Purge Rate: 0756 on 2/6/18  
 08R = out of range  
 \* On 2/6 @ 0755 DTW = 51.01  
 \* Pump off @ 0857

Time	Flow rate
1554	1 gpm
2/6 0756	1 gpm

Signature(s):



WELL DEVELOPMENT DATA SHEET

Client: NAVI AC
Location: Ault Field, Oak Harbor, WA
Event: Well development
Date: 2/5/18
Weather: Cloudy, 40°, breeze

Project Number: 695610 04 FI WI
Well ID: WI-AF-MW-613
Sample ID: NA
Sampling Team: Mark Green, David Butler

Table with 3 columns: Before, After Development (Before completion install), and units. Rows include Total Depth, Depth to water, Water Column, Well Volume, and Total Purge Vol.

Measuring Device: Floriba U-53
Date and Time: 2/5/18 1055

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows for 1, 1.25, 2, and 4 inch diameters.

Purge Device: Mini Monsoon

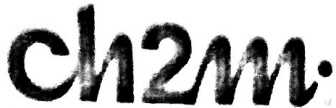
FIELD PARAMETERS table with columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, Other: DTW in ft, Color / Odor / Comments. Includes handwritten data from 10:31 to 10:53.

Observations/Notes: Purge Start Time: 1042 Purge Rate: 0.9 gpm

Flow rate / Time table with handwritten values: 0.9 gpm, 1042

Signature(s): David Butler





WELL DEVELOPMENT DATA SHEET

Client: NAVFAC
Location: Ault Field, Oak Harbor, WA
Event: Well development
Date: 2/6/18
Weather: Cloudy 96°F

Project Number: 695610.04.FI.WI
Well ID: WI-AF-MW-614
Sample ID: NA
Sampling Team: E. Carter, D. Butler

Before After completion installed
Total Depth: 70.20 69.80 FT.(BTOC)
Depth to water: (-) 52.76 52.75 FT.(BTOC)
Water Column: 17.44 17.05 FT.
Well Volume: 2.34 2.78 GAL.
Total Purge Vol.: 66 NA GAL.
Purge Device: Mini Mousse

Measuring Device: Flo-Rite 4-53
Date and Time: 2/6/18 1134

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows: 1 (0.041), 1.25 (0.064), 2 (0.163), 4 (0.653)

FIELD PARAMETERS

Table with 10 columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, Other: \_\_\_\_\_, Color / Odor / Comments. Includes data rows for 1029, 1045, 1050, 1134, 1310, 1325, 1340, 1355.

Observations/Notes. Purge Start Time: 1256 Purge Rate: 1 gpm

Time / Flow rate
1256 / 1 gpm

Pump end time = 1357

Signature(s): David Butler



## WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/26/18  
 Weather: Partly cloudy, 30's, breeze

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW-615  
 Sample ID: NA  
 Sampling Team: D. Butler  
 S. Fitzsimmons

	Before	After	
Total Depth:	94.40		FT.(BTOC)
Depth to water:	(-) 54.57		FT.(BTOC)
Water Column:	39.83		FT.
	(x) 1.469		GAL/FT.
Well Volume:	58.51		GAL.
Total Purge Vol.:	996		GAL.

Purge Device: Grundfos SQ15-290

Measuring Device: Horiba U-53  
 Date and Time: 2/26/18 1331

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

6 in 1.469 gal/foot

### FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW Other: ft b to c	Color / Odor / Comments
<b>Stabilization Criteria</b>									
	constant	constant	± 3%	± 10%	± 0.1	± 10 mV	< 10		
1028	Begin surging								
1043	End surging								
1044	Begin surging								
1100	End surging								
1111	Begin bailing								
1122	Pause bailing								
1126	Stop bailing								
1327	Begin pumping								
1331	Flow rate = 10 gpm								
1333	Flow rate = 26 gpm								
1336	78	16.57	0.553	13.80	5.42	210	00R	60.48	cloudy, lots of sed
1346	138	15.07	0.817	8.43	7.39	-52	00R	60.53	"
1400	222	14.72	0.865	7.71	7.87	-110	00R	60.53	"
1410	282	14.49	0.938	6.45	7.91	-130	00R	60.53	"
1420	342	14.23	0.842	7.81	7.89	-100	00R	60.53	"
1430	402	14.06	0.974	8.33	8.02	-129	06A	60.53	"
1440	462	13.91	0.979	5.70	8.05	-136	381	60.53	"
1445	492	13.90	0.906	7.33	8.04	-138	302	60.53	slightly cloudy
1445	Stop pumping								

Observations/Notes: Purge Start Time: 1327 Purge Rate: ~6 gpm

OOR = out of range

Signature(s): David Butler





WELL DEVELOPMENT DATA SHEET

Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development  
 Date: 2/26/18  
 Weather: Partly cloudy, 40's, breeze

Project Number: 695610.04.FI.WI  
 Well ID: WI-AF-MW-615  
 Sample ID: NA  
 Sampling Team: D. Butler  
 S. Fitzsimmons

	Before	After	
Total Depth:	94.40		FT.(BTOC)
Depth to water:	(-) 54.57		FT.(BTOC)
Water Column:	39.83		FT.
	(x) 1.469		GAL/FT.
Well Volume:	58.51		GAL.
Total Purge Vol.:	996	NA	GAL.

Measuring Device: Horiba U-53  
 Date and Time: 2/26/18

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

6 in 1.469 gal/foot

Purge Device: Grundfos SQ15-290

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW Other: ft btoC	Color / Odor / Comments
<b>Stabilization Criteria</b>		<b>constant</b>	<b>± 3%</b>	<b>± 10%</b>	<b>± 0.1</b>	<b>± 10 mV</b>	<b>&lt;10</b>		
1521	Restart pumping			DTW = 55.05 ft		btoC			
1530	546	13.46	0.981	7.64	8.22	16	145	59.80	Clear. No odor
1540	606	13.41	0.983	6.90	8.18	-3	56.2	59.92	Clear.
1550	666	13.58	0.912	7.45	8.13	-78	33.2	59.98	Clear.
1600	726	14.05	0.888	7.43	8.06	-70	22.4	60.03	" "
1610	786	14.03	1.01	6.02	8.07	-42	20.9	60.05	" "
1620	846	14.11	1.01	6.12	8.16	-97	18.2	60.06	" "
1630	906	14.08	0.806	7.55	8.11	-89	19.8	60.09	" "
1640	966	13.91	1.00	6.90	8.22	-86	18.2	60.10	" "
1640	Pump off								

Observations/Notes: Purge Start Time: 1327 Purge Rate: ~6 gpm

Total pumped vol = 966 gal  
 Total bailed vol = 30 gal  
 Total purge vol = 996 gal

Signature(s): David Butler

Attachment 3  
Survey Report





## Existing Monitoring Wells

### Whidbey Island Naval Air Station - Ault Field

Oak Harbor, WA

Survey Date: May 2018

Existing Wells Point Id	Top of PVC	Top of Metal	Ground Elev
	Casing Elev	Case Elev	
29-MW-4	96.159	96.423	94.266
N29-22D	99.521	99.834	95.933
4-MW-3	85.212	85.733	82.832
MW-201	99.654	100.023	97.533
MW-200	95.922	96.495	93.864
MW-202	89.462	90.031	Flush Mount
MW-204	96.609	97.165	Flush Mount
MW-3	89.331	89.556	Flush Mount
N2-7S	97.999	98.275	96.665
N2-3	122.403	122.852	121.971
N2-8	87.884	88.598	87.474
N2-9	87.564	88.212	86.986
N3-12	99.112	99.701	98.248
3-MW-2	84.948	85.223	82.708

\*Horizontal Coordinates were not established for Existing Wells because CH2M already has that information

#### Notes:

1. VERTICAL DATUM: NAVD88

BENCHMARKS USED (PER NGS DATA SHEET)

FIRE ELEV: 97.870 \*STANDARD BRONZE DISK STAMPED "FIRE, 1951" SET IN CONCRETE BLOCK

2. EQUIPMENT USED: LEICA DNA10 DIGITAL LEVEL





**Set Monitoring Wells**

**Whidbey Island Naval Air Station - Ault Field**

**Oak Harbor, WA**

Survey Date: March 2018

New Wells Point Id	Northing	Easting	Top of Metal	Top of PVC
			Case Elev	Casing Elev
MW-605	496011.657	1200073.919	30.562	30.269
MW-606	496551.205	1200405.991	16.337	16.112
MW-607	496664.598	1200992.787	19.153	18.895
MW-608	494698.521	1200421.099	49.469	49.184
MW-609	494571.867	1200607.071	53.094	52.754
MW-610	494401.082	1200544.453	56.991	56.717
MW-611	494569.614	1203629.960	101.126	100.660
MW-612	490240.070	1189445.221	87.423	87.143
MW-613	490272.463	1188887.696	92.939	92.688
MW-614	489730.101	1189248.989	89.360	89.108
MW-615	488678.088	1189640.435	92.061	91.667

Existing Wells Point Id	Northing	Easting	Ground Elev	Top of Metal	Top of PVC
				Case Elev	Casing Elev
MW-N26C			87.550	89.420	89.195
MW-N2-5			91.807	93.112	92.906
MW114				96.095	95.289

\*Horizontal Coordinates were not established for Existing Wells because CH2M already has that information

Notes:

1. HORIZONTAL DATUM: NAD83/11, WASHINGTON STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD83/11  
 US SURVEY FOOT  
 HORIZONTAL COORDINATES WERE OBTAINED BY RTK USING THE WASHINGTON STATE REFERENCE NETWORK (WSRN)

2. VERTICAL DATUM: NAVD88  
 BENCHMARKS USED (PER NGS DATA SHEET)  
 TORPEDO ELEV: 137.780 \*STANDARD BRONZE DISK STAMPED "TORPEDO, 1951" SET IN CONCRETE BLOCK  
 FIRE ELEV: 97.870 \*STANDARD BRONZE DISK STAMPED "FIRE, 1951" SET IN CONCRETE BLOCK

3. EQUIPMENT USED: LEICA GS15 RECEIVER, LEICA DNA10 DIGITAL LEVEL



Attachment 4  
Sampling Forms





Weather:  
Rain,  
43°F

GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
Location: Ault Field  
Event: February 2017 Groundwater Sampling  
Date: 02/16/18 - 02/17/18

Project Number: 695610.04.FI.FS Page: 1 of 1  
Well ID: WI-AF-MW-605  
Sample ID: WI-AF-MW-605-0218  
Sampling Team: S. Fitzsimmons / RDD  
C. Gardner / SEA

Total Depth: 120.57 FT.(BTOC)  
Depth to water: (-) 13.47 FT.(BTOC)  
Water Column: 106.53 FT.  
(x) 0.163 GAL/FT.  
Well Volume: 17.36 GAL.  
Total Purge Vol.: ~5.5 GAL.

Slight Rain  
02/17  
13.10 ft  
(w/ pump deployed)

Measuring Device: Homb 2-53 Lot # 14259  
Solinst Model 102 Lot # 48925

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Geo CONTROL Pump  
Bladder Pump

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. mL (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
12:18	0 initial	10.00	0.374	2.70	7.94	-49	2.47	13.10	Slightly Cloudy
12:23	2,500	10.64	0.305	0.56	7.25	-53	2.47	13.10	"
12:28	5,000	10.80	0.321	0.53	7.36	-79	2.10	13.10	"
12:33	7,500	10.69	0.324	0.53	7.38	-82	2.10	13.10	"
12:38	10,000	10.65	0.331	0.52	7.43	-88	1.88	13.10	"
12:43	12,500	10.65	0.331	0.52	7.44	-88	2.17	13.10	Clear, slight murkiness
12:48	15,000	10.73	0.338	0.51	7.48	-93	0.96	13.02	"
12:53	17,500	10.80	0.340	0.50	7.57	-99	0.88	13.03	"
12:58	20,000	10.77	0.343	0.50	7.60	-101	0.89	13.03	"
All parameters met Stabilization criteria. Proceed w/ sampling.									

No color

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres., 4°C	125 mL Poly	2

Observations/Notes: Deployed pump at 108 ft on 02/16/18. Returned to sample 02/17/18.

Pump Start Time: 12:00  
Initial Fill Time (FT; sec): 10  
Initial Discharge Time (DT; sec): 13  
Pressure - 52 psi

Final Fill Time: 10  
Final Discharge Time: 13

Purge Rate: 500 mL/min.

Pump Depth: 108 ft. Put slightly above middle of screen due to silty water in area.

time	Flow
12:05	500 mL/min
12:10	500 mL/min

Sample / Time: 13:00

MS/MSD: N/A Duplicate ID: N/A

Signature(s): *[Handwritten Signature]*

Air Monitoring:  
VOC (ppm) = 0  
H2S (ppm) = 0  
LEL (%) = 0  
CO (ppm) = 0  
O2 (%) = 20.9%

Breathing Zone  
0 ppm  
0 ppm  
0 %  
0 ppm  
20.9 %





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02-16-18  
 Weather: Rainy, 45°F, Slight precipitation (off/on)

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-MW-606  
 Sample ID: WI-AF-MW-606-0218 / WI-AF-MW-606P-0218  
 Sampling Team: S. Fitzsimmons / RDD  
 G. Gardner / SEA

Total Depth: 103.85 FT.(BTOC)  
 Depth to water: (-)0.00 FT.(BTOC)  
 Water Column: 103.85 FT.  
 (x)0.163 GAL/FT.  
 Well Volume: 16.93 GAL.  
 Total Purge Vol.: ~12 GAL.

Measuring Device: Horiba U-5000 Lot#: 20003  
 Solinst Model 102 Lot#: 48925

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Bladder Pump - geo CONTROL pump

Turbidity decreasing but still >100 NTU. Wait to purge more volume before recording more parameters.

PARAMETER STABILIZATION CRITERIA							
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS									
Time	Purge Vol. (gals) mL	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
13:25	9,375	11.71	0.519	0.00	7.38	-115	207	0.00	Very Cloudy. No odor.
13:35	18,375	11.78	0.518	0.30	7.49	-130	123	0.00	" "
13:45	27,375	11.77	0.518	0.30	7.50	-115	151	0.00	" "
14:25	47,375	11.72	0.515	0.51	7.42	-102	128	0.00	" "
14:28	48,575	11.78	0.516	0.71	7.54	-120	118	0.00	" "
14:33	100,575	11.82	0.516	0.72	7.57	-126	113	0.00	" "
14:38	102,575	11.84	0.516	0.77	7.54	-124	113	0.00	" "
14:41	103,775	11.82	0.515	0.81	7.55	-129	112	0.00	" "
14:45	105,375	11.80	0.515	0.77	7.55	-130	113	0.00	" "
Turbidity >10 NTU. Proceed w/ sampling. Formation water is turbid.									

Purge Volume  
 No odor.  
 26,000  
 30,000  
 34,000  
 35,200  
 37,200  
 39,200  
 40,400  
 42,400

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	125 mL unpres. poly	2

Observations/Notes: Initial purge water extremely turbid. >1000 NTU. Didn't record initial parameters. Needed to purge silty water. Clogged Horiba twice.

Pump Start Time: 12:30  
 Initial Fill Time (FT; sec): 12 Final Fill Time: 12  
 Initial Discharge Time (DT; sec): 15 Final Discharge Time: 15  
 Pressure ~ 55 psi  
 Purge Rate: 400 mL/min

Air Monitoring:  
 VOC (ppm) = 0 ppm  
 H2S (ppm) = 0 ppm  
 LEL (%) = 0%  
 CO (ppm) = 0 ppm  
 O2 (%) = 0%

Breathing Zone  
 0 ppm  
 0 ppm  
 0%  
 0 ppm  
 0%

Pump Depth: 95 ft BTOC  
 Sample Time: 14:50

Time	Flow
13:05	400 mL/min
13:10	400 mL/min

MS/MSD: N/A Duplicate ID: WI-AF-MW-606P-0218  
 Signature(s): [Signature]





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/16/18 - 02/17/18  
 Weather: 43°F, Slight Rain (AM)  
 Heavy Rain (PM)

Project Number: 695610.04.FLFS  
 Well ID: WI-AF-MW-607  
 Sample ID: WI-AF-MW-607-0218  
 Sampling Team: S. Fitzsimmons / ROD  
 G. Gardner / SEA 2/17 J. Schriber / exchanged

Horiba had wet check dam on 2/17

Total Depth: 177.49 FT. (BTOC)  
 Depth to water: (-) 3.88 FT. (BTOC) 02/17 - 2.62  
 Water Column: 110.61 FT. (w/pump deployed)

Measuring Device: Horiba U-5000 Lot: 20003  
 Solinst Model 102 Lot #: 48925

Well Volume: 18.02 GAL.  
 Total Purge Vol.: ~6.5 GAL. + 02/16 ~ 2.5

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Lot #: 14259  
 Pine Envir.

Purge Device: Bladder Pump  
 geoCONTROL PRO

PARAMETER STABILIZATION CRITERIA							
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
0930	initial	10.13	0.453	0.67	7.87	12	199	2.62	silty, cloudy. No odor
0940	2,250	10.12	0.453	0.63	7.78	9	196	2.62	" "
1000	4,500	10.04	0.453	0.65	7.77	-40	904	2.62	" "
1010	6,750	10.31	0.449	0.62	7.82	-43	0.00	2.62	" "
1020	9,000	10.05	0.443	0.59	7.98	-52	526	2.62	" "
1025	11,250	10.70	0.444	0.57	7.97	-51	314	2.62	" "
1030	13,500	10.71	0.442	0.56	7.62	-52	190	2.62	" "
1040	15,750	10.31	0.442	0.55	7.67	-50	190	2.62	" "
1050	18,000	10.31	0.442	0.57	7.77	-50	191	2.62	" "
1055	20,250	10.77	0.432	0.58	7.77	-82	191	2.62	" "
11:00	22,500	10.79	0.432	0.57	7.78	-83	190	2.62	" "

Clean Horiba Begin leaking

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	125 mL Poly	2

Observations/Notes: On 2/16/18 Purged ~2.5 gallons silty water.  
 Pump Start Time: 2/16 10:10 | 15:25 | 2/17 9:10  
 Initial Fill Time (FT; sec): 11 | Final Fill Time: 11  
 Initial Discharge Time (DT; sec): 14 | Final Discharge Time: 14  
 Purge Rate: 450 mL/min.  
 Pump Depth: 90 ft BTOC  
 Sample /Time: 1108  
 MS/MSD: N/A  
 Duplicate ID: N/A  
 Signature(s):

Air Monitoring:		Breathing Zone:	
VOC (ppm)=	0	VOC (ppm)=	0
H2S (ppm)=	0	H2S (ppm)=	0
LEL (%)=	0/1	LEL (%)=	0%
CO (ppm)=	0	CO (ppm)=	0
O2 (%)=	20.9	O2 (%)=	20.9%

Time	Flow
9:13	450 mL/min
9:20	450 mL/min





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02-15-18  
 Weather: 50°F, cloudy, slight wind mph

Project Number: 695610.04.FI.FS Page: 2 of 2 (SF)  
 Well ID: WI-AF-MW-608  
 Sample ID: WI-AF-MW-608-0218  
 Sampling Team: S. Fitzsimmons / RDD  
 G. Gardner / SEA

Total Depth: 54.60 FT.(BTOC)  
 Depth to water: (-) 31.00 FT.(BTOC)  
 Water Column: 23.60 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 3.85 GAL.  
 Total Purge Vol.: ~ 5 GAL.

Measuring Device: Horiba U-5000  
 Solinst Model 102 Lot#:

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

S.1-40-50  
 Pump - 45 ft Depth  
 Fill Time: 5  
 Discharge: 10 Pressure ~ 25 psi

Purge Device: Bladder Pump  
 Geo CONTROL PRO

PARAMETER STABILIZATION CRITERIA								
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)	

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
15:06	Initial	12.89	0.650	3.34	7.90	-155	21.9	31.60	Cloudy, No odor
15:11	2200	12.89	0.650	3.34	7.90	-155	21.9	31.62	" "
15:16	4400	12.89	0.650	3.34	7.90	-155	21.9	31.60	" "
15:21	6600	12.89	0.650	3.34	7.90	-155	21.9	31.60	" "
15:26	8800	12.89	0.650	3.34	7.90	-155	21.9	31.60	" "
15:31	11000	12.89	0.651	3.62	7.69	-186	1.8	31.6	Clear, No odor
15:36	13200	12.94	0.650	3.57	7.55	-180	1.4	31.6	" "
<del>Purged entire well volume. All parameters stable. Proceed to sampling despite 210 NTU Turbidity</del>									
15:41	15400	12.91	0.648	3.75	7.73	-190	1.2	31.6	Clear, no odor
15:46	17600	12.90	0.647	3.78	7.74	-190	1.4	31.6	" "
15:51	19800	12.88	0.647	3.69	7.74	-191	1.5	31.6	" "

Water Level Meter froze. Fixed & re-recorded stabilized values (SF)

All values stable. Proceed w/ sampling

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	Unpres. 125 mL poly	2

Observations/Notes: Purged ~ 5 gallons. All water re-charge of formation. Proceed w/ sampling despite turbidity parameter. (SF)

Pump Start Time: 14:55  
 Initial Fill Time (FT; sec): 5  
 Initial Discharge Time (DT; sec): 10

Final Fill Time: 7  
 Final Discharge Time: 10  
 Purge Rate: 450 mL/min

Air Monitoring:  
 VOC (ppm)= 0  
 H2S (ppm) 0  
 LEL (%)= 0  
 CO (ppm)= 0  
 O2 (%)= 20.9

Breathing Zone:  
 0 ppm  
 0 ppm  
 0 ppm  
 0 ppm  
 20.9%

Pump Depth: 45 ft.  
 Sample / Time: 15:55

Flow / Time  
 700 mL/min 13:00  
 450 mL/min 15:03

MS/MSD N/A Duplicate ID:  
 Signature(s): [Signature]





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2017 Groundwater Sampling
Date: 02-17-18
Weather: 47°F, Windy ~20 mph

Project Number: 695610.04.FI.FS
Well ID: WI-AF-MW-609
Sample ID: WI-AF-MW-609-0218
Sampling Team: S. Fitzsimmons/RDD
G. Gardner/SEA J. Schriau/cvo

Total Depth: 59.66 FT.(BTOC)
Depth to water: (-) 34.13 FT.(BTOC)
Water Column: 25.53 FT.
Well Volume: 4.16 GAL.
Total Purge Vol.: ~5 GAL.

Measuring Device: Honba 2-53 Lot# 14259
Solinst Model 102 Lot#: 48925

Purge Device: GeoCONTROL PRO Bladder SF Bladder Pump

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows for 1, 1.25, 2, and 4 inch diameters.

S.I. - 45-55
Pump - 50 ft
Depth

PARAMETER STABILIZATION CRITERIA table with columns for Parameter, Temp, Cond, DO, pH, ORP, Turbidity, DTW, and Criteria.

FIELD PARAMETERS table with columns for Time, Purge Vol., Temp, Cond, DO, pH, ORP, Turbidity, DTW, and Color/Odor/Comments.

Sample information table with columns for Analysis, Preservative, Container requirements, and No. of containers.

Observations/Notes: Water surrounding well head. Removed water to below J-plug...
Pump Start Time: 14:55
Initial Fill Time(FT; sec): 5
Initial Discharge Time(DT; sec): 5
Pump Depth: 45 ft
Sample /Time: WI-AF-MW-609-0218 1555
MS/MSD N/A
Signature(s): [Handwritten Signature]
Duplicate ID: N/A

Turb. blinks Clean Flow cell.

Breathing Zone?

7,700

Table with 2 columns: Time and Flow (mL/min). Row for 350 mL/min.



GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: NASWI Ault Field
Event: Ault Field Off-base Sampling
Date: 03/01/18
Weather: 47°F, Sunny, Wind: 10 mph

Project Number: 695610.04.FI.FS Page: 1 of 2
Well ID: WI-AF-MW-611
Sample ID: WI-AF-MW-611
Sampling Team: S. Fitzsimmons/RDD
M. Green/SAC

Total Depth: 170.20 FT.(BTOC)
Depth to water: (1) 81.75 FT.(BTOC)
Water Column: 88.45 FT.
Well Volume: (x) 1.469 GAL/FT.
Total Purge Vol.: 129.93 GAL.
~4 GAL.

Measuring Device: Horiba 21-500 Lot #: 025039
WLM Solinst Model 101 #: 29644

Table with 4 columns: Well Dia. (inches), Volume (gallons/foot), Well Dia. (inches), Volume (gallons/foot). Rows include 1, 1.25, 2, 4 inch diameters.

S.I. - 175-165 ft
Pump Depth - 155 ft btoc

Purge Device: Bladder Pump Lot #: 6131
geoCONTROL Pro Lot #: 4376

PARAMETER STABILIZATION CRITERIA

Table with 8 columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC. Includes criteria values for each parameter.

FIELD PARAMETERS

Table with 10 columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Color / Odor / Comments. Contains multiple rows of sampling data.

Sample information: method, container number, size, and type, preservative used.

Table with 4 columns: Analysis, Preservative, Container requirements, No. of containers. Row for PFAS 537.

Observations/Notes:

Pump Start Time: 13:22
Initial Fill Time(FT; sec): ~15
Initial Discharge Time(DT; sec): 37
Target Pressure - 88 psi

Final Fill Time: 20
Final Discharge Time: 39

Purge Rate: 150 mL/min.

Table for Air Monitoring: HZ, BZ. Rows for VOC, H2S, LEL, CO, O2 percentages.

Pump Depth: 155 ft btoc

Table for Purge Rate: time, Flow Rate. Rows for 13:30 and 13:3.

Sample Time: 15:20

MS/MSD N/A
Signature(s): [Handwritten Signature]

Duplicate ID: N/A



Client: NAVFAC  
 Location: Ault Field, Oak Harbor, WA  
 Event: Well development GW Sampling  
 Date: 3/1/18  
 Weather: 47°F, Sunny, Wind

**WELL DEVELOPMENT DATA SHEET**

Project Number: 695610.04.FI.M.FS  
 Well ID: WI-AF-MW-611  
 Sample ID: NA-WI-AF-MW-611  
 Sampling Team: S. Fitzsimmons/RDP  
 M. Green/SAC

	Before	After	
Total Depth:	170.20		FT.(BTOC)
Depth to water:	(-)81.75		FT.(BTOC)
Water Column:	88.45		FT.
Well Volume:	(x)1.469		GAL/FT.
Total Purge Vol.:	129.93		GAL.
	~ 4 gallons		GAL.

Purge Device: Bladder Pump #6131  
 geo control #4376

Measuring Device: Horiba U-5000 #025039  
 Date and Time: Solinst Model 101 #29644

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Screened Interval  
 145-165 ft Bgs  
 Pump depth - 155 ft Bgs

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: DTW Ft BTOC	Color / Odor / Comments
<b>Stabilization Criteria</b>		constant	± 3%	± 10%	± 0.1	± 10 mV	< 10	-	Clear, No odor
14:35	8250	13.69	0.461	0.93	7.32	-161	4.16	81.79	" "
14:40	8900	13.55	0.462	0.91	7.31	-161	3.73	81.79	" "
14:45	9750	13.39	0.464	0.84	7.29	-162	4.97	81.79	" "
14:50	10500	13.32	0.465	0.85	7.31	-163	2.03	81.79	" "
14:55	11250	13.19	0.465	0.85	7.29	-163	2.65	81.79	" "
15:00	12000	13.21	0.466	0.80	7.28	-163	2.10	81.79	" "
15:05	12750	13.04	0.468	0.77	7.26	-162	1.85	81.79	" "
15:10	13500	13.11	0.469	0.84	7.25	-162	1.33	81.79	" "
15:15	14250	13.10	0.470	0.79	7.30	-165	1.58	81.79	" "
All parameters stable Proceed with sampling.									

Observations/Notes: \_\_\_\_\_ Purge Start Time: \_\_\_\_\_ Purge Rate: \_\_\_\_\_

See page 1 for additional details

MSD Sample Time: 15:20

Signature(s): \_\_\_\_\_





GROUNDWATER SAMPLING DATA SHEET

Page: 1 of 1

Client: NAVFAC

Location: Ault Field

Event: February 2017 Groundwater Sampling

Date: 02/14/2018 / 02/15/18

Weather: Partly Cloudy, Low 40's°F, NW winds @ 6-9 mph

Project Number: 695610.04.FI.FS

Well ID: WI-AF-MW-612

Sample ID: WI-AF-MW-612-0218

Sampling Team: S. Fitzsimmons/ROD  
G. Gardier/SEA

Measuring Device: Horiba U-5000  
Solinst Model D2 Lot#: 48925

Total Depth: 84.49 FT.(BTOC) ← 50.35' by sonar 2/15

Depth to water: (-) 49.98 FT.(BTOC) [INITIAL @ 1457]

Water Column: 34.51 FT.

(x) 0.163 GAL/FT.

Well Volume: 5.63 GAL.

Total Purge Vol.: ~4 GAL.

Purge Device: geoCONTROL PRO  
Bladder Pump

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Fill Time:  $\frac{74}{10} = 7.4$

Discharge =  $\frac{74}{3.75} = 19.7$

Pressure =  $\frac{74}{2} + 10 = 37$  psi

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals) (mLs)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
02/14 1535	AFTER DEPLOY OF PUMP							49.93' BTOC	Cloudy. No odor
02/15 1036	1500	11.51	1.11	0.00	7.57	-38	84.7	50.50	" "
1041	3000	11.37	1.10	0.00	7.91	-133	60.3	50.41	" "
1046	4500	11.32	1.08	0.00	7.93	-144	54.1	50.40	" "
1051	6000	11.32	1.07	0.00	8.05	-145	51.1	50.40	" "
1056	7500	11.26	1.07	0.00	8.08	-153	47.3	50.40	" "
1101	9000	11.34	1.07	0.00	8.04	-151	42.2	50.40	" "
1106	10500	11.20	1.07	0.00	8.08	-154	43.7	50.42	" "
1111	11500	11.20	1.07	0.00	8.08	-154	43.7	50.45	" "
1116	13000	11.20	1.07	0.00	8.08	-154	43.7	50.43	" "
1121	14500	11.20	1.07	0.00	8.08	-154	43.7	50.43	" "

DTW differ due to discharge cycle

Turbidity never stabilized  
Proceed stabilize >10 NTU  
Proceed with sampling

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres, 4°C	125mL Poly	2 (2x 3 samples) = 6 total

Observations/Notes: UPON OPENING J-PLUG, INFILTRATION OBSERVED AND PVC SHAVINGS  
11:21 Purged (1) well volume, all stagnant water purged. High turbidity representative of formation water. Proceed with sampling.

Pump Start Time: 10:20

Initial Fill Time(FT; sec): 7.4

Initial Discharge Time(DT; sec): 19.7

Final Fill Time: 7.4

Final Discharge Time: 19.7

Purge Rate: 300ml/min

time	Flow (mL/min)
10:25	300 mL/min
10:30	300 mL/min

Air Monitoring: HS BZ  
VOC (ppm)= 6.1 6.0  
H2S (ppm) 0.0 0.0  
LEL (%)= 0 0  
CO (ppm)= 5.0 0.0  
O2 (%)= 20.9 20.9

Pump Depth: 74' BTOC (TOP OF PUMP = 72.4' BTOC)

Sample /Time: 11:20

MS/MSD WI-AF-MW-612-0218-MS/MSD Duplicate ID: N/A

Signature(s): *[Signature]*

(not dispelling all volume) fill time





GROUNDWATER SAMPLING DATA SHEET

Page: 2 of 2 (SF)

Client: NAVFAC

Project Number: 695610.04.FI.FS

Location: Ault Field

Well ID: WI-AF-MW-613

Event: February 2017 Groundwater Sampling

Sample ID: WI-AF-MW-613-0218 / WI-AF-MW-613P-0218 (SF)

Date: 02/14/18

Sampling Team: S. Fitzsimmons/RDD

Weather: 43°F, Cloudy-Sunny in afternoon

Measuring Device: WLM: Solinst Model 102 Lot#: 48925  
HORIBA U-500 Lot #20003 (Pine Env)

Total Depth: 78.38 FT.(BTOC)

Depth to water: (-)55.29 FT.(BTOC)

Water Column: 23.09 FT.

Well Volume: (x)0.103 GAL/FT.  
3.70 GAL.

Total Purge Vol.: ~ 94.5 GAL.  
(SF)

Purge Device: Bladder pump  
geo CONTROL PRO

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Fill  
70/10=7  
Discharge  
70/3.75=18.7  
Pressure  
70/2 + 10 = 45

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (mL/gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
14:55	Initial 10	11.00	0.817	0.52	8.916	65	43.0	55.28	Murky, slightly odor
15:00	2500 (SF)	11.27	0.824	0.00	8.92	-15	42.6	55.28	" "
15:05	5000 (SF)	11.37	0.829	0.00	8.67	-91	39.2	55.28	" "
15:10	7500 (SF)	11.46	0.823	0.00	8.59	-112	28.6	55.28	" "
15:15	10000 (SF)	11.61	0.831	0.00	8.50	-127	23.3	55.28	" "
15:20	12500 (SF)	11.62	0.832	0.00	8.43	-129	17.3	55.28	" "
15:25	15000 (SF)	11.64	0.829	0.00	8.33	-130	13.0	55.28	" "
15:30	17500 (SF)	11.70	0.828	0.00	8.31	-131	10.2	55.28	" "
16:00	20000 (SF)	11.68	0.841	0.00	8.32	-134	18.3	55.28	" "
16:05	22500 (SF)	11.76	0.828	0.00	8.31	-135	16.1	55.28	" "
16:10	25000 (SF)	11.51	0.830	0.00	8.26	-133	15.9	55.28	" "

Purge Vol. (mL/gals)  
01250  
2850  
2500  
3750  
8000  
6250  
7500  
8750  
9000  
10250  
11500

More Readings

Needed to get 3rd battery from vehicle.

Turbidity Never Stabilized Process w/ Sample

Analysis	Preservative	Container requirements	No. of containers
PFAs	Unpreserved	125 mL Poly (2)	2

Observations/Notes:

15:30 Recognized pump pressure was & troubleshooted - battery died  
Pump Start Time: 14  
Initial Fill Time(FT; sec): 7  
Initial Discharge Time(DT; sec): 18.7  
Final Fill Time: 7  
Final Discharge Time: 18.7  
Purge Rate: 500 L/min

Air Monitoring:  
VOC (ppm)= 0  
H2S (ppm)= 0  
LEL (%)= 0  
CO (ppm)= 0  
O2 (%)= 20.9  
Breathing Zone:  
0 ppm  
0 ppm  
0 %  
0 ppm  
20.9 %

Pump Depth: 70 ft.

Sample /Time: 16:55

MS/MSD N/A

Duplicate ID: N/A

Signature(s): [Handwritten Signature]





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2017 Groundwater Sampling
Date: 02/14/18
Weather: 39°F, Cloudy/Slight Rain

Project Number: 695610/04.FI.FS
Well ID: WI-AF-MW-614
Sample ID: WI-AF-MW-614
Sampling Team: S. Fitzsimmons / RPD
J. Horton / SEA

Total Depth: 69.76 FT.(BTOC)
Depth to water: 152.73 FT.(BTOC)
Water Column: 17.03 FT.

Measuring Device: Water level meter: Solinst Model 102
Horiba U-SDD Lot#: 20003 (Pine Env.)

Well Volume: 2.77 GAL.
Total Purge Vol.: 84 GAL.

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows include 1, 1.25, 2, and 4 inch diameters.

Handwritten calculations: Fill 65/10 = 6.5, Discharge 65/2 = 32.5, Pressure 65/2 + 10 = 42.5

Purge Device: Bladder Pump
geoCONTROL PRO

PARAMETER STABILIZATION CRITERIA

Table with 8 columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC. Includes criteria values for each parameter.

FIELD PARAMETERS

Table with 10 columns: Time, Purge Vol (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Color / Odor / Comments. Contains 12 rows of field data.

Handwritten note: Divide all purge volumes by 2. Not full cycle for flow rate!

Handwritten notes: DTW: 51.65, Turbidity Parameters never stabilize. Proceed to sampling. Purged well volume.

Sample information: method, container number, size, and type, preservative used.

Table with 4 columns: Analysis, Preservative, Container requirements, No. of containers. Row for PFAS analysis.

Observations/Notes: Pump Start time: 10:40

Air Monitoring: VOC (ppm)= 0.0, H2S (ppm)= 6.0, LEL (%)= 2%, CO (ppm)= 20 ppm, O2 (%)= 20.9. Breathing Zone: 0.0 ppm, 0.0 ppm, 0%, 0 ppm, 20.9.

Pump Start Time: 10:40
Initial Fill Time (FT; sec): 6.5
Initial Discharge Time (DT; sec): 17
Final Fill Time: 6.5
Final Discharge Time: 17
Purge Rate: 600 mL/min (SF) 300

Pump Depth: 65ft.
Time | Flow mL/min
10:46 | 600
10:51 | 600

Sample Time: 11:45

MS/MSD N/A

Duplicate ID: N/A

Signature(s): [Handwritten Signature]



Client: NAVFAC  
 Location: NASWI Ault Field  
 Event: Ault Field Off-base Sampling  
 Date: 03-01-18  
 Weather: 42°F, Clear w/Sun, Wind: 10 mph

**GROUNDWATER SAMPLING DATA SHEET**

Project Number: 695610.04.FI.FS Page: 1 of 2  
 Well ID: WI-AF-MW-615  
 Sample ID: WI-AF-MW-615  
 Sampling Team: S. Fitzsimmons / RDD  
 M. Green / SAC

Total Depth: 53.82 FT.(BTOC)  
 Depth to water: 495.25 FT.(BTOC)  
 Water Column: 1.469 FT.  
 (x) 41.43 GAL/FT.  
 Well Volume: 61 GAL.  
 Total Purge Vol.: 7.1 GAL.

Measuring Device: Horiba U-5000 Lot#: 025031  
 Solinst WLM Model 101  
 Lot #: 29644

Well Dia. (inches)	Volume (gallons/foot)	Well Dia. (inches)	Volume (gallons/foot)
1	0.041	6	1.469
1.25	0.064		
2	0.163		
4	0.653		

Purge Device: Bladder Pump Lot#. 5892  
 Geo Control PRO Lot#. 4376

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. mL/(min) (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
10:07	Initial	10.55	0.989	7.92	5.57	49	26.1	53.83	Clear, No odor
10:12	1500	11.26	0.984	4.82	6.25	-57	29.8	53.83	" "
10:17	3000	11.96	0.973	2.47	7.07	-173	31.1	53.86	Slightly Cloudy
10:22	4500	12.17	0.961	2.03	7.34	-212	34.5	53.86	" "
10:27	6000	12.27	0.961	1.89	7.43	-224	30.0	53.86	" "
10:32	7500	12.36	0.960	1.71	7.51	-237	28.6	53.86	" "
10:37	9000	12.56	0.956	1.47	7.57	-249	25.5	53.87	" "
10:47	12000	12.68	0.954	1.30	7.62	-257	22.5	53.86	" "
10:52	13500	12.60	0.952	1.19	7.66	-262	21.5	53.86	" "
10:57	15000	12.67	0.951	1.10	7.68	-266	17.5	53.86	Clear, No odor
11:02	16500	12.73	0.952	1.06	7.69	-268	15.0	53.86	" "

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres 4°C	125 mL Poly	2

**Observations/Notes:**

Pump Start Time: 9:55  
 Initial Fill Time(FT; sec): 8  
 Initial Discharge Time(DT; sec): ~21  
 Target Pressure = 50 psi

Final Fill Time: 14  
 Final Discharge Time: 17

Purge Rate: 300 mL/min.

Air Monitoring: HZ	Breathing Zone
VOC (ppm) = 0	0
H2S (ppm) = 0	0
LEL (%) = 0	0
CO (ppm) = 0	0
O2 (%) = 20.9	20.9

Pump Depth: 80 ft btoc

S.I. - 70-90 ft

Flow Rate	time
400 mL/min	9:57
300 mL/min	10:03

adjust discharge time

Sample / Time: 11:40

MS/MSD N/A Duplicate ID: \_\_\_\_\_

Signature(s): *[Handwritten Signature]*





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: NASWI Ault Field
Event: Ault Field Off-base Sampling
Date: 3/1/18
Weather: 42°F, Clear w/ Sun Wind: 10 MPH

Project Number: 695610.04.FI.FS
Well ID: WI-AF-MW-615
Sample ID: WI-AF-MW-615-0318
Sampling Team: S. Fitzsimmons / RDD
M. Green ISAC

Total Depth: 95.25 FT.(BTOC)
Depth to water: (-) 53.82 FT.(BTOC)
Water Column: +1.43 FT.
Well Volume: (x) 1.469 GAL/FT.
Total Purge Vol.: 61 GAL.

Measuring Device: Horiba U-5000 #025039
Solinst Model 101 #29644

Purge Device: Bladder Pump #5892
Geo Control #4376

Table with 4 columns: Well Dia. (inches), Volume (gallons/foot), Well Dia. (inches), Volume (gallons/foot). Rows include 1, 1.25, 2, 4 inch diameters.

PARAMETER STABILIZATION CRITERIA table with columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Criteria.

FIELD PARAMETERS table with columns: Time, Purge Vol. (gals)-L, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Color / Odor / Comments.

Sample information table with columns: Analysis, Preservative, Container requirements, No. of containers.

Observations/Notes: Pump Start Time: 0455, Initial Fill Time: 8, Initial Discharge Time: ~21, Target Pressure: ~60 PSI, Final Fill Time: 14, Final Discharge Time: 17, Purge Rate: 300 L/min, Air Monitoring: H2, B2, VOC, H2S, LEL, CO, O2.

Pump Depth: 80 ft BTOC, Sample Time: 11:40, MSMSD: N/A, Duplicate ID: N/A, Signature(s): [Handwritten Signature]



**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC Project Number: W95610.04.F1.FS  
 Location: AULT FIELD Well ID: N2-6C  
 Event: GW Sampling - Existing wells Sample ID: W1-AF-N2-6C-0218  
 Date: 2/18/18 Sampling Team: J. Ulrich | S. Fitzgimmons  
 Weather: overcast, windy, gusts ~ 20 mph

Total Depth: 75.00 FT.(BTOC)  
 Depth to water: (+) 58.03 FT.(BTOC)  
 Water Column: (X) 0.163 FT. 1.697 GAL/FT.  
 Well Volume: 2.76 GAL.  
 Total Purge Vol.: \_\_\_\_\_ GAL.

Measuring Device: Horibar U-5200 #26410  
 Date and Time: Solinist water level #308774  
multirae plus (11.7e lamp)  
 #

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
<u>2</u>	0.163
4	0.653

Purge Device: GeoTech Portable Bladder # 1424

SAMPLE DATA									
Date:	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: _____	Color / Odor / Comments	
Time:									
Method:									

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: <u>DTW</u>	Color / Odor / Comments
1105	Initial	-	-	-	-	-	-	58.43	pump on
1115	0.75	10.04	0.345	1.26	6.74	258	9.3	58.38	clear, no odor
1120	1.30	10.79	0.327	1.26	7.50	257	8.2	58.32	
1125	1.70	10.74	0.320	1.18	7.79	244	3.3	58.32	
1130	2.00	10.79	0.318	1.09	7.79	246	4.0	58.32	
1135	2.50	10.75	0.317	1.09	7.80	240	4.0	58.32	

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers
PFAs	—	4oz HDPE	2

Observations/Notes:  
 Pump Start Time: 1105 VOC Reading: 0.0 ppm  
 Pump Depth: 69' BTOC EQUIPMENT BLANK: W1-AF-FB01-021818 @ 1210  
 Sample Time: 1140 FIELD BLANK: W1-AF-FB01-021818 @ 1145  
 MS/MSD: \_\_\_\_\_ Duplicate ID No.: \_\_\_\_\_  
 Signature(s): \_\_\_\_\_





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2018 Groundwater Sampling  
 Date: 02/20/18  
 Weather: 29°F, cold/cloudy/moderate sun

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-N2-5  
 Sample ID: WI-AF-N2-5-0218  
 Sampling Team: S. Fitzsimmons/RDD  
J. Ulrich/POX

Total Depth: 18.85 FT.(BTOC)  
 Depth to water: (-) 5.07 FT.(BTOC)  
 Water Column: 13.78 FT.  
(x) 0.163 GAL/FT.  
 Well Volume: 2.25 GAL.  
 Total Purge Vol.: ~ 2.3 GAL. *Purged (1) Well volume*  
 Purge Device: Pine Envir. Services  
Series 2 Drive Lot #: 15145

Measuring Device: Horiba U-52 Lot #: 019564  
Solinst Model 102  
 Lot #: 48925

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
09:14	initial	7.49	0.210	2.61	6.50	149	25.3	5.21	Clear. No odor. Slight sulfur
09:19	1,250	7.73	0.201	2.28	6.70	110	22.4	5.21	Slightly tinted. No odor
09:24	2,500	7.91	0.199	2.13	6.82	90	18.8	5.21	" "
09:29	3,750	8.32	0.192	1.72	6.86	63	13.1	5.21	" "
09:34	5,000	8.50	0.190	1.61	6.88	51	9.9	5.21	Clear. No odor
09:39	6,250	8.59	0.190	1.55	6.89	46	9.4	5.21	" "
09:44	7,500	8.63	0.188	1.48	6.93	38	9.0	5.21	" "
09:49	8,750	8.66	0.185	1.39	6.96	36	9.0	5.21	" "
All parameters stable. Proceed with sampling.									

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	125 mL Poly	2

Observations/Notes: *Used peristaltic pump at this well location. All purge parameters were placed for a low-flow. (low speed parameter)*

Pump Start Time: 9:10  
 Initial Fill Time(FT; sec): —  
 Initial Discharge Time(DT; sec): —

Pump End Time: 10:00  
 Purge Rate: 250 mL/min.

Pump Depth: 12 ft btoc.

Sample /Time: 9:55

Air Monitoring: HS | BZ  
 VOC (ppm)= 0 | 0  
 H2S (ppm) = 0 | 0  
 LEL (%)= 0 | 0  
 CO (ppm)= 0 | 0  
 O2 (%)= 20.9 | 20.9

MS/MSD N/A Duplicate ID: N/A  
 Signature(s): *[Signature]*





B2668

GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2018 Groundwater Sampling
Date: 02/20/18
Weather: 38°F, Partial sun with clouds

Project Number: 695610.04.FI.FS
Well ID: WI-AF-MW-114 (Used shortened ID.)
Sample ID: WI-AF-MW-114-0218
Sampling Team: S. Fitzsimmons/RDD
J. Ulrich/PDX

Page: 1 of 1

Total Depth: 13.99 FT.(BTOC)
Depth to water: (-) 7.47 FT.(BTOC)
Water Column: 6.52 FT.
(x) 0.163 GAL/FT.
Well Volume: 1.06 GAL.
Total Purge Vol.: ~ 2.2 GAL.

Measuring Device: Horiba U-52 Lot #019564
Solinst Model 102
Lot #: 48925

Purge Device: Pine Envir. Services
Series 2 Drive Lot #15145

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows include 1, 1.25, 2, 4 inches.

PARAMETER STABILIZATION CRITERIA

Table with 8 columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC. Includes criteria values for each parameter.

FIELD PARAMETERS

Table with 10 columns: Time, Purge Vol. (gals/ml), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Color / Odor / Comments. Contains a time-series log of sampling data.

Table with 4 columns: Analysis, Preservative, Container requirements, No. of containers. Row for PFAS 537 analysis.

Observations/Notes: - Used peristaltic pump. All purge parameters were placed for a low-flow purge. (low speed)
Air Monitoring: HS BZ
VOC (ppm)= 0 0
H2S (ppm) 0 0
LEL (%)= 0 0
CO (ppm)= 0 0
O2 (%)= 20.9 20.9

Pump Start Time: 14:55
Initial Fill Time(FT; sec): -
Initial Discharge Time(DT; sec): -
Final Fill Time: - } N/A
Final Discharge Time: - }
Pump End Time: 16:00
Purge Rate: 175 mL/min.

Pump Depth: 11 ft. btoc
Sample Time: 15:50
Duplicate ID: N/A

MS/MSD: N/A
Signature(s): [Handwritten Signature]





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 2/13/18  
 Weather: Partly sunny, 34°F

Project Number: 695610.04.FLFS Page: 1 of 1  
 Well ID: WI-AF-MW-29-MW-4-0218  
 Sample ID: WI-AF-29-MW-4-0218  
 Sampling Team: Jennifer Ulrich  
 Mark Endo

Total Depth: 58.71 FT.(BTOC) 66.03' bTOL [SOFT BOTTOM]  
 Depth to water: (-) 58.71 FT.(BTOC)  
 Water Column: 7.32 FT.  
(x) 0.653 GAL/FT. 4" DIA WELL  
 Well Volume: 4.78 GAL.  
 Total Purge Vol.: 2.3 GAL.

Measuring Device: HORIBA U-5000 HGS SERIAL # W7VMEP1P  
 Multirae Plus II 7eV # 113775  
 Geo Tech water level meter # 61167 (2007)

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: GF GEO TECH Portable Bladder PUMP  
 SERIAL # 1478

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1257	0.35	-	-	-	-	-	-	58.70	clear, odorless; initial
1305	0.40	13.87	0.925	4.98	7.59	173	0.0	58.69	clear, NO ODOR
1310	0.45	13.61	0.929	4.40	8.15	159	0.0	58.68	"
1315	0.48	13.38	0.934	3.83	8.37	153	0.0	58.68	"
1320	0.55	13.20	0.939	3.38	8.48	147	0.0	58.67	"
1325	0.65	13.15	0.939	3.19	8.54	142	0.0	58.66	"
1330	0.75	13.03	0.939	3.05	8.57	138	0.0	58.66	"
1335	0.80	12.90	0.942	2.90	8.60	133	0.0	58.65	"
1340	0.90	12.82	0.945	2.85	8.61	129	0.0	58.65	"
1345	1.0	12.74	0.949	2.74	8.61	125	0.0	58.65	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
METHOD 537	None, 4°C	125 mL POLY	2

Observations/Notes: PARAMETERS STABLE @ 1345, PROCEED TO SAMPLE. TAKE EQUIPMENT BLANK WI-AF-EB01-021318 @ 1415.

Air Monitoring:	HS	BZ
VOC (ppm)=	0.0	0.0
H2S (ppm)	0.0	0.0
LEL (%)=	0	0
CO (ppm)=	1	1
O2 (%)=	20.9	20.9

Pump Start Time: 1242

Initial Fill Time(FT; sec): 10

Initial Discharge Time(DT; sec): 15

Final Fill Time: 20:15

Final Discharge Time: 15

Purge Rate: @ 13:10 = 70 mL/min  
 @ 13:20 = 60 mL/min

Pump Depth: SUCTION DEPTH = 57' bgs (58.8' BTOC).

Sample Time: 13:50

MS/MSD: NO Duplicate ID: WI-AF-29-MW-4P-0218  
 Signature(s): Mark Endo SAMPLE TIME: 13:55

- WI-AF-EB01-021318 @ 14:00 [FIELD REAGENT BLANK]
- WI-AF-EB03-021318 @ 14:20 [EB ON NEW TUBING, BONDED]
- WI-AF-EB04-021318 @ 14:25 [EB ON NEW PUMP BLADDERS]





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/14/18  
 Weather: Cloudy, Light Rain, Low 40's F

Project Number: 695610.04.FLFS Page: | of |  
 Well ID: WI-AF-MW N29-22D  
 Sample ID: WI-AF-N29-22D-0218  
 Sampling Team: J. ULRICH  
 M. ENDO

Total Depth: 105 FT.(BTOC)  
 Depth to water: (-) 15.01 FT.(BTOC) [INITIAL @ 0955]  
 Water Column: 89.99 FT.  
 (X) 0.163 GAL/FT.  
 Well Volume: 14.67 GAL.  
 Total Purge Vol.: GAL. (ON 02/14/16 = 14.56 GAL)

Measuring Device: GEOTECH WLI # 5976  
 SECURITY # 1020013  
 MULTIRAE (11.7cV) 1137775  
 HORIBA U-52 #21346 & 019564

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Purge Device: GEOTECH PRO # C103202  
 GEOTECH BLADDER #

PARAMETER STABILIZATION CRITERIA								
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)	

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1034	-	-	-	-	-	-	-	11.19	Initial. adjusting
1038	-	-	-	-	-	-	-	12.01	flow to attempt
1046	-	-	-	-	-	-	-	13.40	manage
1100	0.04	10.24	0.833	2.11	8.16	191	14.8	14.62	
1105	-	-	-	-	-	-	-	15.09	PURGE WELL
1549	-	-	-	-	-	-	-	94.97	DRY due to draw down issues.
@ 1343	DTW = 73.63' bTOC, ~ 11 GALLONS PURGED. CONTINUE PURGE.								Disconnect Horiba Allow to purge.

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers

Observations/Notes: continual draw down @ low flow ~ 50 mL/cycle. Lose ~ 8.07/cycle ft of water

Pump Start Time:  
 Initial Fill Time(FT; sec): 10 Final Fill Time: 17  
 Initial Discharge Time(DT; sec): 25 Final Discharge Time: 23

Purge Rate:

Pump Depth: 96.9' bTOC

Sample /Time:

MS/MSD Duplicate ID:

Signature(s):

Air Monitoring: 

	BZ
VOC (ppm)=	0.0
H2S (ppm)	0.0
LEL (%)=	0
CO (ppm)=	0.0
O2 (%)=	20.9

well purged to pump intake. Allow to recharge. Total purged ~ 14.5 gals.

ON 02/15/18 @ 0920 DTW = 94.73' bTOC (PUMP IN WELL). A RISE OF 0.24' FROM 02/14/18 @ 1549. PULL PUMP @ 0945 & SECURE WELL, AWAITING FURTHER INSTRUCTIONS FROM P. LAWSON/J. HORTON.  
 ON 02/17/18 @ 1718 DTW = 94.48' bTOC (PUMP OUT OF WELL). A RISE OF 0.49' FROM 02/14/18 @ 15:49.





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 2/17/18  
 Weather: High winds/gusts up to 35 mph rain

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-MW-4-MW-3  
 Sample ID: WI-AF-4-MW-3-0218  
 Sampling Team: J. Ulrich, M. Endo

Total Depth: <sup>JUP</sup> 68.8 FT.(BTOC) <sup>83.50</sup>  
 Depth to water: (-) 68.82 FT.(BTOC)  
 Water Column: 14.69 FT.  
 (x) 0.653 GAL/FT.  
 Well Volume: 9.08 GAL.  
 Total Purge Vol.: 9.50 GAL.

Measuring Device: Horiba U-5000 # 21346 019564  
 Multi Pae Plus # 1137775  
 Geotech water level # 5996

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: Geotech Portable Bladder pump # 1424

PARAMETER STABILIZATION CRITERIA							
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1033	Initial	-	-	-	-	-	-	68.82	No water. Adjust pump
1045	↓	-	-	-	-	-	-	68.99	settling
1100	1.5	-	-	-	-	-	>1000*	69.01	Water highly turbid.
1110	2.25	-	-	-	-	-	>1000*	69.03	Brown unit yr. or line to clear
1308	8.00	-	-	-	-	-	-	69.03	Water clears. prior to connecting
1310	8.30	13.03	1.04	2.17	7.85	49	399	69.03	Begin water quality redding.
1315	8.60	13.09	1.04	2.10	7.89	30	392	69.01	
1320	8.90	13.11	1.03	1.05	7.99	-21	315	69.03	
1325	9.20	13.16	1.03	1.03	7.81	-28	309	69.01	
1330	9.50	13.18	1.03	1.03	7.83	-27	303	69.02	ORP = -37

Water highly turbid. Brown unit yr. or line to clear prior to connecting to Horiba. & Fines settling out, slight rust color

Sample information: method, container number, size, and type, preservative used.			
Analysis	Preservative	Container requirements	No. of containers
PFA's	-	HDPE * 4 oz poly (125ml)	2

Observations/Notes: Initial - gals highly turbid. Visual observation \* >1000 NTU's. wait to clear up prior to connecting to flow through  
 Pump Start Time: 1033  
 Initial Fill Time(FT; sec): 15 12  
 Initial Discharge Time(DT; sec): 20 215  
 Final Fill Time: 12  
 Final Discharge Time: 15 through  
 Purge Rate: 0.05 gpm  
 Air Monitoring: H5 BZ  
 VOC (ppm)= 0.0 0.0  
 H2S (ppm) 0.0 0.0  
 LEL (%)= 0.0 0  
 CO (ppm)= 0.0 0.0  
 O2 (%)= 20.9 20.9  
 Pump Depth: 77.00 75.40 FT BTOC  
 Sample /Time: 1335  
 MS/MSD  
 Signature(s): Mark Endo  
 Duplicate ID:  
 FIELD BLANK: WI-AF-FB01-021718 @ (JUP) NOT COLLECTED

GRAB SAMPLE TAKEN AFTER 3hr PURGE, ALL PARAMETERS STABLE EXCEPT pH (2.3%) AND ORP (55%). HIGH TURBIDITY, SAMPLE TAKEN AFTER DISCUSSION W/ P. LAWSON.





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC Project Number: 695610.04.FI.FS Page: 1 of 2  
 Location: Ault Field Well ID: WI-AF-MW-201  
 Event: February 2017 Groundwater Sampling Sample ID: WI-AF-MW-201-0218  
 Date: 02/17/18 Sampling Team: M. ENDO  
 Weather: PARTLY CLOUDY, LOW 40's SW WINDS @ 15-20 mph. J. ULRICH

Total Depth: 98.28 FT.(BTOC)  
 Depth to water: (-) 86.71 FT.(BTOC) (INITIAL, NO PUMP @ 1158)  
 Water Column: 11.56 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 1.88 GAL. \*3 = 5.65 GAL  
 Total Purge Vol.: 5.75 GAL.

Measuring Device: HORIBA U-53 WQM # 2134663  
 GEOTECH WLI # 5 K0  
 MULTIRAE PLUS PM-50 # 113775  
 SOLINST 102 WLI # 17838

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Purge Device: GEOTECH BLADDER PUMP #1424  
 GEOTECH PRO # C103202

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
13:04	NA							86.77	NA
13:09	NA							86.75	CLOUDY, GRAYISH COLOR, NO ODOR, NO SCREEN
13:42	NA							86.85'	MOSTLY CLEAR, NO ODOR, NO SCREEN
13:48	2.5	16.21	0.944	9.57	6.60	120	14.5	86.85'	CLEAR, NO ODOR, NO SCREEN
13:53	2.75	14.65	0.934	8.66	7.04	103	11.3	86.85	"
13:58	3.0	14.27	0.925	7.81	7.11	100	8.88	86.85	"
14:03	3.25	13.74	0.929	7.58	7.24	98	6.38	86.85	"
14:08	3.50	13.52	0.928	7.16	7.28	98	4.79	86.85	"
14:13	3.75	13.54	0.928	7.30	7.30	99	4.56	86.85	"
14:18	4.0	13.40	0.929	6.25	7.25	103	3.56	86.85	"
14:23	4.25	13.49	0.928	5.76	7.32	101	2.95	86.85	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
METHOD 537 (PFAS)	NONE, 6°C	125 mL HDPE POLY	2

Observations/Notes: NO AVAILABLE HORIBA WQM @ START. @ 13:42 HOOK UP HORIBA. Air Monitoring: BZ HS  
 ALL PARAMETERS STABLE @ 14:03, EXCEPT DO (±10% DIFF). PULGE FOR 1.75 HRS. VOC (ppm)= 0.0 0.0  
 PROCEED TO SAMPLE. PULGE TIME = 1.75 HRS. ALL PARAMETERS STABLE EXCEPT H2S (ppm) 0.0 0.0  
 PUMP START TIME: 13:04 DO (10.5% DIFF). > 3 WELL VOLUMES PURGED. PROCEED TO LEL (%)= 0 0  
 INITIAL FILL TIME (FT; SEC): 10 Final Fill Time: 9 SAMPLE. CO (ppm)= 0.0 0.0  
 INITIAL DISCHARGE TIME (DT; SEC): 25 Final Discharge Time: 22 O2 (%)= 20.9 20.9  
 Purge Rate: @ 13:09 = 180 mL/min

Pump Depth: 96' BTOC [TOP OF PUMP = 94.4' BTOC]

Sample / Time: 1440 @ 1450 FIELD REAGENT BLANK (WI-AF-FB01-021718) @ 1445 @ 1455

MS/MSD Duplicate ID: -  
 Signature(s): Mark EA

EQUIPMENT BLANK TAKEN (WI-AF-EB01-021718) @ 1645





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2017 Groundwater Sampling
Date: 02/17/18
Weather:

Project Number: 695610.04.FI.FS
Well ID: WI-AF-MW-201
Sample ID: WI-AF-MW-201-0218
Sampling Team: M. ENDO, J. ULRICH

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
Well Volume: GAL/FT.
Total Purge Vol.: GAL.

Measuring Device:

SEE PG. 1

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows include 1, 1.25, 2, 4.

PARAMETER STABILIZATION CRITERIA table with columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC.

FIELD PARAMETERS table with columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, Color / Odor / Comments.

Sample information table with columns: Analysis, Preservative, Container requirements, No. of containers.

Observations/Notes section containing Pump Start Time, Initial/Final Fill/Discharge Times, Purge Rate, Pump Depth, Sample Time, MS/MSD, Duplicate ID, and Signature(s).





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/18/18  
 Weather: 34°F, Snow/Rain/Cloudy

Project Number: 695610.04.FLFS Page: 1 of 2  
 Well ID: WI-AF-MW-200  
 Sample ID: WI-AF-MW-200-0218  
 Sampling Team: S. Fitzsimmons/ROD  
 J. Ulrich/POX

Total Depth: 107.71 FT.(BTOC)  
 Depth to water: 183.69 FT.(BTOC)  
 Water Column: 24.02 FT.  
 (x)0.163 GAL/FT.  
 Well Volume: 3.92 GAL.  
 Total Purge Vol.: ~3.5 GAL.

Measuring Device: Horiba U-53 Lot #14259  
 Solinst Model 102 Lot #48925

Purge Device: GeoCONTROL PRO  
 Bladder Pump

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
10:25	Initial	11.12	0.497	0.94	7.86	136	40.1	84.02	Slightly murky. No color
10:30	750	11.07	0.496	0.92	7.86	134	32.0	84.02	" "
10:35	1500	11.07	0.498	0.91	7.86	130	29.2	84.02	" "
10:40	2250	10.93	0.499	0.88	7.87	127	23.2	84.02	" "
10:45	3000	10.84	0.500	0.90	7.94	120	20.9	84.02	" "
10:50	3750	10.56	0.501	0.86	7.92	115	17.9	84.02	" "
10:55	4500	10.34	0.505	0.82	7.90	111	15.1	84.02	Clear. No color
11:00	5250	10.33	0.505	0.85	7.90	110	13.0	84.02	" "
11:05	6000	10.20	0.507	0.85	7.92	106	11.1	84.02	" "
11:10	6750	9.96	0.509	0.86	7.97	101	10.7	84.02	" "
11:15	7500	9.92	0.508	0.86	7.97	100	10.7	84.02	" "

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	125 mL Poly	2

Observations/Notes: Purged ~0.3 gallons before adding horiba Turbidity still decreasing. Recording more parameters.  
 Pump Start Time: 10:00  
 Initial Fill Time (FT; sec): 33  
 Initial Discharge Time (DT; sec): 27  
 Pressure - 58 psi  
 Final Fill Time: 17  
 Final Discharge Time: 26  
 Purge Rate: 150 mL/min.

Air Monitoring:  
 VOC (ppm) = 0  
 H2S (ppm) = 0  
 LEL (%) = 0  
 CO (ppm) = 0  
 O2 (%) = 20.9

Breathing Zone  
 0  
 0  
 0  
 0  
 20.9

Pump Depth: 102 ft BTOC  
 Sample /Time: 11:50  
 Needed to adjust to make purge uniform.  
 Time | Flow (mL/min)  
 10:10 | 75 mL/min (A Discharge)  
 10:13 | 150 mL/min

MS/MSD N/A Duplicate ID: N/A  
 Signature(s): *[Signature]*





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC

Project Number: 695610.04.FI.FS

Page: 2 of 2

Location: Ault Field

Well ID: WI-AF-MW-200

Event: February 2017 Groundwater Sampling

Sample ID: WI-AF-MW-200-0218

Date: 02/18/18

Sampling Team: S. Fitzsimmons/RDD

Weather: 34 °F, Snow/Rain/Cloudy

J. Ulrich/PDX

Total Depth: 107.71 FT.(BTOC)

Measuring Device: Horiba U-53 Lot #: 14259

Depth to water: 183.69 FT.(BTOC)

Solinst Model 102 Lot #48925

Water Column: 24.02 FT.

(x)0.163 GAL/FT.

Well Volume: 3.92 GAL.

Total Purge Vol.: ~3.5 GAL.

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

Purge Device: GeoCONTROL PRO Bladder Pump

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
11:20	8,250	9.72	0.507	0.86	8.01	98	10.0	84.02	Clear. No odor
11:25	9,000	9.72	0.508	0.86	8.02	95	8.86	84.02	" "
11:30	9,750	9.61	0.508	0.86	8.01	95	7.75	84.02	" "
11:35	10,500	9.71	0.509	0.85	8.04	90	8.05	84.02	" "
11:40	11,250	9.78	0.511	0.84	8.07	83	8.07	84.02	" "
11:45	12,000	9.76	0.511	0.85	8.06	85	8.01	84.02	" "
All parameters stable. Proceed with sampling.									

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	Unpres. 4°C	125mL Poly	2

Observations/Notes:

Pump Start Time: 10:00  
 Initial Fill Time(FT; sec): 33  
 Initial Discharge Time(DT; sec): 27  
 ~58 psi

Final Fill Time: 17  
 Final Discharge Time: 26  
 Purge Rate: 150 mL/min

Air Monitoring:  
 VOC (ppm)= 0  
 H2S (ppm) 0  
 LEL (%)= 0  
 CO (ppm)= 0  
 O2 (%)= 20.9

Breathing Zone  
 0  
 0  
 0  
 0  
 20.9

Pump Depth: 102 ft

Sample Time: 11:50

MS/MSD N/A

Duplicate ID: N/A

Signature(s): *[Handwritten Signature]*





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2018 Groundwater Sampling  
 Date: 02-20-18  
 Weather: 29°F, cold/cloudy/partial sun

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF- MW-202  
 Sample ID: WI-AF- MW-202-0218  
 Sampling Team: S. Fitzsimmons/RDD  
 J. Ulrich/PDX

Total Depth: 15.34 FT.(BTOC)  
 Depth to water: (-) 1.67 FT.(BTOC)  
 Water Column: 13.67 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 2.23 GAL.  
 Total Purge Vol.: ~2.2 GAL. Purged (1) well volume.  
 Purge Device: Pine Envir. Services  
 Series 2 Drive Lot #: 1545

Measuring Device: Horiba U-52 Lot#: 019564  
 Solinst Model 102  
 Lot # 48925

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
10:55	initial	8.74	0.209	2.21	6.88	106	12.5	1.77	Clear. No odor
11:00	1,125	8.90	0.208	1.09	6.89	111	10.5	1.77	" "
11:05	2,250	9.11	0.208	0.74	6.88	112	7.9	1.77	" "
11:10	3,375	9.25	0.207	0.65	6.89	111	5.3	1.77	" "
11:15	4,500	9.25	0.207	0.62	6.89	110	4.6	1.77	" "
11:20	5,625	9.23	0.207	0.61	6.89	107	4.1	1.77	" "
11:25	6,750	9.30	0.207	0.57	6.89	104	3.9	1.77	" "
11:30	7,875	9.31	0.207	0.57	6.89	103	3.8	1.77	" "
All parameters stable. Proceed with sampling.									

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
PFAS 537	unpres. 4°C	125 mL poly	2

Observations/Notes: - Used a peristaltic pump. All purge parameters were placed for a low-flow purge. (low speed)  
 - Water in well. Removed water to below well cap.

Pump Start Time: 10:45  
 Initial Fill Time(FT; sec): — Final Fill Time: — N/A  
 Initial Discharge Time(DT; sec): — Final Discharge Time: — N/A

Pump End Time: 11:40  
 Purge Rate: 225 mL/min

Pump Depth: 9 ft btoC

Sample Time: 11:35

MS/MSD: N/A Duplicate ID: N/A

Signature(s): *[Handwritten Signature]*

Air Monitoring:	HS	BZ
VOC (ppm)=	0	0
H2S (ppm)	0	0
LEL (%)=	0	0
CO (ppm)=	0	0
O2 (%)=	20.9	20.9





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: NASWI AULT FIELD  
 Event: GW Sampling  
 Date: 2/20/18  
 Weather: Partly Cloudy, 32°F

Project Number: 695010.04.FL.FJ  
 Well ID: MW-204  
 Sample ID: WI-AF-MW-204-0218  
 Sampling Team: J. Ulrich, S. Fitzsimmons

Total Depth: 14.00 FT.(BTOC)  
 Depth to water: (-) 8.99 FT.(BTOC)  
 Water Column: 5.01 FT.  
(x) 0.163 GAL/FT.  
 Well Volume: 0.81 GAL.  
 Total Purge Vol.: 1.00 GAL.

Measuring Device: Horiba U-53 # 26410  
 Date and Time: Multi Rae # C103115

Solinst water level  
 (200') model 102 # 3087741

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
<u>2</u>	0.163
4	0.653

Purge Device: Peristaltic Pump #24851  
Dedicated, 1x use 1/4 inch HDPE + Master Flex

**SAMPLE DATA**

Date:	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: _____	Color / Odor / Comments
Time:								
Method:								

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: <u>DTW</u>	Color / Odor / Comments
1516	<u>initial</u>	-	-	-	-	-	-	<u>8.99</u>	<u>clear, some particles</u>
1520	<u>0.25</u>	<u>11.29</u>	<u>0.394</u>	<u>6.09</u>	<u>6.57</u>	<u>131</u>	<u>23.7</u>	<u>9.02</u>	<u>no odor</u>
1525	<u>0.50</u>	<u>11.29</u>	<u>0.407</u>	<u>5.20</u>	<u>6.59</u>	<u>136</u>	<u>4.51</u>	<u>9.02</u>	<u>*water clears</u>
1530	<u>0.75</u>	<u>11.29</u>	<u>0.407</u>	<u>5.12</u>	<u>6.59</u>	<u>137</u>	<u>3.0</u>	<u>9.02</u>	
1535	<u>1.00</u>	<u>11.25</u>	<u>0.408</u>	<u>5.03</u>	<u>6.60</u>	<u>143</u>	<u>2.1</u>	<u>9.02</u>	
<del>1540</del>									

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
<u>PFAc</u>	<u>-</u>	<u>4 oz poly</u>	<u>2</u>

Observations/Notes:

Pump Start Time: 1516 (ppm) VOC Reading: 0.0 CO (ppm): 0.0  
 Pump Depth: 12 ft BTDC H<sub>2</sub>S (ppm): 0.0 O<sub>2</sub> (%): 20.7  
 LEL (%): 0.0

Sample /Time: 1540  
 MS/MSD: - Duplicate ID No.: -

Signature(s):





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2018 Groundwater Sampling  
 Date: 2/20/18  
 Weather: overcast

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-~~N2-5-218~~ MW-3-~~0~~  
 Sample ID: WI-AF-~~N2-5-218~~ W1-AF-MW-3-0218  
 Sampling Team: J. Ulrich, S. Fitzsimmons

Total Depth: 13.50 FT.(BTOC)  
 Depth to water: (-) 1.19 FT.(BTOC)  
 Water Column: 12.31 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 2.00 GAL.  
 Total Purge Vol.: 1.90 GAL.

Measuring Device: HORIBA U-53 #26410  
 Multi Rate #C103115

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Selinist water level (200') model 107 #3087741

Purge Device: #24851  
 Peristaltic pump/dedicated  
 1x use 1/4 inch HDPE tubing &  
 master flex

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1113	initial	-	-	-	-	-	-	1.21	clear, odorless
1118	0.5	6.90	0.129	1.53	5.42	177	9.3	1.29	reduce flow rate
1123	0.8	6.84	0.120	1.48	5.68	132	7.7	1.31	
1128	1.1	6.55	0.118	1.43	5.69	129	3.8	1.31	
1133	1.5	6.49	0.118	1.44	5.69	127	3.1	1.31	
1138	1.9	6.49	0.122	1.44	5.67	127	2.9	1.31	

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers

Observations/Notes:

USING Peristaltic Pump w/ 1x use dedicated TUBING

Pump Start Time: 1113  
 Initial Fill Time(FT; sec): \_\_\_\_\_  
 Initial Discharge Time(DT; sec): \_\_\_\_\_

Final Fill Time: \_\_\_\_\_  
 Final Discharge Time: \_\_\_\_\_

Pump End Time:

Purge Rate: 0.07 gpm

Pump Depth: 9 ft BTOC

Sample Time: 1140

Air Monitoring:	HS	BZ
VOC (ppm)=	0.0	0.0
H2S (ppm)	0.0	0.0
LEL (%)=	0.0	0.0
CO (ppm)=	0.0	0.0
O2 (%)=	20.9	20.9

MS/MSD \_\_\_\_\_ Duplicate ID: \_\_\_\_\_  
 Signature(s): \_\_\_\_\_





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2018 Groundwater Sampling
Date: 2/15/17
Weather: CLOUDY, UPPER 30'S TO LOW 40'S F

Project Number: 695610.04.FI.FS
Page: 1 of 2
Well ID: WI-AF-MW
Sample ID: WI-AF-MW-N2-7S-0218
Sampling Team: J. Ulrich, M. Endo

Total Depth: 20.22 FT.(BTOC)
Depth to water: (-) 7.25 FT.(BTOC)
Water Column: 12.97 FT.
Well Volume: 2.11 GAL.
Total Purge Vol.: 4.25 GAL.

Measuring Device: HORIBA U-52 WQM # 019564
GROTECH WLI # 5996
MULTIATE (11.7CV) # 113775

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows include 1, 1.25, 2, and 4 inches diameters.

Purge Device: GEO CONTROL PRO # C103202
GROTECH BLADDER PUMP # 1478

PARAMETER STABILIZATION CRITERIA table with columns for Parameter, Temp, Cond, DO, pH, ORP, Turbidity, and DTW.

FIELD PARAMETERS table with columns for Time, Purge Vol., Temp, Cond, DO, pH, ORP, Turbidity, DTW, and Color / Odor / Comments.

Sample information: method, container number, size, and type, preservative used.

Table with 4 columns: Analysis, Preservative, Container requirements, No. of containers.

Observations/Notes: \* ADJUSTED VOLUME, NO FLOW RATE CHANGE.

Pump Start Time: 1455
Initial Fill Time(FT; sec): 5 15
Initial Discharge Time(DT; sec): 15 5

Final Fill Time: 15
Final Discharge Time: 8

Purge Rate: Q = 225 mL/min

Air Monitoring: HS BE
VOC (ppm)= 0.0 0.0
H2S (ppm) 0.0 0.0
LEL (%)= 0 0
CO (ppm)= 0.0 0.0
O2 (%)= 20.9 20.9

Pump Depth: 14' 16.0' BTOC

Sample /Time: 1600

MS/MSD Duplicate ID:
Signature(s): M. Endo





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/15/18  
 Weather: OVERCAST 41°F

Project Number: 695610.04.FI.FS Page: 2 of 2  
 Well ID: WI-AF-MW-N2-75  
 Sample ID: WI-AF-MW-N2-75-0218  
 Sampling Team: H. ENDO  
J. ULACH

Total Depth: 20.22 FT.(BTOC)  
 Depth to water: (-) 7.25 FT.(BTOC)  
 Water Column: \_\_\_\_\_ FT.  
(x) \_\_\_\_\_ GAL/FT.  
 Well Volume: \_\_\_\_\_ GAL.  
 Total Purge Vol.: \_\_\_\_\_ GAL.

Measuring Device: \_\_\_\_\_

*SEE PG. 1*

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	4.0% ±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1537	2.75	11.90	0.859	0.80	7.04	155	9.6	7.40	CLEAR, NO ODOOR NO. 3 SEEN
1540	3.0	11.87	0.825	0.78	6.92	155	7.9	7.40	"
1543	3.25	11.85	0.801	0.75	7.02	143	6.5	7.40	"
1546	3.50	11.83	0.783	0.75	6.96	140	5.5	7.40	"
1549	3.75	11.81	0.757	0.74	6.92	145	4.9	7.40	"
1552	4.0	11.80	0.746	0.73	7.03	136	4.2	7.40	"
1555	4.25	11.81	0.733	0.71	6.82	145	4.0	7.40	"

①

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers

Observations/Notes: ① ALL PARAMETERS STABLE FOR > 20 MINUTES, EXCEPT CONDUCTIVITY WHICH IS WITHIN 3% AND < 1 MS/CM. PROCEED TO SAMPLE

**Pump Start Time:**  
 Initial Fill Time(FT; sec): \_\_\_\_\_ Final Fill Time: \_\_\_\_\_  
 Initial Discharge Time(DT; sec): \_\_\_\_\_ Final Discharge Time: \_\_\_\_\_  
 Purge Rate: \_\_\_\_\_

**Air Monitoring:**  
 VOC (ppm)= \_\_\_\_\_  
 H2S (ppm) \_\_\_\_\_  
 LEL (%)= \_\_\_\_\_  
 CO (ppm)= \_\_\_\_\_  
 O2 (%)= \_\_\_\_\_

Pump Depth: \_\_\_\_\_

Sample /Time: 1600

MS/MSD \_\_\_\_\_ Duplicate ID: \_\_\_\_\_

Signature(s): M. Endo





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/16/18  
 Weather: CLOUDY, LIGHT RAIN, UPPER 30's TO LOW 40's °F,  
 SW WINDS 3-6 mph

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-MW-N2-3  
 Sample ID: WI-AF-MW-N2-3-0218  
 Sampling Team: M. ENDD  
 K. RABE

Total Depth: 122.83 FT.(BTOC)  
 Depth to water: (-) 112.25 FT.(BTOC)  
 Water Column: 10.58 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 1.7 GAL.  
 Total Purge Vol.: 1.75 GAL.

Measuring Device: HORIBA U-S2 # 21346  
 GEOTECH WLI # 019564  
 MULTI-RABE # 1137775

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
②	0.163
4	0.653

Purge Device: GEOCONTROL PRO # 4376  
 GEOTECH BLADDER PUMP # 1425

PARAMETER STABILIZATION CRITERIA							
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1153	NA						1	112.42	NA
1209	NA	11.27	1.16	3.40	7.68	81	123	112.35	CLOUDY, SLIGHT BROKEN NO COOR, NO SHEEN YELLOW COLOR
1212	0.1	11.52	1.16	2.60	8.02	18	118	112.35	"
1215	0.2	11.48	1.17	1.92	8.13	-34	99.4	112.35	"
1220	0.3	12.04	1.17	1.57	8.18	-59	69.1	112.35	PARTIAL CLOUDY, SLIGHT NO COOR, NO SHEEN BROWNISH COLOR
1223	0.5	12.12	1.17	1.40	8.20	-71	51.5	112.35	"
1226	0.65	12.14	1.17	1.26	8.22	-81	49.6	112.35	"
1229	0.80	12.19	1.17	1.15	8.08	-83	43.0	112.35	"
1232	0.95	12.20	1.17	1.08	8.07	-85	44.6	112.35	"
1235	1.10	12.20	1.17	1.04	8.16	-92	38.4	112.35	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
MOD METHOD 537 (PFAs)	NONE, 6°C	125 mL HDPE POLY	2

Observations/Notes: PARAMETERS STABLE @ 1235. PROCEED TO SAMPLE.

Air Monitoring:	HS	BZ
VOC (ppm)=	0.0	0.0
H2S (ppm)	0.0	0.0
LEL (%)=	0	0
CO (ppm)=	1	0.0
O2 (%)=	20.0	20.9

Pump Start Time: 1145  
 Initial Fill Time(FT; sec): 15 Final Fill Time: 12  
 Initial Discharge Time(DT; sec): 25 Final Discharge Time: 27  
 Purge Rate: 112.5 mL/min

Pump Depth: 117' BTOC (TOP OF PUMP @ 115.4' BTOC)

Sample/Time: 1240 EQUIPMENT BLANK TAKEN AFTER DECON @ 1455 (WI-AF-EB01-021618)

MS/MSD Duplicate ID:  
 Signature(s): Mark Enck





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/16/18  
 Weather: CLOUDY, RAIN, LOW TO MID 40'S °F SW winds @ 4-6 mph

Project Number: 695610.04.FI.FS Page: 1 of 2  
 Well ID: WI-AF-MW-N2-E  
 Sample ID: WI-AF-MW-N2-E-0218  
 Sampling Team: MARK ENDO  
 KATIE RABE

Total Depth: 113.32 FT.(BTOC)  
 Depth to water: (-) 56.89 FT.(BTOC) (1419, INITIAL, NO PUMP)  
 Water Column: 56.43 FT.  
 Well Volume: (x) 0.163 GAL/FT. 9.2 GAL.  
 Total Purge Vol.: 1.75 GAL.

Measuring Device: HORIBA U-52 # 21346 019564  
 GEOTECH WLR # 5996  
 MULTI-RAE # 1137775

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Purge Device: GEOTECH BLADDER PUMP # 1425  
 GEOTECH GEOCENTRAL PRO # 1425  
 C103202

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	*pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1555	w/ PUMP DEPLOYED							55.38	NA
1633	0.5	10.68	3.65	7.66	13.84	23	126	58.70	SLIGHTLY CLOUDY, SOME YELLOW COLOR
1638	0.55	10.64	3.71	6.89	13.85	8	117	58.70	"
1643	0.60	10.61	3.75	6.63	13.93	-15	116	58.69	"
1648	0.65	10.74	3.77	6.41	13.95	-36	122	58.81	"
1653	0.75	10.86	3.79	6.32	13.96	-56	142	58.88	"
1658	0.80	10.86	3.79	6.34	13.99	-67	142	58.95	"
1703	0.85	10.93	3.75	6.09	13.96	-76	148	59.0	"
1708	0.90	10.94	3.72	5.79	13.98	-81	147	59.0	"
1713	0.95	10.97	3.67	5.60	13.94	-84	152	59.05	"
1718	1.0	10.95	3.56	5.38	13.91	-85	163	59.0	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
METHOD 537	NONE, 6°C	125 mL HDPE POLY	2

Observations/Notes: \* pH READINGS VERY HIGH, Bump TEST HORIBA w/ AUTO CAL SOLUTION: pH = 4.38 (STDEV = 4.0)

Air Monitoring: BZ HS  
 VOC (ppm) = 0.0 0.0  
 H2S (ppm) = 0.0 0.0  
 LEL (%) = 0 0  
 CO (ppm) = 0.0 0.0  
 O2 (%) = 20.9 20.9

Pump Start Time: 1605  
 Initial Fill Time (FT; sec): 10 Final Fill Time: 28  
 Initial Discharge Time (DT; sec): 30 Final Discharge Time: 25  
 Purge Rate: @ 1633 = 40 mL/min  
 @ 1643 = 50 mL/min

Pump Depth: [TOP OF PUMP] 105.15' BTOC  
 SUCTION DEPTH = 106.75' BTOC

Sample /Time: 1740

MS/MSD

Duplicate ID:

Signature(s): Mark Endo





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC
Location: Ault Field
Event: February 2017 Groundwater Sampling
Date: 02/16/18
Weather:

Project Number: 695610.04.FI.FS
Well ID: WI-AF-MW-N2-8
Sample ID: WI-AF-MW-N2-8-0218
Sampling Team: M. ENOC, K. RASE

Total Depth: FT.(BTOC)
Depth to water: (-) FT.(BTOC)
Water Column: FT.
Well Volume: GAL.
Total Purge Vol.: GAL.

Measuring Device:

SEE PG. 1

Table with 2 columns: Well Dia. (inches) and Volume (gallons/foot). Rows include 1, 1.25, 2, and 4 inches.

PARAMETER STABILIZATION CRITERIA

Table with 9 columns: Parameter, Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, and Criteria.

FIELD PARAMETERS

Table with 10 columns: Time, Purge Vol. (gals), Temp. °C, Cond. mS/cm, DO mg/L, pH SU, ORP mV, Turbidity NTU, DTW ft BTOC, and Color / Odor / Comments.

SLIGHTLY CLOUDY, YELLOWISH COLOR, NO COOL, NO SIFTS

Sample information: method, container number, size, and type, preservative used.

Table with 4 columns: Analysis, Preservative, Container requirements, and No. of containers.

Observations/Notes: All parameters stable @ 1733, except cond & DO which are 8% and 9% different, respectively. Purge time = 1.5 hrs, limited daylight proceed to sample.
Pump Start Time: Initial Fill Time(FT; sec): Final Fill Time: Initial Discharge Time(DT; sec): Final Discharge Time: Purge Rate:
Air Monitoring: VOC (ppm)= H2S (ppm) LEL (%)= CO (ppm)= O2 (%)=
Sample /Time: 1740
Signature(s): Paul Enoc

SEE PG. 1





GROUNDWATER SAMPLING DATA SHEET

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 2/15/18  
 Weather: partly cloudy, 43°F

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-MW-N2-9  
 Sample ID: WI-AF-MW-N2-9-0218  
 Sampling Team: J. Ulrich & M. Endo

Total Depth: 91.90 FT.(BTOC) - SEENOTES  
 Depth to water: (-) 50.46 FT.(BTOC)  
 Water Column: 41.44 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 6.75 GAL.  
 Total Purge Vol.: 2.530 GAL.  
 Purge Device: JUP  
 GeoTech Portable  
 Bladder pump  
 Geoburial Pro # C103202

Measuring Device: multi-r-ae Plus # 1137775  
 HORIBA U-5000 # W7VNEP6P  
 Geotech water level # 5996  
 meter

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
4	0.653

PARAMETER STABILIZATION CRITERIA

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1200								50.45	
1212	initial	-	-	-	-	-	-	50.53	Pump on; water clear, yellowish & no odor
1215	0.25	-	-	-	-	-	-	50.53	Air bubbles clear
1220	0.40	-	-	-	-	-	-	50.53	connect to Horiba
1226	0.70	12.03	0.701	6.40	11.06	167	6.42	50.60	-
1231	1.00	11.98	0.755	5.50	10.61	162	139	50.59	-
1236	1.30	11.92	0.852	4.48	10.39	155	87.0	50.58	-
1241	1.60	11.87	0.969	3.40	10.13	151	60.3	50.61	-
1246	1.90	11.98	1.02	2.96	10.06	148	65.6	50.63	-
1251	2.20	11.98	1.04	2.71	9.87	143	62.7	50.62	-
1256	2.50	11.95	1.02	2.75	9.88	140	60.5	50.62	-

yellowish & water clear, no odor  
 a. Allow flow thru to fill prior to next reading

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
1301	2.80	11.97	1.09
	2.73	9.82	139
	58.1	50.62	-

Observations/Notes: HIT OBSTRUCTION @ 91.90. Set pump & purge from here: 90.45' btoC (pulled pump up 1.45')

Pump Start Time:  
 Initial Fill Time(FT; sec): 9 Final Fill Time: 8  
 Initial Discharge Time(DT; sec): 23 Final Discharge Time: 18

PUMP is ~ 5 secs less than shown on this compressor controller unit GEOTECH C-10303202

Pump Depth: 90.45 ft BTOC (JUP)

Sample /Time: ~~W1-AF-MW-N2-9-0218-MS~~ PRIMARY: 1300 1305 (JUP)

MS/MSD: W1-AF-MW-N2-9-0218-MS / W1-AF-MW-N2-9-0218-MS Duplicate ID: W1-AF-MW-N2-9P-0218 @ 1305 (JUP)

Signature(s): MS/MSD @ 1300 1305 (JUP)

Air Monitoring:  
 VOC (ppm)= 0.0  
 H2S (ppm) 0.0  
 LEL (%)= 0.0  
 CO (ppm)= 0.0  
 O2 (%)= 20.9

1315  
 1310





GROUNDWATER SAMPLING DATA SHEET

Page: 1 of 1

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2017 Groundwater Sampling  
 Date: 02/18/18  
 Weather: Cloudy, Light Snow, Upper 20's Low 30's F

Project Number: 695610.04.FI.FS  
 Well ID: WI-AF-MW-N3-12  
 Sample ID: WI-AF-MW-N3-12-0218  
 Sampling Team: MARK ENDO  
 ERIC CUTLER

Measuring Device: HORIBA U-53 WQM # 21363  
 GEOTECH WIZ # 5996 025039  
 MULTIME PGM-50 (11.7CV) # 1137775

Total Depth: 58.93' FT.(BTOC)  
 Depth to water: (-) 52.12' FT.(BTOC) @ INITIAL, NO PUMP. @949  
 Water Column: 6.81 FT.  
 (x) 0.163 GAL/FT.  
 Well Volume: 1.11 GAL. \*3 = 3.33  
 Total Purge Vol.: 2.5 GAL.

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
(2)	0.163
4	0.653

Purge Device: GEOTECH BLADDER PUMP # 1424  
 GEOTECH CONTROL PRO # 4376

PARAMETER STABILIZATION CRITERIA							
Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

FIELD PARAMETERS									
Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1024	NA							52.11'	NA
1033	NA							52.14'	MOSTLY CLEAR NO ODOOR
1041	0.30	10.24	0.854	2.78	6.84	-77	3.99	52.14	CLEAR, NO ODOOR, NO SPECK
1044	0.50	10.46	0.853	2.14	6.91	-86	3.78	52.14	"
1047	0.70	10.55	0.853	1.97	6.94	-91	3.02	52.14	"
1050	0.90	10.69	0.852	1.82	6.96	-94	2.81	52.14	"
1053	1.10	10.61	0.854	1.79	6.90	-92	3.11	52.14	"
1056	1.30	10.63	0.851	1.67	6.96	-97	2.69	52.14	"
1059	1.50	10.77	0.851	1.57	6.99	-100	2.82	52.14	"
1102	1.70	10.70	0.852	1.47	6.94	-97	2.63	52.14	"
1105	1.90	10.70	0.850	1.43	7.00	-102	2.48	52.14	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
(PFAS) METHOD 537	None, 6°C	125mL HOPE POLY	2

Observations/Notes: HORIBA WQM BATTERY DIED @ 1033, PUT NEW BATTERIES IN UNIT. Parameters stable at 1105, proceed to sample.  
 Air Monitoring: MS BZ  
 VOC (ppm)= 0.0 0.0  
 H2S (ppm) 0.0 0.0  
 LEL (%)= 0 0  
 CO (ppm)= 0.0 0.0  
 O2 (%)= 20.9 20.9  
 Pump Start Time: 1025  
 Initial Fill Time(FT; sec): 10 Final Fill Time: 18  
 Initial Discharge Time(DT; sec): 14 Final Discharge Time: 10  
 Purge Rate: @ 1034 = 220 mL/min

Pump Depth: 56 ft btoC

Sample /Time: 1110

MS/MSD Duplicate ID:  
 Signature(s): Mark Endo





**GROUNDWATER SAMPLING DATA SHEET**

Client: NAVFAC  
 Location: Ault Field  
 Event: February 2018 Groundwater Sampling  
 Date: 02/18/18  
 Weather: Cloudy, Low 30's F, N winds @ 10-15 mph.

Project Number: 695610.04.FI.FS Page: 1 of 1  
 Well ID: WI-AF-3-MW-2  
 Sample ID: WI-AF-3-MW-2-0218  
 Sampling Team: MARK ENDO  
 ERIC CUTLER

Total Depth: 98.20 FT.(BTOC) (soft bottom)  
 Depth to water: (-) 56.91 FT.(BTOC) [w/ no pump, initial @ 1205]  
 Water Column: 41.29 FT.  
 (x) 0.653 GAL/FT.  
 Well Volume: 26.9 GAL.  
 Total Purge Vol.: 1.75 GAL.

Measuring Device: HORIBA U-53 # 21363  
 GEOTECH W-LI # 5996  
 MULTIFLUX PGM-50 # 113775

Well Dia. (inches)	Volume (gallons/foot)
1	0.041
1.25	0.064
2	0.163
(4)	0.653

Purge Device: GEOTECH BLADDER Pump #1424  
 GEOTECH CONTROLLER # 4376

**PARAMETER STABILIZATION CRITERIA**

Parameter	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC
Criteria	±0.1	±0.01 (if <1) ±0.02 (if >1)	±0.05 (if <1) ±0.2 (if >1)	±0.1	±10	±10 % ≤ 10 NTU	±0.3 (low flow)

**FIELD PARAMETERS**

Time	Purge Vol. (gals)	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	DTW ft BTOC	Color / Odor / Comments
1243	NA							56.5'	
1254	NA							57.32'	
1324	0.30	6.77	0.812	3.06	7.90	15	11.3	57.81'	No odor/clear
1329	0.50	6.68	0.814	2.70	8.07	9	11.2	57.81'	"
1334	0.70	6.57	0.816	2.44	8.15	7	10.5	57.81'	"
1339	0.90	6.45	0.818	2.28	8.22	8	10.4	57.81'	"
1344	1.10	6.32	0.820	2.20	8.26	8	10.5	57.81'	"
1349	1.30	6.24	0.825	2.04	8.31	8	10.9	57.82'	"
1354	1.35	6.14	0.828	1.99	8.33	9	11.1	57.82	"
1359	1.40	6.09	0.833	2.02	8.37	9	11.6	57.84	"
1404	1.45	6.03	0.841	2.07	8.39	9	10.8	57.86	"

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
METHOD 537 (PFAS)	None, 6°C	125mL HDPE POLY	2

Observations/Notes: Parameters stable at 1404, proceed to sample.

Air Monitoring:	HS	BZ
VOC (ppm)=	0.6	0.0
H2S (ppm)	0.0	0.0
LEL (%)=	0	0
CO (ppm)=	0.0	0.0
O2 (%)=	20.9	20.9

Pump Start Time: 1245  
 Initial Fill Time(FT; sec): 9  
 Initial Discharge Time(DT; sec): 23

Final Fill Time: 39  
 Final Discharge Time: 15

Pump End Time: 1420

Purge Rate: ≈ 35 mL/min @ 1322

Pump Depth: 89' btoC

Sample Time: 1405

MS/MSD Duplicate ID: \_\_\_\_\_  
 Signature(s): Mark Endo



Attachment 5  
Groundwater Elevation Data

NASWI: Ault Field:

# Existing Well

Weather: 03/01 47°F, Sunny  
03/02 38°F, Rain (on & off)

03/01/18 - 03/02/18  
Staff: Mark Green/SAC  
Shannon Fitzsimmons/ROD

## WATER LEVEL SURVEY: EXISTING WELLS

Site	Locaton ID	SI (ft bgs)	DTW (ft btoc) [09/2017]	TD (ft btoc) [09/2017]	Date	Time	DTW (ft btoc)	TD (ft btoc)	VOCs (ppm)	O <sub>2</sub> (%)	LEL (%)	H <sub>2</sub> S (ppm)	CO (ppm)	Samplers	Well Conditions and Additional Comments
Area 2	N2-3	112 - 122	112.6	122.84	03/02/18	11:34	112.46	122.80	0	20.9	0	0	0	MG/SF	
Area 2	N2-6C	64 - 74	58	74	03/02/18	11:06	58.22	74.09	0	20.9	0	0	0	MG/SF	
Area 2	N2-7S	8 - 18	11.3	20.33	03/02/18	11:14	7.39	20.36	0	20.9	0	0	0	MG/SF	N2-7a written on cap not N2-7s. Correct ID on stick-up
Area 2	N2-8	102 - 112	57.1	113.32	03/02/18	11:19	56.37	113.38	0	20.9	33	0	0	MG/SF	Sheen in water puddle surrounding well.
Area 2	N2-9	88 - 98	50.71	98.7	03/02/18	11:47	49.68	98.70	0	20.9	0	0	0	MG/SF	
Area 3	3-MW-2	84 - 94	57.43	98.1	03/02/18	12:10	56.88	98.10	0	20.9	0	0	0	MG/SF	
Area 3	N3-12	48 - 58	51.61	58.91	03/02/18	12:03	52.06	58.95	0	20.9	0	0	0	MG/SF	
Area 4	4-MW-3	69 - 79	69.3	82.74	03/02/18	10:02	69.33	82.78	0	20.9	0	0	0	MG/SF	
Area 29	29-MW-4	52 - 62	58.78	65.97	03/02/18	09:12	57.89	65.94	0	20.9	0	0	0	MG/SF	
Area 29	N29-22D	Unknown	20.6	105	03/02/18	09:22	92.72	105.21	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW3	4 - 14	3.98	13.55	03/02/18	10:45	1.62	13.35	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW-114	8 - 18	10.2	13.98	03/02/18	10:21	7.94	14.00	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW-200	Unknown	83.44	107.7	03/02/18	10:36	83.45	107.66	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW-201	Unknown	86.72	98.28	03/02/18	10:31	86.63	98.25	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW-202	Unknown	4.45	15.23	03/02/18	10:58	2.15	15.28	0	20.9	0	0	0	MG/SF	
Current Fire Fighting School	MW-204	Unknown	11.68	18.42	03/02/18	10:18	9.47	18.42	0	20.9	0	0	0	MG/SF	Stripped screws. Labeled as AFR025 in field. Re-labeled MW-204 under well lid.
Current Fire Fighting School	N2-5	7 - 17	7.91	18.85	03/03/18	10:53	5.57	18.80	0	20.9	0	0	0	MG/SF	

General Comments: All locks (albeit new) were rusted and difficult to open.



1/0/NT-...  
P.N. - 695610.04.FI.FS

NASWI: Ault Field: GW New/Existing 03/02/18

Personnel: Shannon Fitzsimmons / RDO

Mark Green / SAC

Task: Synoptic Water Level Gauge,  
IDW Management, Ship samples.

Weather: (AM) 40°F, Raining w/ overcast  
(PM) 38°F, cloudy w/ 10mph wind.

0730 Meet S. Skeehan + M. Green + S.

Fitzsimmons meet at Best Western then  
demob. to Clover Valley Laydown.

0755 Calibrate PID MultiRAE Lot# 039630

Multi Comp. Gas-Pine Envir. Service Lot#: 833558  
Exp: OCT 2019

Isobutylene ARGUS-HAZCO Lot#: 062947  
Exp: March 2021

FRESH AIR: Pass

OXY	LEL	CO	H <sub>2</sub> S	VOC
18.1 %	52 %	49 ppm	11.3 ppm	160.4 ppm

0815 Demob. from Laydown to Clover Valley  
Field. Tagged (3) wells.

0852 Talk with Kendra Leibman + Steve  
Skeehan about DWL deliveries today.

0933 Finish tagging (2) Area 29 Wells.

0937 Meet S. Skeehan in Laydown. Demob.  
to Firefighting School Area.

0940 Need a DBD pass. Mob to Best  
Western to get on base.



NASWI: Ault Field: GW New/Existing Wells 03/02/10

0958 Arrive at Firefighting School. Begin tagging Area 2, 3, 4 + Current Firefighting School. +2: (SF)

12:20 Complete WL survey for Existing Wells. Only weapons wells remain.

12:32 Demob. from firefighting school to QC + pack samples.

12:45 Begin cooler packing process.

13:55 Tape coolers at Pony Express and drop-off (2) coolers - Vistat. Test America SEA. Saturday Delivery.

14:10 Mob. to get b.w. from Haggren. No Crystal Water. Mob to Walmart still no Crystal Springs Water.

14:38 Mob. to Safeway for Crystal Springs Water. Purchased 20 gallons.

14:47 Demob. to Weapons to meet Steve Skeehan.

15:00 Call Weapons to approve work in area.

15:05 Begin tagging (6) wells in weapons area.

16:18 Complete tagging wells.



NASWI: Ault Field: GW New/Existing Wells 03/02/19

16:25 Mob. to East Laydown to dispose  
of tubing + bladder + PPE from  
MW-611 + MW-615.

16:32 Demob. to drop-off drinking water  
at (2) Residents on Easy St.

17:10 Return to Best Western and  
secure equipment.



03/02

Attachment 6  
Archaeological Monitoring Technical  
Memorandum

# Archaeological Monitoring of NAS Whidbey Island Phase 1 Monitoring Wells, Ault Field Off-Base Location Residences 1 & 2.

PREPARED FOR: Department of the Navy Naval Facilities Engineering Command Northwest  
*Under the:* NAVFAC CLEAN 9000 Program. Contract N62470-16-D-9000

PREPARED BY: Matthew J. Steinkamp M.S., RPA

DATE: March 21, 2018

At the request of NAVFAC NW, CH2M conducted archaeological monitoring of well drill borings in support of the Phase 1 Site Investigations at Residence 1 (Boring MW-611) (Figure 1 and 2) and Residence 2 (Boring MW-615) (Figures 3 and 4). On February 12 and 13 and February 19 and 20, 2018, CH2M geoarchaeologist Matthew Steinkamp, M.S., Registered Professional Archaeologist, conducted archaeological monitoring of well drill borings in support of the Phase 1 Site Investigations. The Area of Potential Effect (APE) for each boring was 15.24 x 15.24 meters at each Residence (0.11-acres total).

## Methods

Prior to set up and drill boring, the CH2M geoarchaeologist conducted a visual inspection of the ground surface at the boring location and within a surrounding 20-meter buffer for cultural resources pre-boring clearance. Following drill equipment set up, the CH2M geoarchaeologist monitored three pre-drill 7.5 cm diameter hand augers placed in a triangular arrangement around the proposed well drill location to determine presence/absence of buried utilities from 0 cm to 210 cm below ground surface (bgs) (Appendix A, Photo 1). The hand augered soils were visually inspected and hand-trowel sorted to determine the presence/absence of cultural resources or evidence of buried features or paleosols (buried surface soils).

Following the utility hand auger clearance, the CH2M geoarchaeologist field monitored the sonic well drilling. The boring consisted of a 20 cm diameter continuous mechanized sonic drill coring and sample retrieval obtained by Yellow Jacket Drilling and collected by CH2M geologists (Appendix A, Photo 2).

The samples (Appendix A, Photo 3) were logged by the CH2M geoarchaeologist from 0 cm to 210 cm bgs. Following retrieval of the 20 cm diameter, 0.45 m long sonic core bag samples, the sample bags were placed in a linear bottom to top alignment from 210 cm to 0 cm. Once aligned, the sample bags were cut longitudinally and photographed prior to logging, inspection and sampling.

The samples were then visually inspected by the the CH2M geoarchaeologist to correlate and log soil horizons and sedimentary strata. The depth of soil horizon changes, such as O, Ap, A, Ab, E, B and C horizons and bioturbations (krotovinae), and stratigraphic changes such as fill and glacial sediments were recorded. Next, the soils and sediments were inspected for evidence of macro content (artifacts, wood, gravel, and roots), then trowel-sorted for micro content (fine artifacts, plant remains, organics, shell, seeds, bone, wood or camas charcoal, inclusions, etc.).

Geoarchaeological logging of samples consisted of describing the Munsell soil color; structure; consistence (rupture resistance, stickiness, plasticity); grain size (feel and 10x hand lens inspection); presence of redoximorphic features, such as oxidation and reduction mottles, or Liesegang bands

(indicative of water table fluctuations and oxygen availability, iron content, gleying, etc.); presence or absence of archaeological materials or paleosols (intact buried soil horizons/sola); and depth of modern fill.

Following field logging of samples, a roughly 250-gram grab sample of each soil horizon was obtained for field lab analysis. In the lab, the samples were air dried and first inspected under a Hastings Triplet 10x power hand lense, followed by a Russian MHKPOCKON MN6-2 24x power field microscope with built-in micrometer of .05 mm incremental scale. The lab samples were inspected for cultural evidence such as micro debitage, charred wood, bone, camas and seed fragments, as well as natural soil components, such as clay bridging, pore linings, insects, etc.

## Results

### **Residence 1-Boring MW-611** (UTM 527450.07m E, 5354362.47m N, Zone 10, Elevation 31m)

No artifacts or evidence of cultural features or paleosols were observed during the hand auguring and sonic boring. Hand augers 1-3 and Boring MW-611 exhibited the following stratigraphy;

- 0-10 cm; A Horizon/Fill. 10YR 3/2 very dark grayish brown sandy loam, lightly compact from vehicle traffic, many fine grass roots. A Horizon is 3 cm thick, yet organic staining by leaching has reached to 10 cm bgs. A Horizon formed in fill.
- 10-45 cm; Fill. 10YR 4/4 dark yellowish brown gravelly sandy loam, few (grass) roots confined to upper 5 cm, moist, granular structure, soft, 20% rounded pebbles and cobbles, few boulders observed, abrupt smooth boundary.
- 45-60 cm; Bw Horizon. 2.5Y 4/3 olive brown gravelly sandy loam, moist, granular to faint blocky structure, 10 % rounded pebbles, diffuse boundary. MN6 microcopy indicates slight water adhesion and sand grains ranging from .20 to .70 mm (medium to coarse sand) that is moderately sorted, with angular to subrounded grains of wide ranging mineralogy (lithic wacke sand).
- 60-210 cm; C Horizon. 2.5Y 5/3 light olive brown gravelly sand, few oxidation mottles. MN6 microcopy indicates sand grains ranging from 0.20 to 1.1 mm (medium to very coarse sand) that is moderately sorted, with angular to rounded grains of wide ranging mineralogy (lithic wacke sand). Below 90 cm the sand alternates grain size ranges, and appears to represent multiple, normal graded depositional sequences over time.

Soils in MW-611 appear to resemble Keystone series soils, though a modern unconformity is evident through the presence of a fill layer that overlies the Bw Horizon. A thin A Horizon has formed within the fill layer which suggest some time has passed since the upper sola removal and concurrent fill placement. The lower undisturbed portion of the sola overlies a thick sequence of glaciomarine or glaciofluvial deposits.

### **Residence 2-Boring MW-615** (UTM 523247.94m E, 5352449.11m N, Zone 10, Elevation 28m)

No artifacts or evidence of cultural features or paleosols were observed during the hand auguring and sonic boring. Hand augers 1-3 and Boring MW-615 exhibited the following stratigraphy;

- 0-30 cm; Fill. 10YR 3/2 very dark grayish brown gravelly sandy loam, many fine (grass) roots, wet, granular structure with water adhesion of grains, soft, slightly sticky and plastic, 10% rounded pebbles and cobbles, smooth abrupt boundary.
- 30-60 cm; Ap Horizon. 10YR 4/2 dark grayish brown gravelly sandy loam, few fine roots, moist, granular structure, slight water adhesion, slightly plastic and sticky, 10 % rounded pebbles, wavy abrupt boundary. MN6 microcopy indicates water adhesion and sand grains up to 0.35 mm (medium sand) that are poorly sorted, with angular to subrounded grains.

- 60-105 cm; B Horizon. 10YR 5/3 brown gravelly sandy loam, few oxidation mottles, slightly sticky and plastic, angular blocky to faint columnar structure, abrupt broken boundary. MN6 microcopy indicates sand grains up to 0.40 mm (medium sand), poorly sorted, angular to subrounded grains.
- 105-150 cm; B2 Horizon. 10YR 5/3 brown loam, many prominent iron oxidation masses of 10YR 4/6, moist (indicative of a seasonally high water table), pH 6.8. MN6 microcopy indicates sand grains up to .10 mm (very fine sand), poorly sorted, angular to subrounded grains.
- 150-180 cm; Cg Horizon. Gley 1 4/10Y dark greenish gray silty clay, very hard, extremely firm, pH 7.2. MN6 microcopy indicates grains up to .05 mm (coarse silt). Grades into clay that continues to 4.57 meters bgs.

Soils in MW-615 appear to resemble Mitchellbay series soils, though no E Horizon was observed. A few rounded pebbles were observed in a clay matrix below the solum, which could be dropstones or ice rafted debris (IRDs), which is very interesting, but non-cultural. The sand content within the solum (A and B horizons) of MW-615 may be higher than typical Mitchellbay soils due to colluvial input from the adjacent ridge.

CH2M monitored the drilling activities according to Washington Department of Archaeology and Historic Preservation (DAHP) guidelines for conducting archaeological monitoring in Washington.

## Recommendations

No evidence of buried archaeological deposits, artifacts, features or paleosols were observed during the Phase 1 monitoring well installation. As such, a finding of No Adversed Effect to Historical Resources is recommended. If, however, additional project work encounters historical resources or human remains, the Inadvertent Discover Plan (IDP) should be followed.

## References

Department of Public Works. 2014. *Inadvertent Discovery Plan for Naval Air Station Whidbey Island, Island County, Washington*. Naval Air Station, Whidbey Island. April 25, 2014.

Department of The Navy. 2017. *Log No 2017-10-07155-USN: Request for Section 106 Consultation on Amended Area of Potential Effects and continued finding of No historic properties affected for the proposed ground disturbing activities to install groundwater monitoring wells at Ault Field and Outlying Field Coupeville, Naval Air Station Whidbey Island, Island County, Washington. Consultation Letter to Washington State Historic Preservation Officer, dated November 28, 2017.*

Dragovich, J.D., Petro, G.T., Thorsen, G.W., Larson, S.L., Foster, G.R., and Norman, D.K., 2005, *Geologic map of the Oak Harbor, Crescent Harbor, and part of the Smith Island 7.5-minute quadrangles, Island County, Washington*: Washington Division of Geology and Earth Resources, Geologic Map GM-59, scale 1:24,000.



Figures



***Final Technical Memorandum  
Evaluation of Per- and Polyfluoroalkyl  
Substances in Groundwater  
Naval Air Station Whidbey Island  
Oak Harbor, Washington***

**NOTIFICATION: FIGURE 1 CONTAINS SENSITIVE BUT UNCLASSIFIED  
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# Appendix A



*Photo 1. Overview of pre-drilling hand auger placement at boring location.*



*Photo 2. Recovery and delivery of sonic core sample to CH2M geologist.*



*Photo 3. Example of sample recovery from 0-210 cm below ground surface. Top of core sample is at left. Note distinct color change from A to B Horizons.*

Attachment 7  
Raw Data and Data Validation Report

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800266  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-SB606-0001-0118	1800266-01	Soil
2	WI-AF-SB606-0405-0118	1800266-02	Soil
3	WI-AF-SB606-06.507.5-0118	1800266-03	Soil
4	WI-AF-SB605-0001-0118	1800266-04	Soil
5	WI-AF-SB605-0202.5-0118	1800266-05	Soil
6	WI-AF-SB605-03.504.5-0118	1800266-06	Soil
7	WI-AF-SB608-0002-0118	1800266-07	Soil
8	WI-AF-SB608-02.503.5-0118	1800266-08	Soil
9	WI-AF-SB608-08.509.5-0118	1800266-09	Soil
10	WI-AF-SB608-3940-0118	1800266-10	Soil
10MS	WI-AF-SB608-3940-0118MS	1800266-10MS	Soil
10MSD	WI-AF-SB608-3940-0118MSD	1800266-10MSD	Soil
11	WI-AF-SB609-00.501.5-0118	1800266-11	Soil
12	WI-AF-SB609-0607-0118	1800266-12	Soil
13	WI-AF-SB609P-0607-0118	1800266-13	Soil
14	WI-AF-SB609-0708-0118	1800266-14	Soil
15	WI-AF-SB609-3940-0118	1800266-15	Soil
16	WI-AF-SB610-0001.5-0118	1800266-16	Soil
17	WI-AF-SB610-07.508-0118	1800266-17	Soil

A full data validation was performed on the analytical data for seventeen soil samples collected on January 20-25, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)”.

Specific method references are as follows:

Analysis  
PFCs

Method References  
VAL Method PFAS

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:



- The USEPA “Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review,” January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All samples were extracted within 28 days for soil samples and analyzed within 30 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-EB05-SO-0118	None - ND	-	-	-
WI-AF-EB06-SO-0118	None - ND	-	-	-
WI-AF-EB07-SO-0118	PFOA	0.898	None	All Associated ND
WI-AF-EB08-SO-0118	None - ND	-	-	-
WI-AF-FB-012018	PFHxS	1.12	None	All Associated ND
WI-AF-FB-012218	PFOA	0.936	None	All Associated ND
WI-AF-FB-012418	PFHxS	1.09	None	All Associated ND
	PFOA	0.725	None	
WI-AF-FB-012518	PFOA	0.862	None	All Associated ND

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier
10	PFUnA	136%/OK/OK	None - Sample ND
	PFTeDA	131%/OK/OK	

**Laboratory Control Samples**

- The LCS samples exhibited acceptable percent recoveries (%R) except for the following.

LCS ID	Compound	%R	Qualifier	Affected Samples
B8B0053-BS1	PFD <sub>o</sub> A	131%	None	All ND
	PFTeDA	131%	None	

**Internal Standard (IS) Area Performance**

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Internal Standard	%R	Qualifier	Affected Samples
12	13C2-PFTeDA	37.4%	UJ	Associated Cmpd
13	13C2-PFTeDA	34.8%	UJ	Associated Cmpd

**Target Compound Identification**

- All mass spectra and quantitation criteria were met.

**Compound Quantitation**

- All criteria were met.

**Field Duplicate Sample Precision**

- Field duplicate results are summarized below. The precision was acceptable.

Compound	WI-AF-SB609-0607-0118 ng/g	WI-AF-SB609P-0607-0118 ng/g	RPD	Qualifier
None	ND	ND	-	-

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:  Dated: 6/1/18  
Nancy Weaver  
Senior Chemist

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.





Sample ID: WI-AF-SB606-0001-0118											VAL - PFAS
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-01	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	20-Jan-18 14:40	Date Received:	07-Feb-18 10:29						
Location:	SB606				% Solids:	70.6					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.217	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFHxA	ND	0.121	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFHpA	ND	0.123	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFHxS	ND	0.185	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFOA	0.163	0.141	0.598	1.20	J	B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFOS	ND	0.505	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFNA	ND	0.106	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFDA	ND	0.153	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
MeFOSAA	ND	0.181	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFUnA	ND	0.212	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
EtFOSAA	ND	0.192	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFDoA	ND	0.165	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFTTrDA	ND	0.0729	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
PFTeDA	ND	0.118	0.598	1.20		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	97.1	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFHxA	IS	96.6	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C4-PFHpA	IS	96.1	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
18O2-PFHxS	IS	84.8	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFOA	IS	76.9	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C8-PFOS	IS	73.5	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C5-PFNA	IS	89.7	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFDA	IS	91.4	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
d3-MeFOSAA	IS	77.5	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFUnA	IS	80.7	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
d5-EtFOSAA	IS	79.0	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFDoA	IS	79.4	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		
13C2-PFTeDA	IS	80.9	50 - 150		B8B0053	07-Feb-18	2.37 g	16-Feb-18 01:56	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

NW 51291.8

Sample ID: WI-AF-SB606-0405-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-02	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	20-Jan-18 14:45	Date Received:	07-Feb-18 10:29		
Location:	SB606			% Solids:	84.8		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.357	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFHxA	ND	0.199	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFHpA	ND	0.201	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFHxS	ND	0.305	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFOA	ND	0.232	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFOS	ND	0.830	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFNA	ND	0.175	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFDA	ND	0.252	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
MeFOSAA	ND	0.297	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFUnA	ND	0.348	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
EtFOSAA	ND	0.315	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFDoA	ND	0.271	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFTTrDA	ND	0.120	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
PFTeDA	ND	0.195	0.983	1.97		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	110	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFHxA	IS	91.2	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C4-PFHpA	IS	85.9	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
18O2-PFHxS	IS	107	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFOA	IS	109	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C8-PFOS	IS	93.3	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C5-PFNA	IS	114	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFDA	IS	85.9	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
d3-MeFOSAA	IS	75.1	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFUnA	IS	82.9	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
d5-EtFOSAA	IS	81.9	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFDoA	IS	88.6	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1
13C2-PFTeDA	IS	98.8	50 - 150		B8B0053	07-Feb-18	1.20 g	16-Feb-18 02:08	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*mw 5/29/18*

Sample ID: WI-AF-SB606-06.507.5-0118											VAL - PFAS
Client Data						Laboratory Data					
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-03	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	20-Jan-18 14:50	Date Received:	07-Feb-18 10:29						
Location:	SB606				% Solids:	84.8					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.348	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFHxA	ND	0.195	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFHpA	ND	0.196	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFHxS	ND	0.297	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFOA	ND	0.226	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFOS	ND	0.810	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFNA	ND	0.171	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFDA	ND	0.245	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
MeFOSAA	ND	0.289	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFUnA	ND	0.339	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
EtFOSAA	ND	0.308	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFDoA	ND	0.264	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFTeDA	ND	0.117	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
PFTeDA	ND	0.190	0.958	1.92		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	134	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFHxA	IS	107	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C4-PFHpA	IS	101	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
18O2-PFHxS	IS	99.4	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFOA	IS	98.4	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C8-PFOS	IS	82.6	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C5-PFNA	IS	70.2	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFDA	IS	88.9	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
d3-MeFOSAA	IS	74.0	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFUnA	IS	77.9	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
d5-EtFOSAA	IS	72.8	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFDoA	IS	76.5	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		
13C2-PFTeDA	IS	81.3	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:19	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*ms129118*

Sample ID: WI-AF-SB605-0001-0118							VAL - PFAS				
Client Data				Laboratory Data							
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-04	Column:	BEH C18				
Project:	NAS WI-AULT FIELD	Date Collected:	22-Jan-18 09:45	Date Received:	07-Feb-18 10:29						
Location:	SB605				% Solids:	77.3					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.382	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFHxA	ND	0.213	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFHpA	ND	0.216	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFHxS	ND	0.326	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFOA	ND	0.248	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFOS	ND	0.889	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFNA	ND	0.187	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFDA	ND	0.269	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
MeFOSAA	ND	0.318	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFUnA	ND	0.372	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
EtFOSAA	ND	0.338	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFDoA	ND	0.290	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFTTrDA	ND	0.128	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
PFTeDA	ND	0.208	1.05	2.10		B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	89.7	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFHxA	IS	83.4	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C4-PFHpA	IS	92.2	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
18O2-PFHxS	IS	95.4	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFOA	IS	82.1	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C8-PFOS	IS	82.0	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C5-PFNA	IS	88.2	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFDA	IS	82.7	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
d3-MeFOSAA	IS	73.0	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFUnA	IS	90.3	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
d5-EtFOSAA	IS	70.2	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFDoA	IS	74.3	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	
13C2-PFTeDA	IS	92.1	50 - 150			B8B0053	07-Feb-18	1.23 g	16-Feb-18 02:31	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL - Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

ms 5/29/18

Sample ID: WI-AF-SB605-0202.5-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-05	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	22-Jan-18 09:50	Date Received:	07-Feb-18 10:29		
Location:	SB605			% Solids:	79.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.340	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFHxA	ND	0.190	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFHpA	ND	0.192	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFHxS	ND	0.290	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFOA	ND	0.221	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFOS	ND	0.791	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFNA	ND	0.167	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFDA	ND	0.240	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
MeFOSAA	ND	0.283	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFUnA	ND	0.331	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
EtFOSAA	ND	0.301	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFDoA	ND	0.258	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFTTrDA	ND	0.114	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
PFTeDA	ND	0.185	0.936	1.87		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	132	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFHxA	IS	97.0	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C4-PFHpA	IS	101	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
18O2-PFHxS	IS	88.8	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFOA	IS	90.6	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C8-PFOS	IS	95.6	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C5-PFNA	IS	100	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFDA	IS	99.8	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
d3-MeFOSAA	IS	90.6	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFUnA	IS	100	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
d5-EtFOSAA	IS	98.0	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFDoA	IS	109	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1
13C2-PFTeDA	IS	97.2	50 - 150		B8B0053	07-Feb-18	1.35 g	16-Feb-18 02:42	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 The results are reported in dry weight  
 LOQ - Limit of quantitation      The sample size is reported in wet weight      Only the linear isomer is reported for all other analytes  
 Results reported to the DL

mw 5129/18



**Sample ID: WI-AF-SB605-03.504.5-0118** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-06	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	22-Jan-18 10:00	Date Received:	07-Feb-18 10:29		
Location:	SB605			% Solids:	83.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.361	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFHxA	ND	0.202	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFHpA	ND	0.204	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFHxS	ND	0.308	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFOA	ND	0.235	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFOS	ND	0.840	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFNA	ND	0.177	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFDA	ND	0.255	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
MeFOSAA	ND	0.300	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFUnA	ND	0.352	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
EtFOSAA	ND	0.319	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFDoA	ND	0.274	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFTeDA	ND	0.121	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
PFTeDA	ND	0.197	0.994	1.99		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	117	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFHxA	IS	91.5	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C4-PFHpA	IS	86.2	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
18O2-PFHxS	IS	89.3	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFOA	IS	97.3	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C8-PFOS	IS	92.7	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C5-PFNA	IS	92.5	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFDA	IS	91.3	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
d3-MeFOSAA	IS	95.7	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFUnA	IS	68.2	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
d5-EtFOSAA	IS	94.7	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFDoA	IS	73.0	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1
13C2-PFTeDA	IS	70.7	50 - 150		B8B0053	07-Feb-18	1.21 g	16-Feb-18 02:54	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

mw 51291.8

Sample ID: WI-AF-SB608-0002-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-07	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	23-Jan-18 15:40	Date Received:	07-Feb-18 10:29		
				% Solids:	81.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.362	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFHxA	ND	0.202	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFHpA	ND	0.204	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFHxS	ND	0.309	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFOA	ND	0.235	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFOS	ND	0.842	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFNA	ND	0.177	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFDA	ND	0.255	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
MeFOSAA	ND	0.301	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFUnA	ND	0.353	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
EtFOSAA	ND	0.320	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFDoA	ND	0.275	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFTTrDA	ND	0.122	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
PFTeDA	ND	0.197	0.996	1.99		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	104	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFHxA	IS	105	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C4-PFHpA	IS	96.2	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
18O2-PFHxS	IS	93.5	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFOA	IS	83.7	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C8-PFOS	IS	91.0	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C5-PFNA	IS	93.1	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFDA	IS	85.8	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
d3-MeFOSAA	IS	85.8	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFUnA	IS	88.9	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
d5-EtFOSAA	IS	78.8	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFDoA	IS	87.2	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1
13C2-PFTeDA	IS	91.5	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 03:05	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

*new size 1.8*

Sample ID: WI-AF-SB608-02.503.5-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-08	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	23-Jan-18 15:45	Date Received:	07-Feb-18 10:29		
				% Solids:	81.9		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.382	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFHxA	ND	0.214	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFHpA	ND	0.216	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFHxS	ND	0.326	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFOA	ND	0.249	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFOS	ND	0.890	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFNA	ND	0.187	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFDA	ND	0.270	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
MeFOSAA	ND	0.318	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFUnA	ND	0.373	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
EtFOSAA	ND	0.338	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFDoA	ND	0.291	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFTTrDA	ND	0.128	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
PFTeDA	ND	0.208	1.05	2.11		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	107	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFHxA	IS	91.1	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C4-PFHpA	IS	91.2	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
18O2-PFHxS	IS	94.7	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFOA	IS	83.6	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C8-PFOS	IS	92.5	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C5-PFNA	IS	104	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFDA	IS	93.5	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
d3-MeFOSAA	IS	84.6	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFUnA	IS	71.7	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
d5-EtFOSAA	IS	75.1	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFDoA	IS	89.4	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1
13C2-PFTeDA	IS	80.1	50 - 150		B8B0053	07-Feb-18	1.16 g	16-Feb-18 03:17	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

rw 51291.8

**Sample ID: WI-AF-SB608-08.509.5-0118** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-09	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	23-Jan-18 15:55	Date Received:	07-Feb-18 10:29		
				% Solids:	88.2		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.358	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFHxA	ND	0.200	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFHpA	ND	0.202	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFHxS	ND	0.306	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFOA	ND	0.233	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFOS	ND	0.833	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFNA	ND	0.175	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFDA	ND	0.252	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
MeFOSAA	ND	0.298	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFUnA	ND	0.349	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
EtFOSAA	ND	0.316	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFDoA	ND	0.272	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFTTrDA	ND	0.120	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
PFTeDA	ND	0.195	0.986	1.97		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	112	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFHxA	IS	97.1	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C4-PFHpA	IS	96.0	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
18O2-PFHxS	IS	105	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFOA	IS	78.8	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C8-PFOS	IS	93.9	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C5-PFNA	IS	84.4	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFDA	IS	94.8	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
d3-MeFOSAA	IS	90.2	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFUnA	IS	93.9	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
d5-EtFOSAA	IS	86.8	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFDoA	IS	97.0	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1
13C2-PFTeDA	IS	73.5	50 - 150		B8B0053	07-Feb-18	1.15 g	16-Feb-18 03:28	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

w/ 5/29/18

Sample ID: WI-AF-SB608-3940-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-10	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	24-Jan-18 09:10	Date Received:	07-Feb-18 10:29		
				% Solids:	81.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.397	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFHxA	ND	0.222	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFHpA	ND	0.224	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFHxS	ND	0.339	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFOA	ND	0.258	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFOS	ND	0.924	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFNA	ND	0.195	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFDA	ND	0.280	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
MeFOSAA	ND	0.330	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFUnA	ND	0.387	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
EtFOSAA	ND	0.351	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFDoA	ND	0.302	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFTeDA	ND	0.133	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
PFTeDA	ND	0.217	1.09	2.19		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	102	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFHxA	IS	96.2	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C4-PFHpA	IS	88.3	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
18O2-PFHxS	IS	96.6	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFOA	IS	92.0	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C8-PFOS	IS	98.7	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C5-PFNA	IS	95.9	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFDA	IS	84.6	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
d3-MeFOSAA	IS	78.6	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFUnA	IS	75.6	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
d5-EtFOSAA	IS	76.1	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFDoA	IS	80.5	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1
13C2-PFTeDA	IS	73.2	50 - 150		B8B0053	07-Feb-18	1.12 g	16-Feb-18 03:40	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

new 5/29/18



Sample ID: WI-AF-SB609-00.501.5-0118											VAL - PFAS
Client Data						Laboratory Data					
Name:	CH2M Hill		Matrix:	Soil		Lab Sample:	1800266-11		Column:	BEH C18	
Project:	NAS WI- AULT FIELD		Date Collected:	24-Jan-18 13:45		Date Received:	07-Feb-18 10:29				
Location:	SB609					% Solids:	91.4				
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.328	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFHxA	ND	0.184	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFHpA	ND	0.185	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFHxS	ND	0.280	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFOA	ND	0.214	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFOS	ND	0.764	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFNA	ND	0.161	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFDA	ND	0.232	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
MeFOSAA	ND	0.273	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFUnA	ND	0.320	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
EtFOSAA	ND	0.290	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFDoA	ND	0.250	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFTeDA	ND	0.110	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
PFTeDA	ND	0.179	0.905	1.81		B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
I3C3-PFBS	IS	103	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFHxA	IS	95.2	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C4-PFHpA	IS	94.7	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I8O2-PFHxS	IS	92.1	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFOA	IS	108	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C8-PFOS	IS	92.4	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C5-PFNA	IS	88.9	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFDA	IS	104	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
d3-MeFOSAA	IS	98.0	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFUnA	IS	98.9	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
d5-EtFOSAA	IS	90.8	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFDoA	IS	109	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	
I3C2-PFTeDA	IS	115	50 - 150			B8B0053	07-Feb-18	1.21 g	16-Feb-18 04:26	1	

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

Only the linear isomer is reported for all other analytes

new 5/29/18

Sample ID: WI-AF-SB609-0607-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-12	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	24-Jan-18 13:50	Date Received:	07-Feb-18 10:29		
Location:	SB609			% Solids:	84.8		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.329	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFHxA	ND	0.184	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFHpA	ND	0.186	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFHxS	ND	0.281	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFOA	ND	0.214	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFOS	ND	0.766	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFNA	ND	0.161	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFDA	ND	0.232	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
MeFOSAA	ND	0.274	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFUnA	ND	0.321	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
EtFOSAA	ND	0.291	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFDoA	ND	0.250	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFTeDA	ND	0.111	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
PFTeDA	ND <i>WJ</i>	0.180	0.907	1.81		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1

*ISL*

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	124	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFHxA	IS	98.7	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C4-PFHpA	IS	86.9	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
18O2-PFHxS	IS	99.7	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFOA	IS	84.4	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C8-PFOS	IS	89.7	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C5-PFNA	IS	97.6	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFDA	IS	79.6	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
d3-MeFOSAA	IS	61.8	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFUnA	IS	75.3	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
d5-EtFOSAA	IS	61.3	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFDoA	IS	79.3	50 - 150		B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1
13C2-PFTeDA	IS	37.4	50 - 150	H	B8B0053	07-Feb-18	1.30 g	16-Feb-18 04:37	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL - Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*see 5129118*

Sample ID: WI-AF-SB609P-0607-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-13	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	24-Jan-18 13:55	Date Received:	07-Feb-18 10:29		
Location:	SB609			% Solids:	84.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.320	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFHxA	ND	0.179	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFHpA	ND	0.181	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFHxS	ND	0.274	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFOA	ND	0.208	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFOS	ND	0.746	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFNA	ND	0.157	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFDA	ND	0.226	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
MeFOSAA	ND	0.267	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFUnA	ND	0.312	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
EtFOSAA	ND	0.283	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFDoA	ND	0.244	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFTeDA	ND	0.108	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
PFTeDA	ND UJ	0.175	0.883	1.77		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1

ISL

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	125	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFHxA	IS	104	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C4-PFHpA	IS	102	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
18O2-PFHxS	IS	99.9	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFOA	IS	94.4	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C8-PFOS	IS	104	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C5-PFNA	IS	81.3	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFDA	IS	82.4	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
d3-MeFOSAA	IS	62.1	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFUnA	IS	83.8	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
d5-EtFOSAA	IS	60.2	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFDoA	IS	76.5	50 - 150		B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1
13C2-PFTeDA	IS	34.8	50 - 150	H	B8B0053	07-Feb-18	1.34 g	16-Feb-18 04:48	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

Sample ID: WI-AF-SB609-0708-0118											VAL - PFAS
Client Data						Laboratory Data					
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-14	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	24-Jan-18 14:05	Date Received:	07-Feb-18 10:29						
Location:	SB609				% Solids:	83.9					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.404	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFHxA	ND	0.226	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFHpA	ND	0.228	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFHxS	ND	0.345	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFOA	ND	0.263	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFOS	ND	0.941	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFNA	ND	0.198	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFDA	ND	0.285	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
MeFOSAA	ND	0.336	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFUnA	ND	0.394	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
EtFOSAA	ND	0.358	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFDoA	ND	0.307	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFTrDA	ND	0.136	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
PFTeDA	ND	0.221	1.11	2.23		B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	120	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFHxA	IS	96.1	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C4-PFHpA	IS	78.7	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
18O2-PFHxS	IS	94.6	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFOA	IS	84.4	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C8-PFOS	IS	85.3	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C5-PFNA	IS	79.1	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFDA	IS	99.8	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
d3-MeFOSAA	IS	91.2	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFUnA	IS	84.6	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
d5-EtFOSAA	IS	104	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFDoA	IS	118	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	
13C2-PFTeDA	IS	126	50 - 150			B8B0053	07-Feb-18	1.07 g	16-Feb-18 05:00	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

new size 1/18

Sample ID: WI-AF-SB609-3940-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-15	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	24-Jan-18 15:15	Date Received:	07-Feb-18 10:29		
Location:	SB609			% Solids:	80.9		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.377	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFHxA	ND	0.211	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFHpA	ND	0.213	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFHxS	ND	0.322	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFOA	ND	0.245	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFOS	ND	0.878	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFNA	ND	0.185	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFDA	ND	0.266	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
MeFOSAA	ND	0.314	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFUnA	ND	0.368	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
EtFOSAA	ND	0.334	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFDoA	ND	0.287	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFTeDA	ND	0.127	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
PFTeDA	ND	0.206	1.04	2.08		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	116	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFHxA	IS	108	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C4-PFHpA	IS	100	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
18O2-PFHxS	IS	84.9	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFOA	IS	99.6	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C8-PFOS	IS	82.8	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C5-PFNA	IS	106	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFDA	IS	96.6	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
d3-MeFOSAA	IS	79.2	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFUnA	IS	77.5	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
d5-EtFOSAA	IS	76.6	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFDoA	IS	77.0	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1
13C2-PFTeDA	IS	103	50 - 150		B8B0053	07-Feb-18	1.19 g	16-Feb-18 05:11	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

mw 5/29/18



Sample ID: WI-AF-SB610-0001.5-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-16	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	25-Jan-18 15:50	Date Received:	07-Feb-18 10:29		
Location:	SB610			% Solids:	86.0		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.343	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFHxA	ND	0.192	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFHpA	ND	0.194	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFHxS	ND	0.293	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFOA	ND	0.223	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFOS	ND	0.799	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFNA	ND	0.168	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFDA	ND	0.242	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
MeFOSAA	ND	0.286	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFUnA	ND	0.335	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
EtFOSAA	ND	0.304	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFDoA	ND	0.261	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFTrDA	ND	0.115	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
PFTeDA	ND	0.187	0.946	1.89		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	108	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFHxA	IS	98.1	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C4-PFHpA	IS	98.1	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
18O2-PFHxS	IS	101	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFOA	IS	76.5	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C8-PFOS	IS	95.3	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C5-PFNA	IS	82.3	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFDA	IS	79.2	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
d3-MeFOSAA	IS	75.4	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFUnA	IS	84.6	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
d5-EtFOSAA	IS	84.2	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFDoA	IS	95.6	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1
13C2-PFTeDA	IS	102	50 - 150		B8B0053	07-Feb-18	1.23 g	16-Feb-18 05:23	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL - Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
 LOQ - Limit of quantitation      The results are reported in dry weight      Only the linear isomer is reported for all other analytes.  
 The sample size is reported in wet weight  
 Results reported to the DL.

W 5129118

Sample ID: WI-AF-SB610-07.508-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800266-17	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	25-Jan-18 15:55	Date Received:	07-Feb-18 10:29		
Location:	SB610			% Solids:	84.7		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.343	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFHxA	ND	0.192	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFHpA	ND	0.194	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFHxS	ND	0.293	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFOA	ND	0.223	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFOS	ND	0.798	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFNA	ND	0.168	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFDA	ND	0.242	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
MeFOSAA	ND	0.285	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFUnA	ND	0.334	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
EtFOSAA	ND	0.303	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFDoA	ND	0.261	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFTeDA	ND	0.115	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
PFTeDA	ND	0.187	0.945	1.89		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	121	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFHxA	IS	91.6	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C4-PFHpA	IS	93.6	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
18O2-PFHxS	IS	97.0	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFOA	IS	101	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C8-PFOS	IS	97.3	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C5-PFNA	IS	83.6	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFDA	IS	83.3	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
d3-MeFOSAA	IS	74.4	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFUnA	IS	83.2	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
d5-EtFOSAA	IS	73.5	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFDoA	IS	91.7	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1
13C2-PFTeDA	IS	91.7	50 - 150		B8B0053	07-Feb-18	1.25 g	16-Feb-18 05:34	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

*ms 1291.8*

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800267  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-EB05-SO-0118	1800267-01	Water
2	WI-AF-FB-012018	1800267-02	Water
3	WI-AF-EB06-SO-0118	1800267-03	Water
4	WI-AF-FB-012218	1800267-04	Water
5*	WI-AF-FB-012318	1800267-05	Water
6	WI-AF-EB07-SO-0118	1800267-06	Water
7	WI-AF-FB-012418	1800267-07	Water
8	WI-AF-EB08-SO-0118	1800267-08	Water
9	WI-AF-EB09-SO-0118	1800267-09	Water
10	WI-AF-FB-012518	1800267-10	Water

\*Sample not received but listed on EOC

A full data validation was performed on the analytical data for five aqueous field blank samples and five aqueous equipment blank samples collected on January 20-25, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

## ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

- All samples were extracted within 14 days for water samples and analyzed within 28 days except for the following.

EDS Sample ID	Date Collected	Date Extracted	# Days	Qualifier
1	1/20/18	2/8/18	19	J/UJ
2	1/20/18	2/8/18	19	J/UJ

EDS Sample ID	Date Collected	Date Extracted	# Days	Qualifier
3	1/22/18	2/8/18	17	J/UJ
4	1/22/18	2/8/18	17	J/UJ
6	1/23/18	2/8/18	16	J/UJ
7	1/24/18	2/8/18	15	J/UJ
8	1/24/18	2/8/18	15	J/UJ

### **LC/MS Tuning**

- All criteria were met.

### **Initial Calibration**

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### **Continuing Calibration**

- All percent difference (%D) and RRF criteria were met.

### **Method Blank**

- The method blanks were free of contamination.

### **Field QC Blank**

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-EB05-SO-0118	None - ND	-	-	-
WI-AF-FB-012018	PFHxS	1.12	None	Applies to Other Packages
WI-AF-EB06-SO-0118	None - ND	-	-	-
WI-AF-FB-012218	PFOA	0.936	None	Applies to Other Packages
WI-AF-EB07-SO-0118	PFOA	0.898	None	Applies to Other Packages
WI-AF-FB-012418	PFHxS	1.09	None	Applies to Other Packages
	PFOA	0.725	None	
WI-AF-EB08-SO-0118	None - ND	-	-	-
WI-AF-EB09-SO-0118	PFHxS	1.05	None	Applies to Other Packages
WI-AF-FB-012518	PFOA	0.862	None	Applies to Other Packages

### **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries**

- MS/MSD samples were not analyzed.



### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R) except for the following.

LCS ID	Compound	%R	Qualifier	Affected Samples
B8B0049-BS1	MeFOSAA	131%	None	All ND

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Internal Standard	%R	Qualifier	Affected Samples
7	d5-EtFOSAA	48.7%	None	See HT

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 6/1/18  
Nancy Weaver  
Senior Chemist

<b>Data Qualifier</b>	<b>Definition</b>
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-EB05-SO-0118						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800267-01	Column:	BEH C18			
Project:	NAS WI- AULT FIELD	Date Collected:	20-Jan-18 14:55		Date Received:	07-Feb-18 10:29					
Location:	SB606										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND <i>WJ</i>	2.00	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFHxA	ND	2.44	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFHpA	ND	0.661	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFHxS	ND	1.06	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFOA	ND	0.728	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFOS	ND	0.903	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFNA	ND	0.906	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFDA	ND	1.67	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
MeFOSAA	ND	1.85	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFUnA	ND	1.17	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
EtFOSAA	ND	1.53	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFDoA	ND	0.886	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFTTrDA	ND	0.552	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
PFTeDA	ND	0.844	5.58	8.95		B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	102	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFHxA	IS	85.5	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C4-PFHpA	IS	84.7	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
18O2-PFHxS	IS	85.8	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFOA	IS	85.6	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C8-PFOS	IS	85.6	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C5-PFNA	IS	90.9	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFDA	IS	63.2	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
d3-MeFOSAA	IS	53.1	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFUnA	IS	62.8	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
d5-EtFOSAA	IS	60.5	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFDoA	IS	62.6	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	
13C2-PFTeDA	IS	99.0	50 - 150			B8B0049	08-Feb-18	0.112 L	18-Feb-18 17:49	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*NW 5/29/18*

Sample ID: WI-AF-FB-012018						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800267-02	Column:	BEH C18			
Project:	NAS WI-AULT FIELD	Date Collected:	20-Jan-18 15:15		Date Received:	07-Feb-18 10:29					
Location:	SB606										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND <i>uJ</i>	1.92	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFHxA	ND	2.34	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFHpA	ND <i>J</i>	0.633	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFHxS	1.12 <i>J</i>	1.01	5.34	8.57	<i>x</i>	B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFOA	ND <i>uJ</i>	0.697	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFOS	ND	0.864	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFNA	ND	0.868	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFDA	ND	1.60	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
MeFOSAA	ND	1.77	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFUnA	ND	1.12	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
EtFOSAA	ND	1.47	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFDoA	ND	0.848	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFTeDA	ND	0.529	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
PFTeDA	ND	0.809	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	104	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFHxA	IS	85.8	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C4-PFHpA	IS	91.6	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
18O2-PFHxS	IS	90.7	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFOA	IS	87.2	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C8-PFOS	IS	90.5	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C5-PFNA	IS	72.0	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFDA	IS	60.7	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
d3-MeFOSAA	IS	57.2	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFUnA	IS	53.4	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
d5-EtFOSAA	IS	59.5	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFDoA	IS	83.6	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	
13C2-PFTeDA	IS	96.5	50 - 150			B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:01	1	

HT

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

20/5/29/18



Sample ID: WI-AF-EB06-SO-0118							Modified EPA Method 537				
Client Data				Laboratory Data							
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-03	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	22-Jan-18 10:05	Date Received:	07-Feb-18 10:29						
Location:	SB605										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND <i>WJ</i>	1.85	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFHxA	ND	2.25	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFHpA	ND	0.610	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFHxS	ND	0.977	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFOA	ND	0.671	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFOS	ND	0.832	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFNA	ND	0.835	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFDA	ND	1.54	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
MeFOSAA	ND	1.70	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFUnA	ND	1.08	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
EtFOSAA	ND	1.41	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFDoA	ND	0.817	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFTeDA	ND	0.510	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
PFTeDA	ND	0.779	5.17	8.25		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	101	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFHxA	IS	89.8	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C4-PFHpA	IS	96.5	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
18O2-PFHxS	IS	88.4	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFOA	IS	69.6	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C8-PFOS	IS	90.9	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C5-PFNA	IS	76.6	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFDA	IS	69.9	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
d3-MeFOSAA	IS	69.8	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFUnA	IS	80.8	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
d5-EtFOSAA	IS	70.7	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFDoA	IS	93.1	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		
13C2-PFTeDA	IS	86.5	50 - 150		B8B0049	08-Feb-18	0.121 L	18-Feb-18 18:12	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

*new size 108*

Sample ID: WI-AF-FB-012218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-04	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	22-Jan-18 10:10	Date Received:	07-Feb-18 10:29		
Location:	SB605						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>uJ</i>	1.92	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFHxA	ND	2.34	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFHpA	ND	0.633	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFHxS	ND	1.01	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFOA	0.936 <i>J</i>	0.697	5.34	8.57	<i>r</i>	B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFOS	ND <i>uJ</i>	0.864	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFNA	ND	0.868	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFDA	ND	1.60	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
MeFOSAA	ND	1.77	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFUnA	ND	1.12	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
EtFOSAA	ND	1.47	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFDoA	ND	0.848	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFTrDA	ND	0.529	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
PFTeDA	ND	0.809	5.34	8.57		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1

HT

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	100	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFHxA	IS	89.1	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C4-PFHpA	IS	91.3	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
18O2-PFHxS	IS	85.6	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFOA	IS	69.4	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C8-PFOS	IS	94.8	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C5-PFNA	IS	76.8	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFDA	IS	57.1	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
d3-MeFOSAA	IS	64.5	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFUnA	IS	69.9	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
d5-EtFOSAA	IS	60.7	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFDoA	IS	81.9	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1
13C2-PFTeDA	IS	79.3	50 - 150		B8B0049	08-Feb-18	0.117 L	18-Feb-18 18:24	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

new 5/29/18

Sample ID: WI-AF-EB07-SO-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-06	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	23-Jan-18 16:00	Date Received:	07-Feb-18 10:29		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>UJ</i>	1.88	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFHxA	ND	2.29	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFHpA	ND	0.621	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFHxS	ND	0.994	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFOA	0.898 <i>J</i>	0.684	5.25	8.40	<i>✓</i>	B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFOS	ND <i>UJ</i>	0.847	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFNA	ND	0.851	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFDA	ND	1.56	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
MeFOSAA	ND	1.73	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFUnA	ND	1.10	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
EtFOSAA	ND	1.44	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFDoA	ND	0.832	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFTrDA	ND	0.519	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
PFTeDA	ND	0.793	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1

HT

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	102	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFHxA	IS	92.1	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C4-PFHpA	IS	92.1	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
18O2-PFHxS	IS	91.2	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFOA	IS	76.4	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C8-PFOS	IS	98.3	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C5-PFNA	IS	83.7	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFDA	IS	65.5	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
d3-MeFOSAA	IS	57.6	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFUnA	IS	55.0	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
d5-EtFOSAA	IS	55.8	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFDoA	IS	76.0	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1
13C2-PFTeDA	IS	92.3	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 18:35	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

18051291.8

Sample ID: WI-AF-FB-012418

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-07	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	24-Jan-18 09:35	Date Received:	07-Feb-18 10:29		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND UJ	1.87	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFHxA	ND	2.27	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFHpA	ND ↓	0.616	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFHxS	1.09 J	0.987	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFOA	0.725 J	0.678	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFOS	ND UJ	0.841	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFNA	ND	0.844	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFDA	ND	1.55	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
MeFOSAA	ND	1.72	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFUnA	ND	1.09	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
EtFOSAA	ND UJ	1.43	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFDoA	ND	0.825	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFTrDA	ND	0.515	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
PFTeDA	ND	0.787	5.21	8.34		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1

HT

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	100	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFHxA	IS	97.9	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C4-PFHpA	IS	90.3	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
18O2-PFHxS	IS	103	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFOA	IS	76.3	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C8-PFOS	IS	108	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C5-PFNA	IS	72.5	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFDA	IS	74.8	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
d3-MeFOSAA	IS	50.9	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFUnA	IS	60.3	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
d5-EtFOSAA	IS	48.7	50 - 150	H	B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFDoA	IS	74.3	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1
13C2-PFTeDA	IS	117	50 - 150		B8B0049	08-Feb-18	0.120 L	18-Feb-18 18:46	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

1800267



Sample ID: WI-AF-EB08-SO-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-08	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	24-Jan-18 09:40	Date Received:	07-Feb-18 10:29		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>uJ</i>	1.80	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFHxA	ND	2.20	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFHpA	ND	0.595	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFHxS	ND	0.954	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFOA	ND	0.656	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFOS	ND	0.813	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFNA	ND	0.816	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFDA	ND	1.50	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
MeFOSAA	ND	1.66	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFUnA	ND	1.06	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
EtFOSAA	ND	1.38	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFDoA	ND	0.798	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFTrDA	ND	0.498	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
PFTeDA	ND	0.760	5.04	8.06		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	88.9	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFHxA	IS	86.0	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C4-PFHpA	IS	85.0	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
18O2-PFHxS	IS	89.9	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFOA	IS	74.7	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C8-PFOS	IS	99.9	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C5-PFNA	IS	80.2	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFDA	IS	59.4	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
d3-MeFOSAA	IS	55.6	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFUnA	IS	63.7	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
d5-EtFOSAA	IS	60.7	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFDoA	IS	70.1	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1
13C2-PFTeDA	IS	88.1	50 - 150		B8B0049	08-Feb-18	0.124 L	18-Feb-18 18:58	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*new 5/29/18*



Sample ID: WI-AF-EB09-SO-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800267-09	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	25-Jan-18 16:00	Date Received:	07-Feb-18 10:29		
Location:	SB610						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.88	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFHxA	ND	2.29	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFHpA	ND	0.620	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFHxS	1.05	0.994	5.25	8.40	J	B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFOA	ND	0.683	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFOS	ND	0.847	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFNA	ND	0.850	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFDA	ND	1.56	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
MeFOSAA	ND	1.73	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFUnA	ND	1.10	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
EtFOSAA	ND	1.44	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFDoA	ND	0.831	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFTeDA	ND	0.519	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
PFTeDA	ND	0.793	5.25	8.40		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	99.5	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFHxA	IS	86.3	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C4-PFHpA	IS	82.5	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
18O2-PFHxS	IS	96.9	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFOA	IS	76.4	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C8-PFOS	IS	92.7	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C5-PFNA	IS	82.8	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFDA	IS	78.7	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
d3-MeFOSAA	IS	72.7	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFUnA	IS	64.0	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
d5-EtFOSAA	IS	69.0	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFDoA	IS	71.4	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1
13C2-PFTeDA	IS	98.4	50 - 150		B8B0049	08-Feb-18	0.119 L	18-Feb-18 19:09	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*nw slz h 8*

Sample ID: WI-AF-FB-012518						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800267-10	Column:	BEH C18			
Project:	NAS WI- AULT FIELD	Date Collected:	25-Jan-18 16:05		Date Received:	07-Feb-18 10:29					
Location:	SB610										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.86	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFHxA	ND	2.27	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFHpA	ND	0.615	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFHxS	ND	0.986	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFOA	0.862	0.678	5.21	8.33	J	B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFOS	ND	0.840	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFNA	ND	0.843	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFDA	ND	1.55	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
MeFOSAA	ND	1.72	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFUnA	ND	1.09	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
EtFOSAA	ND	1.43	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFDoA	ND	0.825	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFTrDA	ND	0.514	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
PFTeDA	ND	0.786	5.21	8.33		B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	97.6	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFHxA	IS	88.5	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C4-PFHpA	IS	78.3	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
18O2-PFHxS	IS	81.9	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFOA	IS	76.9	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C8-PFOS	IS	95.1	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C5-PFNA	IS	81.9	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFDA	IS	72.3	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
d3-MeFOSAA	IS	54.1	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFUnA	IS	61.0	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
d5-EtFOSAA	IS	54.4	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFDoA	IS	62.0	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	
13C2-PFTeDA	IS	85.8	50 - 150			B8B0049	08-Feb-18	0.120 L	18-Feb-18 19:21	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new SI 29 1/18

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800268  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-SB614-0001-0118	1800268-01	Soil
2	WI-AF-SB614-0102-0118	1800268-02	Soil
3	WI-AF-SB614P-0102-0118	1800268-03	Soil
4	WI-AF-SB612-0001-0118	1800268-04	Soil
5	WI-AF-SB612-0204-0118	1800268-05	Soil
6	WI-AF-SB612-04.505.5-0118	1800268-06	Soil
6MS	WI-AF-SB612-04.505.5-0118MS	1800268-06MS	Soil
6MSD	WI-AF-SB612-04.505.5-0118MSD	1800268-06MSD	Soil
7	WI-AF-SB612-6870-0118	1800268-07	Soil
8	WI-AF-SB613-000.5-0118	1800268-08	Soil
9	WI-AF-SB613-0.502-0118	1800268-09	Soil
10	WI-AF-SB613-03.504.5-0118	1800268-10	Soil
11	WI-AF-SB613-5657.5-0118	1800268-11	Soil
12	WI-AF-SB607-000H-0118	1800268-12	Soil
13	WI-AF-SB607P-000H-0118	1800268-13	Soil
14	WI-AF-SB607-0203-0118	1800268-14	Soil
15	WI-AF-SB607-0405-0118	1800268-15	Soil
16	WI-AF-SB607-1011-0118	1800268-16	Soil
17	WI-AF-SB610-3940-0118	1800268-17	Soil
18	WI-AF-SB610P-3940-0118	1800268-18	Soil

A full data validation was performed on the analytical data for eighteen soil samples collected on January 5-26, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis  
PFCs

Method References  
VAL Method PFAS

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and

Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA “Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review,” January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes. There were no qualifications.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

- All samples were extracted within 28 days for soil samples and analyzed within 30 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples are summarized below.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-EB01-SO-0118	None - ND	-	-	-
WI-AF-EB02-SO-0118	PFHxS	1.44	None	All Associated ND
WI-AF-EB03-SO-0118	None - ND	-	-	-
WI-AF-EB04-SO-0118	None - ND	-	-	-
WI-AF-EB10-SO-0118	None - ND	-	-	-
WI-AF-FB-010518	None - ND	-	-	-
WI-AF-FB-010718	None - ND	-	-	-
WI-AF-FB-011018	None - ND	-	-	-
WI-AF-FB-011218	None - ND	-	-	-
WI-AF-FB-012618	PFOA	0.725	None	All Associated ND

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier
6	PFBS	135%/OK/OK	None - Sample ND
	PFTrDA	146%/OK/OK	
	PFD <sub>o</sub> A	OK/OK/39.7	None for RPD Alone



**Laboratory Control Samples**

- The LCS samples exhibited acceptable percent recoveries (%R).

**Internal Standard (IS) Area Performance**

- All internal standards met response and retention time (RT) criteria.

**Target Compound Identification**

- All mass spectra and quantitation criteria were met.

**Compound Quantitation**

- All criteria were met.

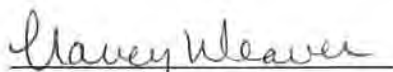
**Field Duplicate Sample Precision**

- Field duplicate results are summarized below. The precision was acceptable.

Compound	WI-AF-SB614-0102-0118 ng/g	WI-AF-SB614P-0102-0118 ng/g	RPD	Qualifier
None	ND	ND	-	-
Compound	WI-AF-SB607-000H-0118 ng/g	WI-AF-SB607P-000H-0118 ng/g	RPD	Qualifier
None	ND	ND	-	-
Compound	WI-AF-SB610-3940-0118 ng/g	WI-AF-SB610P-3940-0118 ng/g	RPD	Qualifier
None	ND	ND	-	-

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:



Nancy Weaver  
Senior Chemist

Dated: 6/1/18

<b>Data Qualifier</b>	<b>Definition</b>
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-SB614-0001-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-01	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	05-Jan-18 09:15	Date Received:	07-Feb-18 10:29		
Location:	SB-614			% Solids:	52.9		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.388	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFHxA	ND	0.217	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFHpA	ND	0.219	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFHxS	ND	0.331	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFOA	ND	0.252	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFOS	ND	0.902	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFNA	ND	0.190	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFDA	ND	0.273	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
MeFOSAA	ND	0.323	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFUnA	ND	0.378	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
EtFOSAA	ND	0.343	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFDoA	ND	0.295	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFTTrDA	ND	0.130	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
PFTeDA	ND	0.211	1.07	2.14		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	89.6	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFHxA	IS	88.9	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C4-PFHpA	IS	85.1	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
18O2-PFHxS	IS	91.2	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFOA	IS	75.0	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C8-PFOS	IS	84.2	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C5-PFNA	IS	79.0	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFDA	IS	62.8	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
d3-MeFOSAA	IS	50.8	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFUnA	IS	51.8	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
d5-EtFOSAA	IS	57.9	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFDoA	IS	60.8	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1
13C2-PFTeDA	IS	93.9	50 - 150		B8B0074	12-Feb-18	1.77 g	22-Feb-18 00:17	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

*new 5/24/18*

Sample ID: WI-AF-SB614-0102-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-02	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	05-Jan-18 09:18	Date Received:	07-Feb-18 10:29		
Location:	SB-614			% Solids:	73.2		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.397	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFHxA	ND	0.222	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFHpA	ND	0.224	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFHxS	ND	0.339	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFOA	ND	0.258	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFOS	ND	0.923	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFNA	ND	0.194	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFDA	ND	0.280	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
MeFOSAA	ND	0.330	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFUnA	ND	0.387	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
EtFOSAA	ND	0.351	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFDoA	ND	0.302	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFTeDA	ND	0.133	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
PFTeDA	ND	0.216	1.09	2.19		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	97.7	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFHxA	IS	88.1	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C4-PFHpA	IS	88.1	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
18O2-PFHxS	IS	78.8	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFOA	IS	79.0	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C8-PFOS	IS	80.7	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C5-PFNA	IS	72.9	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFDA	IS	88.0	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
d3-MeFOSAA	IS	59.5	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFUnA	IS	78.1	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
d5-EtFOSAA	IS	74.9	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFDoA	IS	76.8	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1
13C2-PFTeDA	IS	108	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 00:29	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

W 5/29/18



Sample ID: WI-AF-SB614P-0102-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-03	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	05-Jan-18 09:20	Date Received:	07-Feb-18 10:29		
Location:	SB-614			% Solids:	72.5		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.391	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFHxA	ND	0.219	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFHpA	ND	0.221	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFHxS	ND	0.334	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFOA	ND	0.254	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFOS	ND	0.910	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFNA	ND	0.192	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFDA	ND	0.276	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
MeFOSAA	ND	0.325	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFUnA	ND	0.381	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
EtFOSAA	ND	0.346	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFDoA	ND	0.297	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFTTrDA	ND	0.131	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
PFTeDA	ND	0.213	1.08	2.15		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	97.7	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFHxA	IS	76.8	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C4-PFHpA	IS	87.9	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
18O2-PFHxS	IS	83.3	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFOA	IS	80.2	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C8-PFOS	IS	94.4	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C5-PFNA	IS	87.7	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFDA	IS	93.2	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
d3-MeFOSAA	IS	58.1	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFUnA	IS	77.5	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
d5-EtFOSAA	IS	71.0	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFDoA	IS	69.5	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1
13C2-PFTeDA	IS	55.8	50 - 150		B8B0074	12-Feb-18	1.28 g	22-Feb-18 17:30	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

see S/29 1.8

Sample ID: WI-AF-SB612-0001-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-04	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 08:55	Date Received:	07-Feb-18 10:29		
Location:	SB-612			% Solids:	74.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.371	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFHxA	ND	0.207	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFHpA	ND	0.209	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFHxS	ND	0.317	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFOA	ND	0.241	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFOS	ND	0.864	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFNA	ND	0.182	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFDA	ND	0.262	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
MeFOSAA	ND	0.309	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFUnA	ND	0.362	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
EtFOSAA	ND	0.328	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFDoA	ND	0.282	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFTTrDA	ND	0.125	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
PFTeDA	ND	0.202	1.02	2.04		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	89.4	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFHxA	IS	78.1	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C4-PFHpA	IS	85.8	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
18O2-PFHxS	IS	78.5	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFOA	IS	84.2	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C8-PFOS	IS	86.8	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C5-PFNA	IS	76.7	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFDA	IS	74.5	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
d3-MeFOSAA	IS	64.5	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFUnA	IS	67.3	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
d5-EtFOSAA	IS	76.5	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFDoA	IS	76.1	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1
13C2-PFTeDA	IS	81.6	50 - 150		B8B0074	12-Feb-18	1.32 g	22-Feb-18 00:52	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

*new sl/29 kb*

Sample ID: WI-AF-SB612-0204-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-05	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 09:00	Date Received:	07-Feb-18 10:29		
Location:	SB-612			% Solids:	77.7		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.374	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFHxA	ND	0.209	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFHpA	ND	0.211	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFHxS	ND	0.319	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFOA	ND	0.243	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFOS	ND	0.870	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFNA	ND	0.183	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFDA	ND	0.263	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
MeFOSAA	ND	0.311	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFUnA	ND	0.364	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
EtFOSAA	ND	0.330	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFDoA	ND	0.284	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFTeDA	ND	0.126	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
PFTeDA	ND	0.204	1.03	2.06		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	107	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFHxA	IS	94.3	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C4-PFHpA	IS	89.3	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
18O2-PFHxS	IS	100	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFOA	IS	82.4	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C8-PFOS	IS	110	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C5-PFNA	IS	75.7	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFDA	IS	99.5	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
d3-MeFOSAA	IS	75.1	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFUnA	IS	84.4	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
d5-EtFOSAA	IS	73.8	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFDoA	IS	85.9	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1
13C2-PFTeDA	IS	125	50 - 150		B8B0074	12-Feb-18	1.25 g	22-Feb-18 17:42	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight.

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL.

new 5/29/18

Sample ID: WI-AF-SB612-04H05H-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-06	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 09:20	Date Received:	07-Feb-18 10:29		
Location:	SB-612			% Solids:	71.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.345	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFHxA	ND	0.193	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFHpA	ND	0.195	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFHxS	ND	0.295	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFOA	ND	0.224	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFOS	ND	0.803	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFNA	ND	0.169	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFDA	ND	0.243	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
MeFOSAA	ND	0.287	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFUnA	ND	0.336	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
EtFOSAA	ND	0.305	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFDoA	ND	0.262	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFTeDA	ND	0.116	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
PFTeDA	ND	0.188	0.951	1.90		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	105	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFHxA	IS	84.0	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C4-PFHpA	IS	89.5	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
18O2-PFHxS	IS	91.2	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFOA	IS	79.4	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C8-PFOS	IS	95.5	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C5-PFNA	IS	88.7	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFDA	IS	77.2	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
d3-MeFOSAA	IS	77.4	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFUnA	IS	95.2	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
d5-EtFOSAA	IS	86.6	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFDoA	IS	90.5	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1
13C2-PFTeDA	IS	132	50 - 150		B8B0074	12-Feb-18	1.47 g	22-Feb-18 01:14	1

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes

*rw 5/29/18*

Sample ID: WI-AF-SB612-6870-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-07	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 13:00	Date Received:	07-Feb-18 10:29		
Location:	SB612			% Solids:	82.3		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.339	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFHxA	ND	0.190	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFHpA	ND	0.192	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFHxS	ND	0.290	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFOA	ND	0.221	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFOS	ND	0.790	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFNA	ND	0.166	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFDA	ND	0.239	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
MeFOSAA	ND	0.282	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFUnA	ND	0.331	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
EtFOSAA	ND	0.300	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFDoA	ND	0.258	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFTTrDA	ND	0.114	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
PFTeDA	ND	0.185	0.935	1.87		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	97.8	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFHxA	IS	81.2	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C4-PFHpA	IS	88.2	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
18O2-PFHxS	IS	105	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFOA	IS	83.0	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C8-PFOS	IS	74.1	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C5-PFNA	IS	77.1	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFDA	IS	93.9	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
d3-MeFOSAA	IS	78.6	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFUnA	IS	68.6	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
d5-EtFOSAA	IS	71.2	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFDoA	IS	88.0	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1
13C2-PFTeDA	IS	92.6	50 - 150		B8B0074	12-Feb-18	1.30 g	22-Feb-18 17:53	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*see 5/29/18*



Sample ID: WI-AF-SB613-000H-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-08	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 11:55	Date Received:	07-Feb-18 10:29		
Location:	SB613			% Solids:	72.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.360	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFHxA	ND	0.201	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFHpA	ND	0.203	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFHxS	ND	0.307	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFOA	ND	0.234	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFOS	ND	0.837	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFNA	ND	0.176	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFDA	ND	0.254	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
MeFOSAA	ND	0.299	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFUnA	ND	0.351	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
EtFOSAA	ND	0.318	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFDoA	ND	0.273	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFTTrDA	ND	0.121	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
PFTeDA	ND	0.196	0.991	1.98		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	89.9	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFHxA	IS	72.7	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C4-PFHpA	IS	81.7	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
18O2-PFHxS	IS	76.7	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFOA	IS	70.9	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C8-PFOS	IS	90.1	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C5-PFNA	IS	68.8	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFDA	IS	85.6	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
d3-MeFOSAA	IS	75.1	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFUnA	IS	77.1	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
d5-EtFOSAA	IS	75.3	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFDoA	IS	89.7	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1
13C2-PFTeDA	IS	113	50 - 150		B8B0074	12-Feb-18	1.39 g	22-Feb-18 18:05	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

www.s/29/18

Sample ID: WI-AF-SB613-0H02-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-09	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 12:00	Date Received:	07-Feb-18 10:29		
Location:	SB613			% Solids:	72.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.376	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFHxA	ND	0.210	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFHpA	ND	0.212	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFHxS	ND	0.321	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFOA	ND	0.244	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFOS	ND	0.875	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFNA	ND	0.184	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFDA	ND	0.265	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
MeFOSAA	ND	0.313	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFUnA	ND	0.367	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
EtFOSAA	ND	0.332	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFDoA	ND	0.286	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFTTrDA	ND	0.126	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
PFTeDA	ND	0.205	1.04	2.07		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	99.1	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFHxA	IS	76.8	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C4-PFHpA	IS	85.9	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
18O2-PFHxS	IS	75.9	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFOA	IS	69.8	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C8-PFOS	IS	89.0	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C5-PFNA	IS	75.2	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFDA	IS	76.9	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
d3-MeFOSAA	IS	62.7	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFUnA	IS	66.4	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
d5-EtFOSAA	IS	68.4	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFDoA	IS	80.2	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1
13C2-PFTeDA	IS	113	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 18:16	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight.

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL.

سید 5/29/18

Sample ID: WI-AF-SB613-03H04H-0118											VAL - PFAS
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-10	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	10-Jan-18 12:10	Date Received:	07-Feb-18 10:29						
Location:	SB613				% Solids:	73.8					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.410	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFHxA	ND	0.229	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFHpA	ND	0.232	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFHxS	ND	0.350	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFOA	ND	0.267	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFOS	ND	0.955	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFNA	ND	0.201	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFDA	ND	0.289	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
MeFOSAA	ND	0.341	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFUnA	ND	0.400	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
EtFOSAA	ND	0.363	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFDoA	ND	0.312	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFTTrDA	ND	0.138	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
PFTeDA	ND	0.224	1.13	2.26		B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	95.4	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFHxA	IS	79.5	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C4-PFHpA	IS	84.6	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
18O2-PFHxS	IS	93.8	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFOA	IS	75.1	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C8-PFOS	IS	88.4	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C5-PFNA	IS	63.7	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFDA	IS	84.1	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
d3-MeFOSAA	IS	62.2	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFUnA	IS	74.1	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
d5-EtFOSAA	IS	58.1	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFDoA	IS	66.3	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	
13C2-PFTeDA	IS	81.8	50 - 150			B8B0074	12-Feb-18	1.20 g	22-Feb-18 18:28	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight.  
The sample size is reported in wet weight  
Results reported to the DL

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

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Sample ID: WI-AF-SB613-5657H-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-11	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	10-Jan-18 15:15	Date Received:	07-Feb-18 10:29		
Location:	SB613			% Solids:	94.9		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.311	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFHxA	ND	0.174	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFHpA	ND	0.176	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFHxS	ND	0.266	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFOA	ND	0.202	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFOS	ND	0.724	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFNA	ND	0.153	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFDA	ND	0.219	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
MeFOSAA	ND	0.259	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFOxA	ND	0.303	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
EtFOSAA	ND	0.275	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFDoA	ND	0.237	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFTeDA	ND	0.105	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
PFTeDA	ND	0.170	0.857	1.71		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	116	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFHxA	IS	78.9	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C4-PFHpA	IS	101	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
18O2-PFHxS	IS	81.8	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFOA	IS	84.3	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C8-PFOS	IS	97.8	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C5-PFNA	IS	90.5	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFDA	IS	75.8	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
d3-MeFOSAA	IS	88.1	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFOxA	IS	74.2	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
d5-EtFOSAA	IS	81.0	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFDoA	IS	83.7	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1
13C2-PFTeDA	IS	100	50 - 150		B8B0074	12-Feb-18	1.23 g	22-Feb-18 18:39	1

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes

سید 5/29/18

Sample ID: WI-AF-SB607-000H-0118										VAL - PFAS	
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-12	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	12-Jan-18 15:20	Date Received:	07-Feb-18 10:29						
Location:	SB607				% Solids:	88.5					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.387	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFHxA	ND	0.216	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFHpA	ND	0.219	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFHxS	ND	0.331	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFOA	ND	0.252	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFOS	ND	0.901	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFNA	ND	0.190	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFDA	ND	0.273	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
MeFOSAA	ND	0.322	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFUnA	ND	0.377	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
EtFOSAA	ND	0.342	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFDoA	ND	0.294	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFTTrDA	ND	0.130	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
PFTeDA	ND	0.211	1.07	2.13		B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	94.3	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFHxA	IS	82.1	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C4-PFHpA	IS	83.6	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
18O2-PFHxS	IS	96.0	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFOA	IS	69.2	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C8-PFOS	IS	84.5	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C5-PFNA	IS	76.2	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFDA	IS	86.6	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
d3-MeFOSAA	IS	58.3	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFUnA	IS	78.6	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
d5-EtFOSAA	IS	71.2	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFDoA	IS	71.7	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	
13C2-PFTeDA	IS	81.9	50 - 150			B8B0074	12-Feb-18	1.06 g	22-Feb-18 18:51	1	

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight.

The sample size is reported in wet weight

Results reported to the DL.

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

Only the linear isomer is reported for all other analytes

MS/29/1.8



Sample ID: WI-AF-SB607P-000H-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-13	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	12-Jan-18 15:25	Date Received:	07-Feb-18 10:29		
Location:	SB607			% Solids:	84.2		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.322	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFHxA	ND	0.180	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFHpA	ND	0.182	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFHxS	ND	0.275	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFOA	ND	0.209	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFOS	ND	0.749	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFNA	ND	0.158	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFDA	ND	0.227	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
MeFOSAA	ND	0.268	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFUnA	ND	0.314	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
EtFOSAA	ND	0.285	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFDoA	ND	0.245	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFTTrDA	ND	0.108	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
PFTeDA	ND	0.176	0.886	1.77		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	89.6	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFHxA	IS	75.1	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C4-PFHpA	IS	72.3	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
18O2-PFHxS	IS	91.9	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFOA	IS	80.7	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C8-PFOS	IS	82.5	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C5-PFNA	IS	82.4	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFDA	IS	72.4	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
d3-MeFOSAA	IS	63.6	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFUnA	IS	61.8	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
d5-EtFOSAA	IS	63.8	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFDoA	IS	64.5	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1
13C2-PFTeDA	IS	82.9	50 - 150		B8B0074	12-Feb-18	1.34 g	22-Feb-18 19:02	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*rw 5/29/18*

Sample ID: WI-AF-SB607-0203-0118						VAL - PFAS				
Client Data					Laboratory Data					
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-14	Column:	BEH C18			
Project:	NAS WI- AULT FIELD	Date Collected:	12-Jan-18 15:30	Date Received:	07-Feb-18 10:29					
Location:	SB607				% Solids:	87.5				
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.340	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFHxA	ND	0.190	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFHpA	ND	0.192	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFHxS	ND	0.290	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFOA	ND	0.221	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFOS	ND	0.792	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFNA	ND	0.167	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFDA	ND	0.240	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
MeFOSAA	ND	0.283	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFUnA	ND	0.332	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
EtFOSAA	ND	0.301	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFDoA	ND	0.259	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFTTrDA	ND	0.114	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
PFTeDA	ND	0.185	0.937	1.87		B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	94.1	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFHxA	IS	83.0	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C4-PFHpA	IS	95.9	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
18O2-PFHxS	IS	81.8	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFOA	IS	86.8	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C8-PFOS	IS	85.1	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C5-PFNA	IS	107	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFDA	IS	74.4	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
d3-MeFOSAA	IS	59.2	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFUnA	IS	81.1	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
d5-EtFOSAA	IS	70.9	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFDoA	IS	81.5	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1
13C2-PFTeDA	IS	119	50 - 150			B8B0074	12-Feb-18	1.22 g	22-Feb-18 19:48	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight.

Only the linear isomer is reported for all other analytes.

The sample size is reported in wet weight

Results reported to the DL.

new 5/29/18

Sample ID: WI-AF-SB607-0405-0118											VAL - PFAS
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Soil	Lab Sample:	1800268-15	Column:	BEH C18			
Project:	NAS WI- AULT FIELD		Date Collected:	12-Jan-18 15:45	Date Received:	07-Feb-18 10:29					
Location:	SB607					% Solids:	85.2				
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.422	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFHxA	ND	0.236	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFHpA	ND	0.238	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFHxS	ND	0.360	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFOA	ND	0.274	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFOS	ND	0.982	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFNA	ND	0.207	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFDA	ND	0.298	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
MeFOSAA	ND	0.351	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFUnA	ND	0.412	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
EtFOSAA	ND	0.373	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFDoA	ND	0.321	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFTTrDA	ND	0.142	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
PFTeDA	ND	0.230	1.16	2.32		B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	103	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFHxA	IS	77.0	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C4-PFHpA	IS	76.3	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
18O2-PFHxS	IS	80.6	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFOA	IS	82.1	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C8-PFOS	IS	83.7	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C5-PFNA	IS	85.1	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFDA	IS	75.0	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
d3-MeFOSAA	IS	66.3	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFUnA	IS	69.6	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
d5-EtFOSAA	IS	67.9	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFDoA	IS	88.8	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	
13C2-PFTeDA	IS	95.8	50 - 150			B8B0074	12-Feb-18	1.01 g	22-Feb-18 20:00	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

سر 5/29/18

Sample ID: WI-AF-SB607-1011-0118											VAL - PFAS
Client Data						Laboratory Data					
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-16	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	12-Jan-18 15:55	Date Received:	07-Feb-18 10:29						
Location:	SB607				% Solids:	89.0					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.324	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFHxA	ND	0.181	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFHpA	ND	0.183	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFHxS	ND	0.277	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFOA	ND	0.211	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFOS	ND	0.754	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFNA	ND	0.159	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFDA	ND	0.228	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
MeFOSAA	ND	0.269	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFUnA	ND	0.316	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
EtFOSAA	ND	0.286	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFDoA	ND	0.246	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFTeDA	ND	0.109	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
PFTeDA	ND	0.177	0.892	1.78		B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	99.8	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFHxA	IS	84.2	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C4-PFHpA	IS	85.7	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
18O2-PFHxS	IS	76.2	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFOA	IS	91.7	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C8-PFOS	IS	77.9	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C5-PFNA	IS	103	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFDA	IS	80.4	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
d3-MeFOSAA	IS	74.2	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFUnA	IS	93.7	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
d5-EtFOSAA	IS	77.0	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFDoA	IS	77.8	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	
13C2-PFTeDA	IS	111	50 - 150			B8B0074	12-Feb-18	1.26 g	22-Feb-18 20:11	1	

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

Only the linear isomer is reported for all other analytes

*new 5/29/18*

Sample ID: WI-AF-SB610-3940-0118											VAL - PFAS
Client Data						Laboratory Data					
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-17	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	26-Jan-18 15:45	Date Received:	07-Feb-18 10:29						
Location:	SB610				% Solids:	82.3					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.401	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFHxA	ND	0.224	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFHpA	ND	0.226	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFHxS	ND	0.342	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFOA	ND	0.261	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFOS	ND	0.934	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFNA	ND	0.197	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFDA	ND	0.283	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
MeFOSAA	ND	0.334	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFUnA	ND	0.391	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
EtFOSAA	ND	0.355	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFDoA	ND	0.305	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFTrDA	ND	0.135	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
PFTeDA	ND	0.219	1.10	2.21		B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	111	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFHxA	IS	76.5	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C4-PFHpA	IS	102	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
18O2-PFHxS	IS	90.7	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFOA	IS	85.3	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C8-PFOS	IS	88.4	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C5-PFNA	IS	86.0	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFDA	IS	94.3	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
d3-MeFOSAA	IS	82.6	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFUnA	IS	90.5	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
d5-EtFOSAA	IS	89.7	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFDoA	IS	97.4	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	
13C2-PFTeDA	IS	87.4	50 - 150			B8B0074	12-Feb-18	1.10 g	22-Feb-18 20:22	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

*new 5/29/18*



Sample ID: WI-AF-SB610P-3940-0118

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800268-18	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	26-Jan-18 15:50	Date Received:	07-Feb-18 10:29		
Location:	SB610			% Solids:	82.6		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.360	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFHxA	ND	0.201	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFHpA	ND	0.203	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFHxS	ND	0.308	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFOA	ND	0.234	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFOS	ND	0.839	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFNA	ND	0.177	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFDA	ND	0.254	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
MeFOSAA	ND	0.300	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFUnA	ND	0.351	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
EtFOSAA	ND	0.319	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFDoA	ND	0.274	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 20:34	1
PFTTrDA	ND	0.121	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
PFTeDA	ND	0.197	0.992	1.98		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	95.2	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFHxA	IS	95.3	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C4-PFHpA	IS	93.3	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
18O2-PFHxS	IS	89.6	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFOA	IS	88.5	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C8-PFOS	IS	74.3	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C5-PFNA	IS	79.1	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFDA	IS	73.6	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
d3-MeFOSAA	IS	62.2	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFUnA	IS	79.2	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
d5-EtFOSAA	IS	65.8	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFDoA	IS	81.2	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1
13C2-PFTeDA	IS	85.1	50 - 150		B8B0074	12-Feb-18	1.22 g	22-Feb-18 04:52	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

MS/29/18

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800269  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-FB-010518	1800269-01	Water
2	WI-AF-EB01-SO-0118	1800269-02	Water
3	WI-AF-FB-010718	1800269-03	Water
4	WI-AF-EB02-SO-0118	1800269-04	Water
5	WI-AF-FB-011018	1800269-05	Water
6	WI-AF-EB03-SO-0118	1800269-06	Water
7	WI-AF-FB-011218	1800269-07	Water
8	WI-AF-EB04-SO-0118	1800269-08	Water
9	WI-AF-FB-012618	1800269-09	Water
10	WI-AF-EB10-0118	1800269-10	Water

A full data validation was performed on the analytical data for five aqueous field blank samples and five aqueous equipment blank samples collected on January 5-26, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

## ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

- All samples were extracted outside of the 14-day holding time and were qualified as estimated (J/UJ).

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB-010518	None - ND	-	-	-
WI-AF-EB01-SO-0118	None - ND	-	-	-
WI-AF-FB-010718	None - ND	-	-	-
WI-AF-EB02-SO-0118	PFHxS	1.44	None	Applies to Other Packages
WI-AF-FB-011018	None - ND	-	-	-
WI-AF-EB03-SO-0118	None - ND	-	-	-
WI-AF-FB-011218	None - ND	-	-	-
WI-AF-EB04-SO-0118	None - ND	-	-	-
WI-AF-FB-012618	PFOA	0.725	None	Applies to Other Packages
WI-AF-EB10-0118	None - ND	-	-	-

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- MS/MSD samples were not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 6/1/18  
Nancy Weaver  
Senior Chemist



<b>Data Qualifier</b>	<b>Definition</b>
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-FB-010518

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-01	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	05-Jan-18 10:10	Date Received:	07-Feb-18 10:29		
Location:	Reagent Blank						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.87	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFHxA	ND	2.27	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFHpA	ND	0.616	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFHxS	ND	0.987	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFOA	ND	0.678	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFOS	ND	0.841	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFNA	ND	0.844	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFDA	ND	1.55	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
MeFOSAA	ND	1.72	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFUnA	ND	1.09	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
EtFOSAA	ND	1.43	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFDoA	ND	0.825	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFTeDA	ND	0.515	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
PFTeDA	ND	0.787	5.21	8.34		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	107	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFHxA	IS	86.5	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C4-PFHpA	IS	95.2	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
18O2-PFHxS	IS	96.0	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFOA	IS	101	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C8-PFOS	IS	97.4	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C5-PFNA	IS	80.0	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFDA	IS	74.8	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
d3-MeFOSAA	IS	74.5	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFUnA	IS	102	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
d5-EtFOSAA	IS	94.5	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFDoA	IS	110	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1
13C2-PFTeDA	IS	114	50 - 150		B8B0043	09-Feb-18	0.120 L	21-Feb-18 21:25	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL - Lower control limit - upper control limit  
Results reported to the DL

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

new 5/29/18

Sample ID: WI-AF-EB01-SO-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-02	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	05-Jan-18 12:30	Date Received:	07-Feb-18 10:29		
Location:	Equip Blank						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.97	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFHxA	ND	2.40	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFHpA	ND	0.652	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFHxS	ND	1.04	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFOA	ND	0.718	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFOS	ND	0.890	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFNA	ND	0.894	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFDA	ND	1.64	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
MeFOSAA	ND	1.82	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFUnA	ND	1.16	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
EtFOSAA	ND	1.51	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFDoA	ND	0.874	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFTrDA	ND	0.545	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
PFTeDA	ND	0.833	5.53	8.83		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	132	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFHxA	IS	101	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C4-PFHpA	IS	90.1	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
18O2-PFHxS	IS	91.1	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFOA	IS	83.7	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C8-PFOS	IS	93.9	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C5-PFNA	IS	103	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFDA	IS	79.9	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
d3-MeFOSAA	IS	76.6	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFUnA	IS	78.5	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
d5-EtFOSAA	IS	93.1	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFDoA	IS	96.7	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1
13C2-PFTeDA	IS	111	50 - 150		B8B0043	09-Feb-18	0.113 L	21-Feb-18 21:36	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 5/29/18

Sample ID: WI-AF-FB-010718

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-03	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	07-Jan-18 12:50	Date Received:	07-Feb-18 10:29		
Location:	Reagent Blank						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>uJ</i>	1.88	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFHxA	ND	2.30	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFHpA	ND	0.622	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFHxS	ND	0.997	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFOA	ND	0.685	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFOS	ND	0.850	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFNA	ND	0.853	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFDA	ND	1.57	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
MeFOSAA	ND	1.74	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFUnA	ND	1.11	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
EtFOSAA	ND	1.44	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFDoA	ND	0.834	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFTeDA	ND	0.520	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
PFTeDA	ND	0.795	5.25	8.42		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	123	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFHxA	IS	93.0	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C4-PFHpA	IS	99.8	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
18O2-PFHxS	IS	95.3	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFOA	IS	94.6	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C8-PFOS	IS	95.3	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C5-PFNA	IS	69.9	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFDA	IS	83.7	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
d3-MeFOSAA	IS	91.6	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFUnA	IS	108	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
d5-EtFOSAA	IS	74.1	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFDoA	IS	78.6	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1
13C2-PFTeDA	IS	101	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 21:48	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*new 5/29/18*



Sample ID: WI-AF-EB02-SO-0118							Modified EPA Method 537				
Client Data				Laboratory Data							
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-04	Column:	BEH C18				
Project:	NAS WI- AULT FIELD	Date Collected:	07-Jan-18 13:05	Date Received:	07-Feb-18 10:29						
Location:	Equip Blank										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND <i>uJ</i>	2.43	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFHxA	ND	2.97	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFHpA	ND	0.804	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFHxS	1.44 <i>J</i>	1.29	6.80	10.9	<i>J</i>	B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFOA	ND <i>uJ</i>	0.886	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFOS	ND	1.10	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFNA	ND	1.10	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFDA	ND	2.03	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
MeFOSAA	ND	2.24	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFUnA	ND	1.43	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
EtFOSAA	ND	1.86	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFDoA	ND	1.08	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFTeDA	ND	0.672	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
PFTeDA	ND	1.03	6.80	10.9		B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	118	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFHxA	IS	104	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C4-PFHpA	IS	108	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
18O2-PFHxS	IS	92.9	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFOA	IS	102	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C8-PFOS	IS	99.2	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C5-PFNA	IS	79.0	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFDA	IS	87.5	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
d3-MeFOSAA	IS	65.8	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFUnA	IS	73.0	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
d5-EtFOSAA	IS	84.8	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFDoA	IS	66.6	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	
13C2-PFTeDA	IS	113	50 - 150			B8B0043	09-Feb-18	0.0919 L	21-Feb-18 21:59	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

*uJ 5/29/18*

Sample ID: WI-AF-FB-011018

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-05	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	10-Jan-18 13:10	Date Received:	07-Feb-18 10:29		
Location:	SB613						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>uJ</i>	1.89	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFHxA	ND	2.31	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFHpA	ND	0.625	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFHxS	ND	1.00	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFOA	ND	0.688	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFOS	ND	0.853	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFNA	ND	0.856	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFDA	ND	1.58	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
MeFOSAA	ND	1.74	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFUnA	ND	1.11	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
EtFOSAA	ND	1.45	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFDoA	ND	0.837	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFTrDA	ND	0.522	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
PFTeDA	ND	0.798	5.30	8.46		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1

HT

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	117	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFHxA	IS	95.2	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C4-PFHpA	IS	101	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
18O2-PFHxS	IS	102	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFOA	IS	102	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C8-PFOS	IS	82.8	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C5-PFNA	IS	88.9	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFDA	IS	73.2	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
d3-MeFOSAA	IS	78.5	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFUnA	IS	94.9	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
d5-EtFOSAA	IS	75.4	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFDoA	IS	85.5	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1
13C2-PFTeDA	IS	140	50 - 150		B8B0043	09-Feb-18	0.118 L	21-Feb-18 22:11	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

NW 51291.8

Sample ID: WI-AF-EB03-SO-0118						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800269-06	Column:	BEH C18			
Project:	NAS WI-AULT FIELD	Date Collected:	10-Jan-18 13:15		Date Received:	07-Feb-18 10:29					
Location:	SB613										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND <sup>uJ</sup>	1.88	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFHxA	ND	2.29	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFHpA	ND	0.621	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFHxS	ND	0.995	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFOA	ND	0.684	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFOS	ND	0.848	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFNA	ND	0.851	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFDA	ND	1.57	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
MeFOSAA	ND	1.73	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFUnA	ND	1.10	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
EtFOSAA	ND	1.44	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFDoA	ND	0.832	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFTrDA	ND	0.519	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
PFTeDA	ND	0.793	5.25	8.40		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	107	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFHxA	IS	93.2	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C4-PFHpA	IS	87.6	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
18O2-PFHxS	IS	96.0	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFOA	IS	104	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C8-PFOS	IS	81.1	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C5-PFNA	IS	86.7	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFDA	IS	87.7	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
d3-MeFOSAA	IS	71.6	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFUnA	IS	77.5	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
d5-EtFOSAA	IS	74.6	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFDoA	IS	75.3	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	
13C2-PFTeDA	IS	106	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:22	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
Only the linear isomer is reported for all other analytes

nw 5/29/18

Sample ID: WI-AF-FB-011218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800269-07	Column:	BEI1 C18			
Project:	NAS WI-AULT FIELD	Date Collected:	12-Jan-18 16:00		Date Received:	07-Feb-18 10:29					
Location:	SB607										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.88	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFHxA	ND	2.29	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFHpA	ND	0.622	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFHxS	ND	0.996	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFOA	ND	0.685	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFOS	ND	0.849	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFNA	ND	0.852	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFDA	ND	1.57	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
MeFOSAA	ND	1.74	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFUnA	ND	1.10	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
EtFOSAA	ND	1.44	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFDoA	ND	0.833	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFTrDA	ND	0.520	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
PFTeDA	ND	0.794	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	117	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFHxA	IS	93.4	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C4-PFHpA	IS	103	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
18O2-PFHxS	IS	102	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFOA	IS	95.4	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C8-PFOS	IS	109	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C5-PFNA	IS	82.7	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFDA	IS	76.6	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
d3-MeFOSAA	IS	71.4	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFUnA	IS	71.3	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
d5-EtFOSAA	IS	80.9	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFDoA	IS	79.8	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	
13C2-PFTeDA	IS	92.8	50 - 150			B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:34	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported: PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

nw 5/29/18



Sample ID: WI-AF-EB04-SO-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-08	Column:	BEH C18
Project:	NAS WI- AULT FIELD	Date Collected:	12-Jan-18 16:05	Date Received:	07-Feb-18 10:29		
Location:	SB607						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>UJ</i>	2.00	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFHxA	ND	2.43	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFHpA	ND	0.659	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFHxS	ND	1.06	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFOA	ND	0.726	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFOS	ND	0.900	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFNA	ND	0.903	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFDA	ND	1.66	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
MeFOSAA	ND	1.84	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFUnA	ND	1.17	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
EtFOSAA	ND	1.53	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFDoA	ND	0.883	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFTTrDA	ND	0.551	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
PFTeDA	ND	0.842	5.58	8.92		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	122	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFHxA	IS	102	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C4-PFHpA	IS	99.6	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
18O2-PFHxS	IS	99.4	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFOA	IS	92.2	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C8-PFOS	IS	88.2	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C5-PFNA	IS	86.3	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFDA	IS	74.3	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
d3-MeFOSAA	IS	57.8	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFUnA	IS	65.0	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
d5-EtFOSAA	IS	59.8	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFDoA	IS	65.8	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1
13C2-PFTeDA	IS	78.7	50 - 150		B8B0043	09-Feb-18	0.112 L	21-Feb-18 22:45	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

*rw 5/29/18*



**Sample ID: WI-AF-FB-012618** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-09	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	26-Jan-18 15:40	Date Received:	07-Feb-18 10:29		
Location:	SB610						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.88	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFHxA	ND	2.29	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFHpA	ND	0.621	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFHxS	ND	0.996	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFOA	0.725	0.684	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFOS	ND	0.848	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFNA	ND	0.851	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFDA	ND	1.57	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
MeFOSAA	ND	1.73	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFUnA	ND	1.10	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
EtFOSAA	ND	1.44	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFDaA	ND	0.833	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFTrDA	ND	0.519	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
PFTeDA	ND	0.794	5.25	8.41		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	123	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFHxA	IS	99.3	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C4-PFHpA	IS	97.1	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
18O2-PFHxS	IS	113	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFOA	IS	96.6	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C8-PFOS	IS	97.6	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C5-PFNA	IS	93.8	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFDA	IS	74.2	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
d3-MeFOSAA	IS	70.2	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFUnA	IS	63.4	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
d5-EtFOSAA	IS	68.9	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFDaA	IS	73.2	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1
13C2-PFTeDA	IS	105	50 - 150		B8B0043	09-Feb-18	0.119 L	21-Feb-18 22:57	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

ms/29/18

Sample ID: WI-AF-EB10-0118

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800269-10	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	26-Jan-18 15:55	Date Received:	07-Feb-18 10:29		
Location:	SB610						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.85	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFHxA	ND	2.25	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFHpA	ND	0.610	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFHxS	ND	0.978	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFOA	ND	0.672	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFOS	ND	0.833	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFNA	ND	0.836	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFDA	ND	1.54	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
MeFOSAA	ND	1.70	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFUnA	ND	1.08	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
EtFOSAA	ND	1.41	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFDoA	ND	0.818	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFTrDA	ND	0.510	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
PFTeDA	ND	0.780	5.17	8.26		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	112	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFHxA	IS	90.9	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C4-PFHpA	IS	98.8	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
18O2-PFHxS	IS	86.8	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFOA	IS	107	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C8-PFOS	IS	84.3	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C5-PFNA	IS	98.5	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFDA	IS	77.4	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
d3-MeFOSAA	IS	68.8	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFUnA	IS	74.8	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
d5-EtFOSAA	IS	80.2	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFDoA	IS	69.2	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1
13C2-PFTeDA	IS	88.1	50 - 150		B8B0043	09-Feb-18	0.121 L	21-Feb-18 23:08	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*rw 5/29/18*

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800340  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-MW-614-0218	1800340-01	Water
2	WI-AF-MW-613-0218	1800340-02	Water
3	WI-AF-FB02-021418	1800340-03	Water
4	WI-AF-EB02-021418	1800340-04	Water
5	WI-AF-MW-612-0218	1800340-05	Water
5MS	WI-AF-MW-612-0218MS	1800340-05MS	Water
5MSD	WI-AF-MW-612-0218MSD	1800340-05MSD	Water
6	WI-AF-EB02-021518	1800340-06	Water
7	WI-AF-MW-608-0218	1800340-07	Water
8	WI-AF-MW-606-0218	1800340-08	Water
9	WI-AF-MW-606P-0218	1800340-09	Water
10	WI-AF-FB02-021618	1800340-10	Water
11	WI-AF-MW-607-0218	1800340-11	Water
12	WI-AF-MW-605-0218	1800340-12	Water
13	WI-AF-MW-609-0218	1800340-13	Water

A full data validation was performed on the analytical data for nine water samples, two aqueous field blank samples, and two aqueous equipment blank samples collected on February 14-17, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)”.

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA “Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review,” January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB02-021418	None - ND	-	-	-
WI-AF-EB02-021418	None - ND	-	-	-
WI-AF-EB02-021518	None - ND	-	-	-
WI-AF-FB02-021618	None - ND	-	-	-
WI-AF-FB01-021518	None - ND	-	-	-
WI-AF-FB01-021718	PFOS	2.23	None	All Associated ND
WI-AF-EB01-021718	PFOS	1.95	None	All Associated ND

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier
5	PFOS	OK/158%/32.9	None - Sample ND



### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Compound	%R	Qualifier
13	13C2-PFDoA	44.8%	UJ - Associated Cmpd

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

### Compound Quantitation

- All criteria were met.

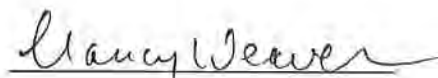
### Field Duplicate Sample Precision

- Field duplicate results are summarized below. The precision was acceptable.

Compound	WI-AF-MW-606-0218 ng/L	WI-AF-MW-606P-0218 ng/L	RPD	Qualifier
None	ND	ND	-	-

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:



Dated: 6/1/18

Nancy Weaver  
Senior Chemist

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-MW-614-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-01	Column:	BEH C18
Project:	695610.04.FLFS	Date Collected:	14-Feb-18 11:45	Date Received:	20-Feb-18 09:04		
Location:	MW-614						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.90	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFHxA	ND	2.31	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFHpA	ND	0.626	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFHxS	ND	1.00	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFOA	ND	0.689	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFOS	ND	0.855	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFNA	ND	0.858	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFDA	ND	1.58	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
MeFOSAA	ND	1.75	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFUnA	ND	1.11	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
EtFOSAA	ND	1.45	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFDoA	ND	0.839	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFTeDA	ND	0.523	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
PFTeDA	ND	0.800	5.30	8.47		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	99.3	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFHxA	IS	81.5	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C4-PFHpA	IS	81.0	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
18O2-PFHxS	IS	87.9	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFOA	IS	66.0	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C8-PFOS	IS	89.0	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C5-PFNA	IS	86.6	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFDA	IS	70.2	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
d3-MeFOSAA	IS	85.8	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFUnA	IS	67.3	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
d5-EtFOSAA	IS	77.4	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFDoA	IS	78.3	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1
13C2-PFTeDA	IS	91.5	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 07:33	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL.

Only the linear isomer is reported for all other analytes

MW 5/29/18

**Sample ID: WI-AF-MW-613-0218** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-02	Column:	BEH C18
Project:	695610.04.FLFS	Date Collected:	14-Feb-18 16:55	Date Received:	20-Feb-18 09:04		
Location:	MW-613						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.97	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFHxA	ND	2.40	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFHpA	ND	0.652	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFHxS	ND	1.04	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFOA	ND	0.718	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFOS	ND	0.890	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFNA	ND	0.893	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFDA	ND	1.64	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
MeFOSAA	ND	1.82	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFUnA	ND	1.16	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
EtFOSAA	ND	1.51	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFDoA	ND	0.874	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFTeDA	ND	0.545	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
PFTeDA	ND	0.833	5.53	8.82		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	91.7	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFHxA	IS	89.6	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C4-PFHpA	IS	82.0	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
18O2-PFHxS	IS	88.0	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFOA	IS	60.0	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C8-PFOS	IS	85.1	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C5-PFNA	IS	83.2	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFDA	IS	65.5	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
d3-MeFOSAA	IS	71.5	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFUnA	IS	63.4	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
d5-EtFOSAA	IS	63.5	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFDoA	IS	53.4	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1
13C2-PFTeDA	IS	71.3	50 - 150		B8B0130	22-Feb-18	0.113 L	28-Feb-18 07:44	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL - Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL.      Only the linear isomer is reported for all other analytes

سور 5/29/18



Sample ID: WI-AF-FB02-021418

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-03	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	14-Feb-18 17:55	Date Received:	20-Feb-18 09:04		
Location:	Field Blank						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.86	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFHxA	ND	2.27	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFHpA	ND	0.615	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFHxS	ND	0.986	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFOA	ND	0.678	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFOS	ND	0.840	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFNA	ND	0.843	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFDA	ND	1.55	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
MeFOSAA	ND	1.72	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFUnA	ND	1.09	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
EtFOSAA	ND	1.43	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFDoA	ND	0.824	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFTeDA	ND	0.514	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
PFTeDA	ND	0.786	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	120	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFHxA	IS	94.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C4-PFHpA	IS	88.1	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
18O2-PFHxS	IS	88.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFOA	IS	70.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C8-PFOS	IS	84.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C5-PFNA	IS	81.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFDA	IS	73.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
d3-MeFOSAA	IS	73.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFUnA	IS	65.1	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
d5-EtFOSAA	IS	66.8	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFDoA	IS	64.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1
13C2-PFTeDA	IS	65.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:30	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL - Lower control limit - upper control limit  
Results reported to the DL

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

*mw 5/29/18*

Sample ID: WI-AF-EB02-021418					Modified EPA Method 537					
Client Data				Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-04	Column:	BEH C18			
Project:	695610.04.FLFS	Date Collected:	14-Feb-18 18:20	Date Received:	20-Feb-18 09:04					
Location:	Equipment Blank									
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.86	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFHxA	ND	2.26	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFHpA	ND	0.614	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFHxS	ND	0.984	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFOA	ND	0.676	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFOS	ND	0.838	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFNA	ND	0.842	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFDA	ND	1.55	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
MeFOSAA	ND	1.71	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFUnA	ND	1.09	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
EtFOSAA	ND	1.42	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFDoA	ND	0.823	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFTeDA	ND	0.513	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
PFTeDA	ND	0.784	5.21	8.31		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	93.5	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFHxA	IS	74.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C4-PFHpA	IS	71.7	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
18O2-PFHxS	IS	89.0	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFOA	IS	57.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C8-PFOS	IS	77.5	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C5-PFNA	IS	83.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFDA	IS	80.6	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
d3-MeFOSAA	IS	69.0	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFUnA	IS	52.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
d5-EtFOSAA	IS	62.7	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFDoA	IS	54.5	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1
13C2-PFTeDA	IS	68.8	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:42	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers:

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

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Sample ID: WI-AF-MW-612-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-05	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	15-Feb-18 11:20	Date Received:	20-Feb-18 09:04		
Location:	MW-612						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.86	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFHxA	ND	2.27	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFHpA	ND	0.616	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFHxS	ND	0.986	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFOA	ND	0.678	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFOS	ND	0.841	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFNA	ND	0.844	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFDA	ND	1.55	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
MeFOSAA	ND	1.72	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFUnA	ND	1.09	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
EtFOSAA	ND	1.43	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFDoA	ND	0.825	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFTTrDA	ND	0.515	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
PFTeDA	ND	0.786	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	93.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFHxA	IS	74.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C4-PFHpA	IS	79.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
18O2-PFHxS	IS	77.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFOA	IS	51.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C8-PFOS	IS	79.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C5-PFNA	IS	70.1	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFDA	IS	88.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
d3-MeFOSAA	IS	79.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFUnA	IS	70.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
d5-EtFOSAA	IS	72.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFDoA	IS	60.8	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1
13C2-PFTeDA	IS	64.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 08:53	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

5/29/18

Sample ID: WI-AF-EB02-021518					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800340-06	Column:	BEH C18			
Project:	695610.04.FLFS	Date Collected:	15-Feb-18 12:45		Date Received:	20-Feb-18 09:04					
Location:	Equipment Blank										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.85	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFHxA	ND	2.25	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFHpA	ND	0.610	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFHxS	ND	0.978	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFOA	ND	0.672	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFOS	ND	0.833	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFNA	ND	0.837	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFDA	ND	1.54	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
MeFOSAA	ND	1.70	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFUnA	ND	1.08	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
EtFOSAA	ND	1.41	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFDoA	ND	0.818	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFTeDA	ND	0.510	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
PFTeDA	ND	0.780	5.17	8.26		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	87.9	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFHxA	IS	84.8	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C4-PFHpA	IS	69.7	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
18O2-PFHxS	IS	98.7	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFOA	IS	62.2	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C8-PFOS	IS	71.0	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C5-PFNA	IS	88.3	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFDA	IS	81.0	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
d3-MeFOSAA	IS	64.3	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFUnA	IS	55.8	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
d5-EtFOSAA	IS	68.5	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFDoA	IS	51.9	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		
13C2-PFTeDA	IS	60.1	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 09:05	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

rev 5/29/18

Sample ID: WI-AF-MW-608-0218							Modified EPA Method 537				
Client Data				Laboratory Data							
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-07	Column:	BEH C18				
Project:	695610.04.FI.FS	Date Collected:	15-Feb-18 15:55	Date Received:	20-Feb-18 09:04						
Location:	MW-608										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	4.57	1.87	5.21	8.36	J	B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFHxA	9.86	2.28	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFHpA	3.58	0.617	5.21	8.36	J	B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFHxS	9.26	0.989	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFOA	8.75	0.680	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFOS	ND	0.843	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFNA	ND	0.846	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFDA	ND	1.56	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
MeFOSAA	ND	1.72	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFUnA	ND	1.10	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
EtFOSAA	ND	1.43	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFDoA	ND	0.827	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFTrDA	ND	0.516	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
PFTeDA	ND	0.789	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	91.7	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFHxA	IS	83.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C4-PFHpA	IS	74.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
18O2-PFHxS	IS	79.1	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFOA	IS	68.8	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C8-PFOS	IS	78.9	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C5-PFNA	IS	81.9	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFDA	IS	72.1	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
d3-MeFOSAA	IS	80.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFUnA	IS	63.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
d5-EtFOSAA	IS	79.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFDoA	IS	80.6	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	
13C2-PFTeDA	IS	66.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:16	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported: PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 5/29/18



Sample ID: WI-AF-MW-606-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-08	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	16-Feb-18 14:50	Date Received:	20-Feb-18 09:04		
Location:	MW-606						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.87	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFHxA	ND	2.28	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFHpA	ND	0.617	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFHxS	ND	0.989	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFOA	ND	0.680	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFOS	ND	0.843	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFNA	ND	0.846	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFDA	ND	1.56	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
MeFOSAA	ND	1.72	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFUnA	ND	1.10	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
EtFOSAA	ND	1.43	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFDoA	ND	0.827	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFTTrDA	ND	0.516	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
PFTeDA	ND	0.788	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	96.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFHxA	IS	89.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C4-PFHpA	IS	72.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
18O2-PFHxS	IS	89.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFOA	IS	63.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C8-PFOS	IS	82.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C5-PFNA	IS	77.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFDA	IS	73.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
d3-MeFOSAA	IS	65.8	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFUnA	IS	70.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
d5-EtFOSAA	IS	67.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFDoA	IS	56.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1
13C2-PFTeDA	IS	68.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 09:28	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

5/29/18

Sample ID: WI-AF-MW-606P-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800340-09	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	16-Feb-18 14:50		Date Received:	20-Feb-18 09:04					
Location:	MW-606										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.89	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFHxA	ND	2.30	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFHpA	ND	0.624	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFHxS	ND	1.00	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFOA	ND	0.687	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFOS	ND	0.852	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFNA	ND	0.855	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFDA	ND	1.57	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
MeFOSAA	ND	1.74	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFUnA	ND	1.11	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
EtFOSAA	ND	1.45	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFDoA	ND	0.836	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFTTrDA	ND	0.522	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
PFTeDA	ND	0.797	5.30	8.45		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	104	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFHxA	IS	102	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C4-PFHpA	IS	87.3	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
18O2-PFHxS	IS	72.6	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFOA	IS	60.2	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C8-PFOS	IS	86.8	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C5-PFNA	IS	89.8	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFDA	IS	71.6	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
d3-MeFOSAA	IS	83.7	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFUnA	IS	70.1	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
d5-EtFOSAA	IS	82.0	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFDoA	IS	84.5	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		
13C2-PFTeDA	IS	87.5	50 - 150		B8B0130	22-Feb-18	0.118 L	28-Feb-18 09:39	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

see 5/29/18

**Sample ID: WI-AF-FB02-021618** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800340-10	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	16-Feb-18 15:00	Date Received:	20-Feb-18 09:04		
Location:	F.B.						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.82	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFHxA	ND	2.22	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFHpA	ND	0.602	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFHxS	ND	0.965	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFOA	ND	0.663	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFOS	ND	0.822	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFNA	ND	0.825	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFDA	ND	1.52	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
MeFOSAA	ND	1.68	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFUnA	ND	1.07	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
EtFOSAA	ND	1.40	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFDoA	ND	0.807	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFTeDA	ND	0.503	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
PFTeDA	ND	0.769	5.08	8.15		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	98.6	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFHxA	IS	83.0	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C4-PFHpA	IS	85.1	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
18O2-PFHxS	IS	91.8	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFOA	IS	65.5	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C8-PFOS	IS	85.4	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C5-PFNA	IS	81.1	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFDA	IS	66.9	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
d3-MeFOSAA	IS	71.8	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFUnA	IS	64.7	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
d5-EtFOSAA	IS	72.2	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFDoA	IS	50.9	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1
13C2-PFTeDA	IS	58.3	50 - 150		B8B0130	22-Feb-18	0.123 L	28-Feb-18 09:51	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL.

Only the linear isomer is reported for all other analytes

see 5/29/18

Sample ID: WI-AF-MW-607-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous			Lab Sample:	1800340-11	Column:	BEH C18		
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 11:08			Date Received:	20-Feb-18 09:04				
Location:	MW-607										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.97	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFHxA	ND	2.40	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFHpA	ND	0.650	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFHxS	ND	1.04	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFOA	ND	0.716	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFOS	ND	0.887	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFNA	ND	0.891	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFDA	ND	1.64	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
MeFOSAA	ND	1.81	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFUnA	ND	1.15	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
EtFOSAA	ND	1.51	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFDoA	ND	0.871	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFTeDA	ND	0.543	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
PFTeDA	ND	0.830	5.48	8.80		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	94.7	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFHxA	IS	95.1	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C4-PFHpA	IS	77.0	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
18O2-PFHxS	IS	71.9	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFOA	IS	59.6	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C8-PFOS	IS	89.1	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C5-PFNA	IS	70.8	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFDA	IS	75.6	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
d3-MeFOSAA	IS	68.2	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFUnA	IS	54.4	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
d5-EtFOSAA	IS	64.2	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFDoA	IS	58.0	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		
13C2-PFTeDA	IS	59.4	50 - 150		B8B0130	22-Feb-18	0.114 L	28-Feb-18 10:02	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 5/29/18

Sample ID: WI-AF-MW-605-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous			Lab Sample:	1800340-12	Column:	BEH C18		
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 13:00			Date Received:	20-Feb-18 09:04				
Location:	MW-605										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.87	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFHxA	ND	2.28	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFHpA	ND	0.617	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFHxS	ND	0.989	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFOA	ND	0.680	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFOS	ND	0.842	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFNA	ND	0.846	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFDA	ND	1.56	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
MeFOSAA	ND	1.72	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFUnA	ND	1.10	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
EtFOSAA	ND	1.43	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFDoA	ND	0.827	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFTeDA	ND	0.516	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
PFTeDA	ND	0.788	5.21	8.35		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	88.5	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFHxA	IS	83.0	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C4-PFHpA	IS	77.8	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
18O2-PFHxS	IS	75.0	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFOA	IS	61.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C8-PFOS	IS	86.5	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C5-PFNA	IS	89.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFDA	IS	79.8	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
d3-MeFOSAA	IS	81.1	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFUnA	IS	54.6	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
d5-EtFOSAA	IS	72.2	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFDoA	IS	53.4	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	
13C2-PFTeDA	IS	65.3	50 - 150			B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:14	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

مر 5/29/18



Sample ID: WI-AF-MW-609-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800340-13	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 15:55		Date Received:	20-Feb-18 09:04					
Location:	MW-609										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.87	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFHxA	ND	2.28	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFHpA	ND	0.618	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFHxS	ND	0.990	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFOA	ND	0.681	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFOS	ND	0.844	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFNA	ND	0.847	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFDA	ND	1.56	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
MeFOSAA	ND	1.73	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFUnA	ND	1.10	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
EtFOSAA	ND	1.43	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFDoA	ND	0.828	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFTTrDA	ND	0.516	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
PFTeDA	ND	0.789	5.21	8.36		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	86.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFHxA	IS	89.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C4-PFHpA	IS	75.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
18O2-PFHxS	IS	96.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFOA	IS	64.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C8-PFOS	IS	77.8	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C5-PFNA	IS	86.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFDA	IS	84.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
d3-MeFOSAA	IS	69.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFUnA	IS	62.1	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
d5-EtFOSAA	IS	62.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFDoA	IS	44.8	50 - 150	H	B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		
13C2-PFTeDA	IS	61.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 10:25	1		

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

new 5/29/18

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
SDG: 1800341  
Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
Date: May 29, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-MW-N13-12-0218	1800341-01	Water
2	WI-AF-3-MW-2-0218	1800341-02	Water
3	WI-AF-N29-22D-0218	1800341-03	Water
4	WI-AF-FB01-021918	1800341-04	Water
5	WI-AF-EB01-021918	1800341-05	Water

A full data validation was performed on the analytical data for three water samples, one aqueous field blank sample, and one aqueous equipment blank sample collected on February 18-19, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times

- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Perfluorinated Compounds (PFCs)

### Data Completeness, Case Narrative & Custody Documentation

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB01-021918	None - ND	-	-	-
WI-AF-EB01-021918	None - ND	-	-	-
WI-AF-EB01-021818	None - ND	-	-	-
WI-AF-FB01-021818	None - ND	-	-	-

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples were not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Compound	%R	Qualifier
3	13C2-PFDoA	43.0%	UJ - Associated Cmpd
4	13C2-PFUnA	38.4%	UJ - Associated Cmpd
	13C2-PFDoA	48.8%	UJ - Associated Cmpd

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

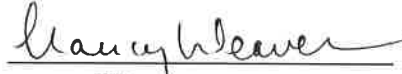
- All criteria were met.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:



Nancy Weaver  
Senior Chemist

Dated: 6/1/18



Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-MW-N3-12-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Aqueous		Lab Sample:	1800341-01		Column:	BEH C18	
Project:	NASWI - Ault Field		Date Collected:	18-Feb-18 11:10		Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	71.4	1.90	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFHxA	228	2.31	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFHpA	104	0.626	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFHxS	913	1.00	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFOA	175	0.690	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFOS	1620	0.855	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFNA	31.0	0.858	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFDA	ND	1.58	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
MeFOSAA	ND	1.75	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFUnA	ND	1.11	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
EtFOSAA	ND	1.45	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFDoA	ND	0.839	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFTTrDA	ND	0.524	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
PFTeDA	ND	0.800	5.30	8.48		B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	103	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFHxA	IS	88.2	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C4-PFHpA	IS	74.3	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
18O2-PFHxS	IS	82.9	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFOA	IS	57.4	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C8-PFOS	IS	77.5	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C5-PFNA	IS	72.1	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFDA	IS	70.1	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
d3-MeFOSAA	IS	82.5	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFUnA	IS	73.8	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
d5-EtFOSAA	IS	69.9	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFDoA	IS	71.2	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	
13C2-PFTeDA	IS	69.7	50 - 150			B8B0130	22-Feb-18	0.118 L	28-Feb-18 10:37	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

سم 5129/18

Sample ID: WI-AF-3-MW-2-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Aqueous		Lab Sample:	1800341-02		Column:	BEH C18	
Project:	NASWI - Ault Field		Date Collected:	18-Feb-18 14:05		Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.85	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFHxA	ND	2.25	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFHpA	ND	0.611	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFHxS	ND	0.979	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFOA	ND	0.673	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFOS	ND	0.834	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFNA	ND	0.837	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFDA	ND	1.54	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
MeFOSAA	ND	1.70	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFUnA	ND	1.08	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
EtFOSAA	ND	1.42	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFDoA	ND	0.818	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFTeDA	ND	0.510	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
PFTeDA	ND	0.780	5.17	8.27		B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	112	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFHxA	IS	88.3	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C4-PFHpA	IS	76.4	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
18O2-PFHxS	IS	86.7	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFOA	IS	56.7	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C8-PFOS	IS	72.0	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C5-PFNA	IS	77.7	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFDA	IS	82.3	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
d3-MeFOSAA	IS	81.1	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFUnA	IS	64.0	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
d5-EtFOSAA	IS	72.9	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFDoA	IS	73.3	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	
13C2-PFTeDA	IS	57.3	50 - 150			B8B0130	22-Feb-18	0.121 L	28-Feb-18 10:48	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes.

see 5/29/18

Sample ID: WI-AF-N29-22D-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Aqueous	Lab Sample:	1800341-03	Column:	BEH C18			
Project:	NASWI - Ault Field		Date Collected:	19-Feb-18 09:40	Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.87	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFHxA	ND	2.27	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFHpA	ND	0.616	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFHxS	1.11	0.987	5.21	8.34	J	B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFOA	0.702	0.678	5.21	8.34	J	B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFOS	2.80	0.841	5.21	8.34	J	B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFNA	ND	0.844	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFDA	ND	1.55	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
MeFOSAA	ND	1.72	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFUnA	ND	1.09	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
EtFOSAA	ND	1.43	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFDoA	ND	0.825	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFTrDA	ND	0.515	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
PFTeDA	ND	0.787	5.21	8.34		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	85.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFHxA	IS	87.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C4-PFHpA	IS	77.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
18O2-PFHxS	IS	101	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFOA	IS	60.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C8-PFOS	IS	69.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C5-PFNA	IS	82.1	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFDA	IS	63.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
d3-MeFOSAA	IS	67.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFUnA	IS	54.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
d5-EtFOSAA	IS	65.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFDoA	IS	43.0	50 - 150	H	B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		
13C2-PFTeDA	IS	64.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 11:00	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DL.When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes

NW 5/29/18



**Sample ID: WI-AF-FB01-021918** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800341-04	Column:	BEH C18
Project:	NASWI - Ault Field	Date Collected:	19-Feb-18 09:50	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.92	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFHxA	ND	2.34	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFHpA	ND	0.633	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFHxS	ND	1.01	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFOA	ND	0.697	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFOS	ND	0.865	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFNA	ND	0.868	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFDA	ND	1.60	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
MeFOSAA	ND	1.77	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFUnA	ND <i>uJ</i>	1.12	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1 <i>ISL</i>
EtFOSAA	ND	1.47	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFDoA	ND <i>uJ</i>	0.848	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1 <i>ISL</i>
PFTrDA	ND	0.529	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
PFTeDA	ND	0.809	5.34	8.57		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	84.3	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFHxA	IS	81.8	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C4-PFHpA	IS	65.2	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
18O2-PFHxS	IS	74.3	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFOA	IS	57.8	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C8-PFOS	IS	89.8	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C5-PFNA	IS	75.2	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFDA	IS	72.1	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
d3-MeFOSAA	IS	59.6	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFUnA	IS	38.4	50 - 150	H	B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
d5-EtFOSAA	IS	57.1	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFDoA	IS	48.8	50 - 150	H	B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1
13C2-PFTeDA	IS	55.8	50 - 150		B8B0130	22-Feb-18	0.117 L	28-Feb-18 11:11	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

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Sample ID: WI-AF-EB01-021918						Modified EPA Method 537						
Client Data					Laboratory Data							
Name:	CH2M Hill		Matrix:	Aqueous		Lab Sample:	1800341-05		Column:	BEH C18		
Project:	NASWI - Ault Field		Date Collected:	19-Feb-18 11:30		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
PFBS	ND	1.84	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFHxA	ND	2.24	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFHpA	ND	0.608	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFHxS	ND	0.975	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFOA	ND	0.670	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFOS	ND	0.831	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFNA	ND	0.834	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFDA	ND	1.53	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
MeFOSAA	ND	1.70	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFUnA	ND	1.08	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
EtFOSAA	ND	1.41	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFDoA	ND	0.815	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFTTrDA	ND	0.509	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
PFTeDA	ND	0.777	5.17	8.24		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1		
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution			
13C3-PFBS	IS	123	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFHxA	IS	89.5	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C4-PFHpA	IS	85.6	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
18O2-PFHxS	IS	83.4	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFOA	IS	55.2	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C8-PFOS	IS	98.2	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C5-PFNA	IS	82.6	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFDA	IS	84.8	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
d3-MeFOSAA	IS	75.1	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFUnA	IS	68.3	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
d5-EtFOSAA	IS	57.6	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFDoA	IS	66.0	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			
13C2-PFTeDA	IS	64.5	50 - 150		B8B0130	22-Feb-18	0.121 L	28-Feb-18 11:23	1			

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

NW 5/29/18

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800342  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 30, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-29-MW-4-0218	1800342-01	Water
2	WI-AF-29-MW-4P-0218	1800342-02	Water
3	WI-AF-FB01-021318	1800342-03	Water
4	WI-AF-EB01-021318	1800342-04	Water
5	WI-AF-EB03-021318	1800342-05	Water
6	WI-AF-EB04-021318	1800342-06	Water
7	WI-AF-MW-N2-9-0218	1800342-07	Water
7MS	WI-AF-MW-N2-9-0218MS	1800342-07MS	Water
7MSD	WI-AF-MW-N2-9-0218MSD	1800342-07MSD	Water
8	WI-AF-MW-N2-9P-0218	1800342-08	Water
9	WI-AF-FB01-021518	1800342-09	Water
10	WI-AF-MW-N2-7S-0218	1800342-10	Water
11	WI-AF-MW-N2-3-0218	1800342-11	Water
12	WI-AF-EB01-021618	1800342-12	Water
13	WI-AF-MW-N2-8-0218	1800342-13	Water
14	WI-AF-MW-201-0218	1800342-14	Water
15	WI-AF-FB01-021718	1800342-15	Water
16	WI-AF-4-MW-3-0218	1800342-16	Water
17	WI-AF-EB01-021718	1800342-17	Water
18	WI-AF-N2-6C-0218	1800342-18	Water
19	WI-AF-FB01-021818	1800342-19	Water
20	WI-AF-MW-200-0218	1800342-20	Water
21	WI-AF-EB01-021818	1800342-21	Water

A full data validation was performed on the analytical data for eleven water samples, four aqueous field blank samples, and six aqueous equipment blank samples collected on February 13-18, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)”.

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA “Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review,” January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

### ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

## Perfluorinated Compounds (PFCs)

### Data Completeness, Case Narrative & Custody Documentation

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met except for the following.

CCAL Date	Compound	%D	Qualifier	Affected Samples
2/24/18	PFTeDA	150%	None	All ND
2/26/18	PFTeDA	152%	None	All ND
2/28/18	PFTeDA	138%	None	All ND

### Method Blank

- The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
B8B0132-BLK2	PFOA	0.848	U	2, 4, 8, 11, 16, 17, 19

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB01-021318	None - ND	-	-	-
WI-AF-EB01-021318	None - ND	-	-	-



Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-EB03-021318	None - ND	-	-	-
WI-AF-EB04-021318	None - ND	-	-	-
WI-AF-FB01-021518	None - ND	-	-	-
WI-AF-EB01-021618	None - ND	-	-	-
WI-AF-FB01-021718	PFOS	2.23	None	All Associated ND or >10X
WI-AF-EB01-021718	PFOS	1.95	None	All Associated ND or >10X
WI-AF-FB01-021818	None - ND	-	-	-
WI-AF-EB01-021818	None - ND	-	-	-

### **Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries**

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier
7	PFOS	OK/225%/89.4	None - All ND
	PFNA	OK/132%/OK	None - All ND

### **Laboratory Control Samples**

- The LCS samples exhibited acceptable percent recoveries (%R) except for the following.

LCS ID	Compound	%R	Qualifier
B8B0132-BS1	PFTeDA	136%	None - All ND

### **Internal Standard (IS) Area Performance**

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Compound	%R	Qualifier
3	13C2-PFDoA	44.4%	UJ - Associated Cmpd
12	13C2-PFUnA	48.5%	UJ - Associated Cmpd
13	13C2-PFDoA	44.5%	UJ - Associated Cmpd
14	13C2-PFDoA	49.1%	UJ - Associated Cmpd
16	13C2-PFDoA	49.8%	UJ - Associated Cmpd
	13C2-PFTeDA	46.6%	UJ - Associated Cmpd
17	13C2-PFTeDA	46.0%	UJ - Associated Cmpd

### **Target Compound Identification**

- All mass spectra and quantitation criteria were met.

**Compound Quantitation**

- Several samples were analyzed at a dilution for various compounds due to high concentrations. The reporting limits were adjusted accordingly. No action was required.

**Field Duplicate Sample Precision**

- Field duplicate results are summarized below. The precision was acceptable.

Compound	WI-AF-29-MW-4-0218 ng/L	WI-AF-29-MW-4P-0218 ng/L	RPD	Qualifier
None	ND	ND	-	-

Compound	WI-AF-MW-N2-9-0218 ng/L	WI-AF-MW-N2-9P-0218 ng/L	RPD	Qualifier
None	ND	ND	-	-

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver Dated: 6/1/18  
Nancy Weaver  
Senior Chemist

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-29-MW-4-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-01	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	13-Feb-18 13:50		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.82	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFHxA	ND	2.22	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFHpA	ND	0.602	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFHxS	ND	0.965	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFOA	ND	0.663	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFOS	ND	0.822	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFNA	ND	0.825	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFDA	ND	1.52	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
MeFOSAA	ND	1.68	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFUnA	ND	1.07	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
EtFOSAA	ND	1.40	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFDoA	ND	0.807	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFTTrDA	ND	0.503	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
PFTeDA	ND	0.769	5.08	8.15		B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	99.1	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFHxA	IS	84.7	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C4-PFHpA	IS	77.5	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
18O2-PFHxS	IS	83.2	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFOA	IS	85.3	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C8-PFOS	IS	78.4	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C5-PFNA	IS	84.1	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFDA	IS	81.3	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
d3-MeFOSAA	IS	70.8	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFUnA	IS	64.1	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
d5-EtFOSAA	IS	87.7	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFDoA	IS	67.7	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	
13C2-PFTeDA	IS	71.2	50 - 150			B8B0132	21-Feb-18	0.123 L	24-Feb-18 15:51	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

NW 5/30/18



Sample ID: WI-AF-29-MW-4P-0218						Modified EPA Method 537				
Client Data					Laboratory Data					
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-02	Column:	BEH C18		
Project:	695610.04.FLFS	Date Collected:	13-Feb-18 13:55		Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.91	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFHxA	ND	2.33	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFHpA	ND	0.632	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFHxS	ND	1.01	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFOA	5.34 <del>1.01</del>	0.696	5.34	8.56	LB	B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFOS	ND	0.863	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFNA	ND	0.866	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFDA	ND	1.59	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
MeFOSAA	ND	1.76	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFUnA	ND	1.12	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
EtFOSAA	ND	1.47	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFDoA	ND	0.847	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFTeDA	ND	0.528	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
PFTeDA	ND	0.808	5.34	8.56		B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	109	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFHxA	IS	79.2	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C4-PFHpA	IS	87.9	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
18O2-PFHxS	IS	81.6	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFOA	IS	63.2	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C8-PFOS	IS	88.1	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C5-PFNA	IS	71.4	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFDA	IS	81.3	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
d3-MeFOSAA	IS	103	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFUnA	IS	76.3	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
d5-EtFOSAA	IS	102	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFDoA	IS	59.4	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1
13C2-PFTeDA	IS	75.9	50 - 150			B8B0132	21-Feb-18	0.117 L	24-Feb-18 16:02	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 1301.8

Sample ID: WI-AF-FB01-021318					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-03	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	13-Feb-18 14:00		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.77	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFHxA	ND	2.15	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFHpA	ND	0.584	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFHxS	ND	0.935	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFOA	ND	0.643	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFOS	ND	0.797	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFNA	ND	0.800	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFDA	ND	1.47	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
MeFOSAA	ND	1.63	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFUnA	ND	1.04	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
EtFOSAA	ND	1.35	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFDoA	ND <i>ND ۱۳</i>	0.782	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1 <i>ISL</i>	
PFTTrDA	ND	0.488	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
PFTeDA	ND	0.746	4.92	7.90		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	111	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFHxA	IS	89.7	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C4-PFHpA	IS	72.7	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
18O2-PFHxS	IS	87.2	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFOA	IS	69.2	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C8-PFOS	IS	72.6	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C5-PFNA	IS	58.4	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFDA	IS	55.8	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
d3-MeFOSAA	IS	72.3	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFUnA	IS	60.4	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
d5-EtFOSAA	IS	73.4	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFDoA	IS	44.4	50 - 150		H	B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	
13C2-PFTeDA	IS	65.1	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:14	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

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**Sample ID: WI-AF-EB01-021318** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-04	Column:	BEH C18
Project:	695610.04.FLFS	Date Collected:	13-Feb-18 14:15	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.81	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFHxA	ND	2.20	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFHpA	ND	0.597	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFHxS	ND	0.957	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFOA	5.04 <del>1.45</del> u	0.658	5.04	8.09	LB	B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFOS	ND	0.816	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFNA	ND	0.819	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFDA	ND	1.51	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
MeFOSAA	ND	1.67	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFUnA	ND	1.06	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
EtFOSAA	ND	1.38	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFDoA	ND	0.801	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFTTrDA	ND	0.499	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
PFTeDA	ND	0.763	5.04	8.09		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1

MBL

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	101	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFHxA	IS	96.7	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C4-PFHpA	IS	80.1	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
18O2-PFHxS	IS	78.8	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFOA	IS	89.2	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C8-PFOS	IS	82.6	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C5-PFNA	IS	76.0	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFDA	IS	67.4	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
d3-MeFOSAA	IS	87.6	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFUnA	IS	59.0	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
d5-EtFOSAA	IS	82.8	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFDoA	IS	58.6	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1
13C2-PFTeDA	IS	86.4	50 - 150		B8B0132	21-Feb-18	0.124 L	24-Feb-18 16:25	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL - Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

new 5/30/18

Sample ID: WI-AF-EB03-021318					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-05	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	13-Feb-18 14:20		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.76	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFHxA	ND	2.15	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFHpA	ND	0.582	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFHxS	ND	0.932	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFOA	ND	0.641	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFOS	ND	0.795	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFNA	ND	0.798	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFDA	ND	1.47	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
MeFOSAA	ND	1.62	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFUnA	ND	1.03	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
EtFOSAA	ND	1.35	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFDoA	ND	0.780	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFTTrDA	ND	0.486	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
PFTeDA	ND	0.743	4.92	7.88		B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	121	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFHxA	IS	88.3	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C4-PFHpA	IS	76.9	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
18O2-PFHxS	IS	85.0	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFOA	IS	68.8	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C8-PFOS	IS	69.5	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C5-PFNA	IS	59.0	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFDA	IS	52.3	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
d3-MeFOSAA	IS	83.1	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFUnA	IS	67.7	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
d5-EtFOSAA	IS	70.9	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFDoA	IS	68.8	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	
13C2-PFTeDA	IS	64.6	50 - 150			B8B0132	21-Feb-18	0.127 L	24-Feb-18 16:37	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results: reported to the DL

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

WS/301.8

Sample ID: WI-AF-EB04-021318

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-06	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	13-Feb-18 14:25	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.80	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFHxA	ND	2.19	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFHpA	ND	0.593	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFHxS	ND	0.950	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFOA	ND	0.653	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFOS	ND	0.809	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFNA	ND	0.812	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFDA	ND	1.49	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
MeFOSAA	ND	1.65	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFUnA	ND	1.05	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
EtFOSAA	ND	1.37	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFDoA	ND	0.794	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFTTrDA	ND	0.495	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
PFTeDA	ND	0.757	5.00	8.02		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	104	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFHxA	IS	82.7	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C4-PFHpA	IS	88.7	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
18O2-PFHxS	IS	97.1	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFOA	IS	76.7	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C8-PFOS	IS	79.7	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C5-PFNA	IS	68.5	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFDA	IS	76.8	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
d3-MeFOSAA	IS	75.9	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFUnA	IS	60.4	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
d5-EtFOSAA	IS	78.6	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFDoA	IS	68.6	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1
13C2-PFTeDA	IS	62.4	50 - 150		B8B0132	21-Feb-18	0.125 L	26-Feb-18 10:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

rw sl 301.8



Sample ID: WI-AF-MW-N2-9-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-07	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	15-Feb-18 13:05		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.88	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFHxA	ND	2.29	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFHpA	ND	0.622	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFHxS	ND	0.996	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFOA	ND	0.685	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFOS	ND	0.849	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFNA	ND	0.852	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFDA	ND	1.57	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
MeFOSAA	ND	1.74	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFUnA	ND	1.10	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
EtFOSAA	ND	1.44	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFDoA	ND	0.833	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFTTrDA	ND	0.520	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
PFTeDA	ND	0.794	5.25	8.42		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	97.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFHxA	IS	81.5	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C4-PFHpA	IS	86.5	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
18O2-PFHxS	IS	77.0	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFOA	IS	78.2	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C8-PFOS	IS	68.9	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C5-PFNA	IS	66.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFDA	IS	98.4	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
d3-MeFOSAA	IS	107	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFUnA	IS	67.0	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
d5-EtFOSAA	IS	94.2	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFDoA	IS	68.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		
13C2-PFTeDA	IS	68.2	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:34	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new sl 301.8

Sample ID: WI-AF-MW-N2-9P-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-08	Column:	BEH C18
Project:	695610.04.FLFS	Date Collected:	15-Feb-18 13:10	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.88	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFHxA	ND	2.29	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFHpA	ND	0.621	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFHxS	ND	0.995	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFOA	5.25	1.10 U	0.684	5.25	L-B	B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFOS	ND	0.848	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFNA	ND	0.851	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFDA	ND	1.57	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
MeFOSAA	ND	1.73	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFUnA	ND	1.10	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
EtFOSAA	ND	1.44	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFDoA	ND	0.832	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFTrDA	ND	0.519	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
PFTeDA	ND	0.794	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1

M3L

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	88.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFHxA	IS	84.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C4-PFHpA	IS	82.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
18O2-PFHxS	IS	81.3	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFOA	IS	85.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C8-PFOS	IS	90.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C5-PFNA	IS	89.8	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFDA	IS	65.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
d3-MeFOSAA	IS	75.2	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFUnA	IS	71.8	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
d5-EtFOSAA	IS	82.9	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFDoA	IS	68.5	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1
13C2-PFTeDA	IS	63.5	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 17:46	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL - Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

NW 5/30/18

Sample ID: WI-AF-FB01-021518					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-09	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	15-Feb-18 13:15		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.94	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFHxA	ND	2.36	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFHpA	ND	0.640	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFHxS	ND	1.03	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFOA	ND	0.705	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFOS	ND	0.874	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFNA	ND	0.877	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFDA	ND	1.61	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
MeFOSAA	ND	1.79	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFUnA	ND	1.14	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
EtFOSAA	ND	1.48	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFDoA	ND	0.857	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFTTrDA	ND	0.535	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
PFTeDA	ND	0.817	5.43	8.66		B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	109	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFHxA	IS	93.6	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C4-PFHpA	IS	90.4	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
18O2-PFHxS	IS	86.7	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFOA	IS	84.3	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C8-PFOS	IS	80.0	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C5-PFNA	IS	66.6	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFDA	IS	74.2	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
d3-MeFOSAA	IS	81.2	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFUnA	IS	63.7	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
d5-EtFOSAA	IS	82.0	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFDoA	IS	76.5	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	
13C2-PFTeDA	IS	91.3	50 - 150			B8B0132	21-Feb-18	0.115 L	24-Feb-18 17:57	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes

NW 513018

Sample ID: WI-AF-MW-N2-7S-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-10	Column:	BEH C18				
Project:	695610.04.FI.FS	Date Collected:	15-Feb-18 16:00	Date Received:	20-Feb-18 09:04						
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	182	1.80	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFHxA	172	2.20	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFHpA	38.4	0.596	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFHxS	1700	0.955	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFOA	117	0.656	5.04	8.06	<del>P</del>	B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFOS	568	0.814	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFNA	1.69	0.817	5.04	8.06	J	B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFDA	ND	1.50	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
MeFOSAA	ND	1.66	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFUnA	ND	1.06	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
EtFOSAA	ND	1.38	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFDoA	ND	0.798	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFTeDA	ND	0.498	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
PFTeDA	ND	0.761	5.04	8.06		B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	93.8	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFHxA	IS	85.9	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C4-PFHpA	IS	87.7	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
18O2-PFHxS	IS	89.8	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFOA	IS	87.8	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C8-PFOS	IS	103	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C5-PFNA	IS	70.6	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFDA	IS	71.1	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
d3-MeFOSAA	IS	89.5	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFUnA	IS	75.9	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
d5-EtFOSAA	IS	90.3	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFDoA	IS	77.6	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	
13C2-PFTeDA	IS	82.8	50 - 150			B8B0132	21-Feb-18	0.124 L	24-Feb-18 18:09	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

51301-8

Sample ID: WI-AF-MW-N2-3-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-11	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	16-Feb-18 12:40	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.89	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFHxA	ND	2.31	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFHpA	ND	0.625	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFHxS	1.30	1.00	5.30	8.46	J	B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFOA	5.30	1.95 u	0.689	5.30	LB	B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFOS	ND	0.854	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFNA	ND	0.857	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFDA	ND	1.58	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
MeFOSAA	ND	1.75	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFUnA	ND	1.11	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
EtFOSAA	ND	1.45	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFDoA	ND	0.838	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFTrDA	ND	0.523	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
PFTeDA	ND	0.799	5.30	8.46		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1

MBL

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	108	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFHxA	IS	82.1	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C4-PFHpA	IS	79.2	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
18O2-PFHxS	IS	82.3	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFOA	IS	89.6	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C8-PFOS	IS	87.5	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C5-PFNA	IS	74.5	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFDA	IS	70.3	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
d3-MeFOSAA	IS	104	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFUnA	IS	79.1	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
d5-EtFOSAA	IS	105	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFDoA	IS	67.5	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1
13C2-PFTeDA	IS	77.5	50 - 150		B8B0132	21-Feb-18	0.118 L	24-Feb-18 18:20	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

~ 5/30/18



Sample ID: WI-AF-EB01-021618					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-12	Column:	BEH C18			
Project:	695610.04.FLFS	Date Collected:	16-Feb-18 14:55		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.88	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFHxA	ND	2.29	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFHpA	ND	0.622	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFHxS	ND	0.996	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFOA	ND	0.685	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFOS	ND	0.849	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFNA	ND	0.852	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFDA	ND	1.57	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
MeFOSAA	ND	1.74	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFUnA	ND UJ	1.10	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
EtFOSAA	ND	1.44	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFDoA	ND	0.833	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFTeDA	ND	0.520	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
PFTeDA	ND	0.794	5.25	8.41		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	102	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFHxA	IS	84.9	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C4-PFHpA	IS	85.9	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
18O2-PFHxS	IS	80.1	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFOA	IS	75.1	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C8-PFOS	IS	99.9	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C5-PFNA	IS	64.7	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFDA	IS	75.4	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
d3-MeFOSAA	IS	77.6	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFUnA	IS	48.5	50 - 150		H	B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
d5-EtFOSAA	IS	78.9	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFDoA	IS	57.3	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	
13C2-PFTeDA	IS	55.0	50 - 150			B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:31	1	

ISL

new sl 3018

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL.

Only the linear isomer is reported for all other analytes

Sample ID: WI-AF-MW-N2-8-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Aqueous		Lab Sample:	1800342-13		Column:	BEH C18	
Project:	695610.04.F1.FS		Date Collected:	16-Feb-18 17:40		Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.86	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFHxA	ND	2.26	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFHpA	ND	0.614	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFHxS	ND	0.983	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFOA	ND	0.676	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFOS	ND	0.838	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFNA	ND	0.841	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFDA	ND	1.55	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
MeFOSAA	ND	1.71	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFUnA	ND	1.09	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
EtFOSAA	ND	1.42	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFDoA	ND <i>uJ</i>	0.822	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1 <i>IsL</i>	
PFTrDA	ND	0.513	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
PFTeDA	ND	0.784	5.21	8.30		B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	97.6	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFHxA	IS	87.2	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C4-PFHpA	IS	92.0	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
18O2-PFHxS	IS	83.1	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFOA	IS	65.3	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C8-PFOS	IS	98.4	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C5-PFNA	IS	69.3	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFDA	IS	79.3	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
d3-MeFOSAA	IS	70.4	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFUnA	IS	70.1	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
d5-EtFOSAA	IS	79.0	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFDoA	IS	44.5	50 - 150		H	B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	
13C2-PFTeDA	IS	61.8	50 - 150			B8B0132	21-Feb-18	0.120 L	24-Feb-18 18:43	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes*MW 513018*

Sample ID: WI-AF-MW-201-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-14	Column:	BEH C18				
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 14:50	Date Received:	20-Feb-18 09:04						
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	2090	1.88	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFHxA	8670	22.9	52.5	84.0	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10	
PFHpA	2400	0.620	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFHxS	17000	9.94	52.5	84.0	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10	
PFOA	3010	0.683	5.25	8.40	D	B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFOS	23500	8.47	52.5	84.0	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10	
PFNA	69.0	0.850	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFDA	4.41	1.56	5.25	8.40	J	B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
MeFOSAA	ND	1.73	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFUnA	ND	1.10	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
EtFOSAA	ND	1.44	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFDoA	ND uJ	0.831	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFTrDA	ND	0.518	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
PFTeDA	ND	0.792	5.25	8.40		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	122	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C2-PFHxA	IS	98.5	50 - 150	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10		
13C4-PFHpA	IS	92.4	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
18O2-PFHxS	IS	142	50 - 150	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10		
13C2-PFOA	IS	80.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C8-PFOS	IS	82.6	50 - 150	D	B8B0132	21-Feb-18	0.119 L	28-Feb-18 23:25	10		
13C5-PFNA	IS	71.1	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C2-PFDA	IS	71.7	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
d3-MeFOSAA	IS	62.6	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C2-PFUnA	IS	55.4	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
d5-EtFOSAA	IS	69.3	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C2-PFDoA	IS	49.1	50 - 150	H	B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		
13C2-PFTeDA	IS	54.4	50 - 150		B8B0132	21-Feb-18	0.119 L	24-Feb-18 18:54	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes

see 5/30/18

Sample ID: WI-AF-FB01-021718					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-15	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 14:55		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	2.01	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFHxA	ND	2.45	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFHpA	ND	0.663	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFHxS	ND	1.06	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFOA	ND	0.730	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFOS	2.23	0.905	5.63	8.97	J	B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFNA	ND	0.908	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFDA	ND	1.67	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
MeFOSAA	ND	1.85	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFUnA	ND	1.18	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
EtFOSAA	ND	1.54	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFDoA	ND	0.888	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFTeDA	ND	0.554	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
PFTeDA	ND	0.847	5.63	8.97		B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	114	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFHxA	IS	93.3	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C4-PFHpA	IS	89.8	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
18O2-PFHxS	IS	89.5	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFOA	IS	88.1	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C8-PFOS	IS	105	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C5-PFNA	IS	85.5	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFDA	IS	75.7	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
d3-MeFOSAA	IS	53.1	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFUnA	IS	62.9	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
d5-EtFOSAA	IS	66.9	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFDoA	IS	72.7	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	
13C2-PFTeDA	IS	62.5	50 - 150			B8B0132	21-Feb-18	0.111 L	07-Mar-18 19:27	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

w 5/30/18

Sample ID: WI-AF-4-MW-3-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-16	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 13:35	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	2.02	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFHxA	ND	2.46	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFHpA	ND	0.667	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFHxS	ND	1.07	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFOA	<i>S.63</i> 0.905 <i>u</i>	0.735	5.63	9.04	<i>LB</i>	B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1 <i>MBL</i>
PFOS	ND	0.911	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFNA	ND	0.915	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFDA	ND	1.68	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
MeFOSAA	ND	1.86	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFUnA	ND	1.19	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
EtFOSAA	ND	1.55	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFDoA	<i>ND uJ</i>	0.894	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1 <i>ISL</i>
PFTrDA	ND	0.558	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
PFTeDA	<i>ND uJ</i>	0.853	5.63	9.04		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1 <i>ISL</i>

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	94.0	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFHxA	IS	88.6	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C4-PFHpA	IS	78.0	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
18O2-PFHxS	IS	100	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFOA	IS	91.4	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C8-PFOS	IS	78.3	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C5-PFNA	IS	94.6	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFDA	IS	74.1	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
d3-MeFOSAA	IS	66.9	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFUnA	IS	61.2	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
d5-EtFOSAA	IS	75.2	50 - 150		B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFDoA	IS	49.8	50 - 150	H	B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1
13C2-PFTeDA	IS	46.6	50 - 150	H	B8B0132	21-Feb-18	0.111 L	24-Feb-18 19:17	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

*MW/30/18*



Sample ID: WI-AF-EB01-021718

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-17	Column:	BEH C18
Project:	695610.04.FI.FS	Date Collected:	17-Feb-18 16:45	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.78	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFHxA	ND	2.17	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFHpA	ND	0.587	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFHxS	ND	0.941	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFOA	4.96	<del>0.814</del> u	0.647	4.96	7.95	<del>L-B</del>	B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
PFOS	1.95	0.802	4.96	7.95	J	B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFNA	ND	0.805	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFDA	ND	1.48	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
MeFOSAA	ND	1.64	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFUnA	ND	1.04	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
EtFOSAA	ND	1.36	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFDoA	ND	0.787	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFTTrDA	ND	0.491	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	
PFTeDA	<del>ND</del> uJ	0.750	4.96	7.95		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	99.6	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFHxA	IS	75.9	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C4-PFHpA	IS	83.5	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
18O2-PFHxS	IS	105	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFOA	IS	81.6	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C8-PFOS	IS	81.4	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C5-PFNA	IS	71.1	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFDA	IS	62.9	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
d3-MeFOSAA	IS	77.7	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFUnA	IS	67.9	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
d5-EtFOSAA	IS	85.7	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFDoA	IS	52.9	50 - 150		B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1
13C2-PFTeDA	IS	46.0	50 - 150	H	B8B0132	21-Feb-18	0.126 L	24-Feb-18 19:29	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

new 5/30/18

Sample ID: WI-AF-N2-6C-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800342-18	Column:	BEH C18			
Project:	695610.04.FI.FS	Date Collected:	18-Feb-18 11:40		Date Received:	20-Feb-18 09:04					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	98.7	1.92	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFHxA	762	2.34	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFHpA	726	0.636	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFHxS	2570	1.02	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFOA	671	0.700	5.39	8.60	8	B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFOS	9450	4.34	26.9	43.0	8	B8B0132	21-Feb-18	0.116 L	28-Feb-18 23:36	5	
PFNA	139	0.871	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFDA	27.7	1.60	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
MeFOSAA	ND	1.77	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFUnA	ND	1.13	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
EtFOSAA	ND	1.47	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFDoA	ND	0.852	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFTTrDA	ND	0.531	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
PFTeDA	ND	0.812	5.39	8.60		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	109	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFHxA	IS	83.3	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C4-PFHpA	IS	88.7	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
18O2-PFHxS	IS	78.8	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFOA	IS	75.8	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C8-PFOS	IS	82.9	50 - 150	8	B8B0132	21-Feb-18	0.116 L	28-Feb-18 23:36	5		
13C5-PFNA	IS	61.8	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFDA	IS	63.9	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
d3-MeFOSAA	IS	90.6	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFUnA	IS	59.8	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
d5-EtFOSAA	IS	92.4	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFDoA	IS	63.2	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		
13C2-PFTeDA	IS	58.3	50 - 150		B8B0132	21-Feb-18	0.116 L	24-Feb-18 19:40	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

ms 5/30/18

Sample ID: WI-AF-FB01-021818						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Aqueous		Lab Sample:	1800342-19		Column:	BEH C18	
Project:	695610.04.FLFS		Date Collected:	18-Feb-18 11:45		Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.97	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFHxA	ND	2.39	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFHpA	ND	0.649	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFHxS	ND	1.04	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFOA	5.48	1.01 u	0.715	5.48	LB	B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFOS	ND	0.886	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFNA	ND	0.889	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFDA	ND	1.64	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
MeFOSAA	ND	1.81	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFUnA	ND	1.15	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
EtFOSAA	ND	1.50	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFDoA	ND	0.869	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFTrDA	ND	0.542	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
PFTeDA	ND	0.829	5.48	8.78		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	99.2	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFHxA	IS	83.2	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C4-PFHpA	IS	84.0	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
18O2-PFHxS	IS	80.3	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFOA	IS	63.7	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C8-PFOS	IS	84.2	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C5-PFNA	IS	62.7	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFDA	IS	68.0	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
d3-MeFOSAA	IS	88.3	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFUnA	IS	62.5	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
d5-EtFOSAA	IS	84.8	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFDoA	IS	64.2	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		
13C2-PFTeDA	IS	69.9	50 - 150		B8B0132	21-Feb-18	0.114 L	24-Feb-18 19:52	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

mw 51301.8

Sample ID: WI-AF-MW-200-0218						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous			Lab Sample:	1800342-20	Column:	BEH C18		
Project:	695610.04.FI.FS	Date Collected:	18-Feb-18 11:50			Date Received:	20-Feb-18 09:04				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	879	1.87	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFHxA	2550	2.28	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFHpA	334	0.617	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFHxS	1810	9.88	5.21	8.35	∅	B8B0130	22-Feb-18	0.120 L	06-Mar-18 18:14	10	
PFOA	436	0.679	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFOS	96.5	0.842	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFNA	ND	0.845	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFDA	ND	1.56	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
MeFOSAA	ND	1.72	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFUnA	ND	1.10	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
EtFOSAA	ND	1.43	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFDoA	ND	0.827	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFTeDA	ND	0.516	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
PFTeDA	ND	0.788	5.21	8.35		B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	101	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C2-PFHxA	IS	89.2	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C4-PFHpA	IS	89.4	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
18O2-PFHxS	IS	88.6	50 - 150		∅	B8B0130	22-Feb-18	0.120 L	06-Mar-18 18:14	10	
13C2-PFOA	IS	85.8	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C8-PFOS	IS	86.8	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C5-PFNA	IS	71.1	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C2-PFDA	IS	59.4	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
d3-MeFOSAA	IS	82.2	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C2-PFUnA	IS	84.4	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
d5-EtFOSAA	IS	80.8	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C2-PFDoA	IS	76.5	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	
13C2-PFTeDA	IS	74.8	50 - 150			B8B0130	22-Feb-18	0.120 L	02-Mar-18 03:21	1	

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers.  
Only the linear isomer is reported for all other analytes

new 5/3 = 1.8

Sample ID: WI-AF-EB01-021818

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800342-21	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	18-Feb-18 12:10	Date Received:	20-Feb-18 09:04		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.86	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFHxA	ND	2.27	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFHpA	ND	0.615	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFHxS	ND	0.986	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFOA	ND	0.678	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFOS	ND	0.840	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFNA	ND	0.843	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFDA	ND	1.55	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
MeFOSAA	ND	1.72	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFUnA	ND	1.09	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
EtFOSAA	ND	1.43	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFDoA	ND	0.825	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFTTrDA	ND	0.514	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
PFTeDA	ND	0.786	5.21	8.33		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	112	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFHxA	IS	87.3	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C4-PFHpA	IS	80.9	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
18O2-PFHxS	IS	91.5	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFOA	IS	61.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C8-PFOS	IS	80.4	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C5-PFNA	IS	78.0	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFDA	IS	72.6	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
d3-MeFOSAA	IS	65.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFUnA	IS	50.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
d5-EtFOSAA	IS	54.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFDoA	IS	58.2	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1
13C2-PFTeDA	IS	52.7	50 - 150		B8B0130	22-Feb-18	0.120 L	28-Feb-18 12:20	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

new 5/30/18



**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800346  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 30, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-SB-FB01-021418	1800346-01	Water
2	WI-AF-SB-FB01-021318	1800346-02	Water
3	WI-AF-SB615-6768-0218	1800346-03	Soil
3MS	WI-AF-SB615-6768-0218MS	1800346-03MS	Soil
3MSD	WI-AF-SB615-6768-0218MSD	1800346-03MSD	Soil
4	WI-AF-SB615-0001-0218	1800346-04	Soil
5	WI-AF-SB615-0506-0218	1800346-05	Soil

A full data validation was performed on the analytical data for three soil samples and two aqueous field blank samples collected on February 13-14, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis

PFCs (Soil)  
 PFCs (Water)

Method References

VAL Method PFAS  
 USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

## ***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### **Perfluorinated Compounds (PFCs)**

#### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

#### **Holding Times**

- All water samples were extracted within 14 days and analyzed within 28 days. All soil samples were extracted within 28 days and analyzed within 30 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-SB-FB01-021318	PFOS	2.08	U	4
WI-AF-EB01-021318	None - ND	-	-	-
WI-AF-EB02-021418	None - ND	-	-	-
WI-AF-SB-FB01-021418	PFOS	2.20	None	All Associated ND

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

MS/MSD Sample	Compound	MS %R/MSD %R/RPD	Qualifier
3	PFHxA	OK/134%/OK	None - Sample ND
	PFHpA	OK/131%/OK	None - Sample ND
	PFHxS	OK/132%/OK	None - Sample ND
	PFOA	131%/131%/OK	None - Sample ND
	PFDA	OK/131%/OK	None - Sample ND
	EtFOSAA	143%/136%/OK	None - Sample ND
	PFTeDA	145%/133%/OK	None - Sample ND

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Compound	%R	Qualifier
4	13C3-PFBS	43.5%	UJ - Associated Cmpd

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver  
Nancy Weaver  
Senior Chemist

Dated: 6/1/18

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.





Sample ID: WI-AF-SB-FB01-021418

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800346-01	Column:	BEH C18
Project:	NASWI Ault Field	Date Collected:	14-Feb-18 17:50	Date Received:	21-Feb-18 09:00		
Location:	MW-615						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.91	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFHxA	ND	2.33	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFHpA	ND	0.631	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFHxS	ND	1.01	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFOA	ND	0.695	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFOS	2.20	0.861	5.34	8.54	J	B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFNA	ND	0.864	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFDA	ND	1.59	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
MeFOSAA	ND	1.76	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFUnA	ND	1.12	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
EtFOSAA	ND	1.46	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFDoA	ND	0.845	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFTrDA	ND	0.527	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
PFTeDA	ND	0.806	5.34	8.54		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	112	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFHxA	IS	101	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C4-PFHpA	IS	102	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
18O2-PFHxS	IS	106	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFOA	IS	91.1	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C8-PFOS	IS	104	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C5-PFNA	IS	90.8	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFDA	IS	76.2	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
d3-MeFOSAA	IS	79.0	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFUnA	IS	79.7	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
d5-EtFOSAA	IS	82.0	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFDoA	IS	85.7	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1
13C2-PFTeDA	IS	67.1	50 - 150		B8B0147	26-Feb-18	0.117 L	07-Mar-18 23:16	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

*nw 5/30/18*

Sample ID: WI-AF-SB-FB01-021318						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800346-02	Column:	BEH C18			
Project:	NASWI Ault Field	Date Collected:	13-Feb-18 15:30		Date Received:	21-Feb-18 09:00					
Location:	MW-615										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.98	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFHxA	ND	2.41	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFHpA	ND	0.653	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFHxS	ND	1.05	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFOA	ND	0.719	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFOS	2.08	0.891	5.53	8.84	J	B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFNA	ND	0.895	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFDA	ND	1.65	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
MeFOSAA	ND	1.82	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFUnA	ND	1.16	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
EtFOSAA	ND	1.51	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFDoA	ND	0.875	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFTeDA	ND	0.546	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
PFTeDA	ND	0.834	5.53	8.84		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	112	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFHxA	IS	92.8	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C4-PFHpA	IS	94.0	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
18O2-PFHxS	IS	92.8	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFOA	IS	86.3	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C8-PFOS	IS	87.1	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C5-PFNA	IS	90.6	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFDA	IS	80.6	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
d3-MeFOSAA	IS	67.7	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFUnA	IS	60.0	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
d5-EtFOSAA	IS	64.5	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFDoA	IS	72.7	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		
13C2-PFTeDA	IS	70.1	50 - 150		B8B0147	26-Feb-18	0.113 L	07-Mar-18 23:28	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes

**Sample ID: WI-AF-SB615-6768-0218** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800346-03	Column:	BEH C18
Project:	NASWI Ault Field	Date Collected:	14-Feb-18 11:30	Date Received:	21-Feb-18 09:00		
Location:	MW-615			% Solids:	87.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.386	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFHxA	ND	0.216	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFHpA	ND	0.218	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFHxS	ND	0.330	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFOA	ND	0.251	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFOS	ND	0.899	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFNA	ND	0.189	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFDA	ND	0.272	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
MeFOSAA	ND	0.321	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFUnA	ND	0.376	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
EtFOSAA	ND	0.341	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFDoA	ND	0.293	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFTeDA	ND	0.130	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
PFTeDA	ND	0.211	1.06	2.13		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	98.9	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFHxA	IS	80.7	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C4-PFHpA	IS	85.8	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
18O2-PFHxS	IS	92.4	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFOA	IS	78.5	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C8-PFOS	IS	88.9	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C5-PFNA	IS	95.8	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFDA	IS	79.6	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
d3-MeFOSAA	IS	72.7	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFUnA	IS	71.3	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
d5-EtFOSAA	IS	85.8	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFDoA	IS	86.7	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1
13C2-PFTeDA	IS	72.1	50 - 150		B8B0151	27-Feb-18	1.08 g	08-Mar-18 05:35	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

new sl 130118

Sample ID: WI-AF-SB615-0001-0218

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800346-04	Column:	BEH C18
Project:	NASWI Ault Field	Date Collected:	13-Feb-18 14:30	Date Received:	21-Feb-18 09:00		
Location:	MW-615			% Solids:	78.3		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND <i>WJ</i>	0.348	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFHxA	ND	0.195	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFHpA	ND	0.197	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFHxS	ND	0.298	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFOA	ND	0.227	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFOS	1.09 <i>u</i>	0.811	0.960	1.92	<i>+</i>	B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFNA	ND	0.171	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFDA	ND	0.246	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
MeFOSAA	ND	0.290	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFUnA	ND	0.340	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
EtFOSAA	ND	0.308	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFDoA	ND	0.265	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFTTrDA	ND	0.117	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
PFTeDA	ND	0.190	0.960	1.92		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1

*FSL*  
*FBL*

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	43.5	50 - 150	H	B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFHxA	IS	63.4	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C4-PFHpA	IS	65.5	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
18O2-PFHxS	IS	58.7	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFOA	IS	61.3	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C8-PFOS	IS	50.9	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C5-PFNA	IS	74.5	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFDA	IS	68.5	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
d3-MeFOSAA	IS	76.2	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFUnA	IS	78.5	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
d5-EtFOSAA	IS	78.8	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFDoA	IS	70.8	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1
13C2-PFTeDA	IS	78.4	50 - 150		B8B0151	27-Feb-18	1.33 g	08-Mar-18 05:47	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*new 5/30/18*



Sample ID: W1-AF-SB615-0506-0218

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800346-05	Column:	BEH C18
Project:	NASWI Ault Field	Date Collected:	13-Feb-18 14:45	Date Received:	21-Feb-18 09:00		
Location:	MW-615			% Solids:	79.1		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.382	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFHxA	ND	0.214	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFHpA	ND	0.216	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFHxS	ND	0.327	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFOA	ND	0.249	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFOS	ND	0.890	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFNA	ND	0.188	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFDA	ND	0.270	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
MeFOSAA	ND	0.318	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFUnA	ND	0.373	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
EtFOSAA	ND	0.338	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFDoA	ND	0.291	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFTeDA	ND	0.129	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
PFTeDA	ND	0.209	1.05	2.11		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	106	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFHxA	IS	90.1	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C4-PFHpA	IS	90.3	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
18O2-PFHxS	IS	80.6	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFOA	IS	93.3	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C8-PFOS	IS	95.5	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C5-PFNA	IS	89.7	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFDA	IS	81.8	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
d3-MeFOSAA	IS	79.4	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFUnA	IS	79.9	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
d5-EtFOSAA	IS	91.7	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFDoA	IS	81.0	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1
13C2-PFTeDA	IS	99.1	50 - 150		B8B0151	27-Feb-18	1.20 g	08-Mar-18 05:58	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
The results are reported in dry weight  
The sample size is reported in wet weight  
Results reported to the DL

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

W 513018

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
 SDG: 1800353  
 Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
 Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
 Date: May 30, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-N2-5-0218	1800353-01	Water
2	WI-AF-FB01-022018	1800353-02	Water
3	WI-AF-MW-3-0218	1800353-03	Water
4	WI-AF-MW-202-0218	1800353-04	Water
5	WI-AF-MW-204-0218	1800353-05	Water
6	WI-AF-MW-114-0218	1800353-06	Water
7	WI-AF-EB03-022018	1800353-07	Water

A full data validation was performed on the analytical data for five water samples, one aqueous field blank sample, and one aqueous equipment blank sample collected on February 20, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method “Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)”.

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA “Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review,” January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

**Organics**

- Date Completeness, Case Narrative & Custody Documentation

- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Perfluorinated Compounds (PFCs)

### Data Completeness, Case Narrative & Custody Documentation

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
B8B0157-BLK1	PFOA	0.374	U	7

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB01-022018	None - ND	-	-	-
WI-AF-EB03-022018	None - ND	-	-	-

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples were not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- Several samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver  
Nancy Weaver  
Senior Chemist

Dated: 6/1/8



Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-N2-5-0218					Modified EPA Method 537					
Client Data					Laboratory Data					
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800353-01	Column:	BEH C18		
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 09:55		Date Received:	22-Feb-18 09:13				
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	38.8	2.01	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFHxA	330	2.45	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFHpA	223	0.664	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFHxS	995	1.06	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFOA	338	0.732	5.63	8.99	<del>B</del>	B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFOS	14500	9.07	56.3	89.9	<del>D</del>	B8B0157	27-Feb-18	0.111 L	08-Mar-18 23:03	10
PFNA	50.9	0.910	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFDA	22.3	1.67	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
MeFOSAA	ND	1.85	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFUnA	ND	1.18	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
EtFOSAA	ND	1.54	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFDoA	ND	0.890	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFTrDA	ND	0.555	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
PFTeDA	ND	0.849	5.63	8.99		B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	102	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFHxA	IS	93.6	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C4-PFHpA	IS	104	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
18O2-PFHxS	IS	87.4	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFOA	IS	91.0	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C8-PFOS	IS	87.7	50 - 150		<del>D</del>	B8B0157	27-Feb-18	0.111 L	08-Mar-18 23:03	10
13C5-PFNA	IS	86.5	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFDA	IS	75.7	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
d3-MeFOSAA	IS	60.5	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFUnA	IS	79.2	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
d5-EtFOSAA	IS	63.7	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFDoA	IS	87.9	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1
13C2-PFTeDA	IS	86.5	50 - 150			B8B0157	27-Feb-18	0.111 L	11-Mar-18 01:35	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

ms 51301.8

Sample ID: WI-AF-FB01-022018					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800353-02	Column:	BEH C18			
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 10:05		Date Received:	22-Feb-18 09:13					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.87	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFHxA	ND	2.28	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFHpA	ND	0.618	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFHxS	ND	0.990	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFOA	ND	0.681	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFOS	ND	0.844	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFNA	ND	0.847	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFDA	ND	1.56	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
MeFOSAA	ND	1.72	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFUnA	ND	1.10	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
EtFOSAA	ND	1.43	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFDaA	ND	0.828	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFTeDA	ND	0.516	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
PFTeDA	ND	0.789	5.21	8.36		B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	111	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFHxA	IS	97.8	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C4-PFHpA	IS	107	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
18O2-PFHxS	IS	97.4	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFOA	IS	92.0	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C8-PFOS	IS	81.0	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C5-PFNA	IS	95.2	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFDA	IS	66.7	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
d3-MeFOSAA	IS	55.5	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFUnA	IS	66.8	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
d5-EtFOSAA	IS	56.4	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFDaA	IS	74.4	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	
13C2-PFTeDA	IS	96.2	50 - 150			B8B0157	27-Feb-18	0.120 L	11-Mar-18 01:12	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

MW 51301.8

Sample ID: WI-AF-MW-3-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800353-03	Column:	BEH C18			
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 11:40		Date Received:	22-Feb-18 09:13					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	49.0	1.91	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFHxA	363	2.32	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFHpA	371	0.629	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFHxS	1020	1.01	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFOA	312	0.693	5.34	8.52	B	B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFOS	6050	4.30	26.7	42.6	B	B8B0157	27-Feb-18	0.117 L	08-Mar-18 23:15	5	
PFNA	45.9	0.862	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFDA	6.64	1.59	5.34	8.52	J	B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
MeFOSAA	ND	1.76	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFUnA	ND	1.12	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
EtFOSAA	ND	1.46	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFDoA	ND	0.843	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFTTrDA	ND	0.526	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
PFTeDA	ND	0.804	5.34	8.52		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	98.1	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFHxA	IS	94.7	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C4-PFHpA	IS	94.0	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
18O2-PFHxS	IS	96.5	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFOA	IS	91.6	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C8-PFOS	IS	79.8	50 - 150	B	B8B0157	27-Feb-18	0.117 L	08-Mar-18 23:15	5		
13C5-PFNA	IS	87.4	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFDA	IS	83.0	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
d3-MeFOSAA	IS	67.4	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFUnA	IS	90.6	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
d5-EtFOSAA	IS	68.2	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFDoA	IS	88.8	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		
13C2-PFTeDA	IS	121	50 - 150		B8B0157	27-Feb-18	0.117 L	11-Mar-18 01:47	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

س 5/30/18



Sample ID: WI-AF-MW-202-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800353-04	Column:	BEH C18			
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 11:35		Date Received:	22-Feb-18 09:13					
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	126	1.99	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFHxA	1020	2.42	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFHpA	735	0.656	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFHxS	3870	1.05	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFOA	815	0.723	5.53	8.88	8	B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFOS	10900	8.96	55.3	88.8	8	B8B0157	27-Feb-18	0.113 L	08-Mar-18 23:26	10	
PFNA	160	0.900	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFDA	63.2	1.65	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
MeFOSAA	ND	1.83	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFUnA	11.1	1.17	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
EtFOSAA	ND	1.52	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFDoA	ND	0.880	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFTrDA	ND	0.549	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
PFTeDA	ND	0.838	5.53	8.88		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	102	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFHxA	IS	93.0	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C4-PFHpA	IS	95.5	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
18O2-PFHxS	IS	93.3	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFOA	IS	85.0	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C8-PFOS	IS	91.9	50 - 150	8	B8B0157	27-Feb-18	0.113 L	08-Mar-18 23:26	10		
13C5-PFNA	IS	78.0	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFDA	IS	74.3	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
d3-MeFOSAA	IS	71.2	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFUnA	IS	81.4	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
d5-EtFOSAA	IS	72.0	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFDoA	IS	85.7	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		
13C2-PFTeDA	IS	106	50 - 150		B8B0157	27-Feb-18	0.113 L	11-Mar-18 01:58	1		

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 5/30/18

Sample ID: WI-AF-MW-204-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800353-05	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 15:40	Date Received:	22-Feb-18 09:13		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	63.6	1.90	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFHxA	1470	2.31	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFHpA	1140	0.626	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFHxS	4580	10.0	53.0	84.7	D	B8B0157	27-Feb-18	0.118 L	08-Mar-18 23:38	10
PFOA	2520	0.689	5.30	8.47	D	B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFOS	20600	8.54	53.0	84.7	D	B8B0157	27-Feb-18	0.118 L	08-Mar-18 23:38	10
PFNA	378	0.858	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFDA	70.7	1.58	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
MeFOSAA	ND	1.75	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFUnA	ND	1.11	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
EtFOSAA	ND	1.45	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFDoA	ND	0.838	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFTTrDA	ND	0.523	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
PFTeDA	ND	0.799	5.30	8.47		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	104	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C2-PFHxA	IS	91.8	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C4-PFHpA	IS	99.9	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
18O2-PFHxS	IS	97.9	50 - 150	D	B8B0157	27-Feb-18	0.118 L	08-Mar-18 23:38	10
13C2-PFOA	IS	91.2	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C8-PFOS	IS	106	50 - 150	D	B8B0157	27-Feb-18	0.118 L	08-Mar-18 23:38	10
13C5-PFNA	IS	81.7	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C2-PFDA	IS	79.2	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
d3-MeFOSAA	IS	76.3	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C2-PFUnA	IS	81.0	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
d5-EtFOSAA	IS	70.2	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C2-PFDoA	IS	92.9	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1
13C2-PFTeDA	IS	117	50 - 150		B8B0157	27-Feb-18	0.118 L	11-Mar-18 03:10	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

new SI/30.1.8

Sample ID: WI-AF-MW-114-0218					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800353-06	Column:	BEH C18				
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 15:50	Date Received:	22-Feb-18 09:13						
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	68.6	1.88	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFHxA	544	2.30	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFHpA	368	0.622	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFHxS	2280	0.997	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFOA	549	0.685	5.25	8.42	B	B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFOS	29200	8.50	52.5	84.2	B	B8B0157	27-Feb-18	0.119 L	08-Mar-18 23:49	10	
PFNA	84.0	0.853	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFDA	22.3	1.57	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
MeFOSAA	ND	1.74	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFUnA	ND	1.11	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
EtFOSAA	ND	1.44	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFDoA	ND	0.834	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFTeDA	ND	0.520	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
PFTeDA	ND	0.795	5.25	8.42		B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	95.7	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFHxA	IS	89.2	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C4-PFHpA	IS	94.9	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
18O2-PFHxS	IS	90.7	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFOA	IS	86.0	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C8-PFOS	IS	83.3	50 - 150		B	B8B0157	27-Feb-18	0.119 L	08-Mar-18 23:49	10	
13C5-PFNA	IS	83.4	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFDA	IS	76.0	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
d3-MeFOSAA	IS	57.1	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFUnA	IS	63.2	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
d5-EtFOSAA	IS	66.5	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFDoA	IS	85.3	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	
13C2-PFTeDA	IS	109	50 - 150			B8B0157	27-Feb-18	0.119 L	11-Mar-18 03:56	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL - Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

new 5/30/18

**Sample ID: WI-AF-EB03-022018** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800353-07	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	20-Feb-18 17:00	Date Received:	22-Feb-18 09:13		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.83	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFHxA	ND	2.23	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFHpA	ND	0.603	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFHxS	ND	0.967	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFOA	5.12 <del>0.673</del> u	0.664	5.12	8.17	J.B	B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFOS	ND	0.824	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFNA	ND	0.827	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFDA	ND	1.52	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
MeFOSAA	ND	1.68	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFUnA	ND	1.07	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
EtFOSAA	ND	1.40	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFDoA	ND	0.808	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFTrDA	ND	0.504	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
PFTeDA	ND	0.771	5.12	8.17		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1

MBL

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	83.6	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFHxA	IS	85.9	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C4-PFHpA	IS	88.7	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
18O2-PFHxS	IS	83.0	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFOA	IS	85.8	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C8-PFOS	IS	96.9	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C5-PFNA	IS	85.4	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFDA	IS	70.9	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
d3-MeFOSAA	IS	53.4	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFUnA	IS	67.5	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
d5-EtFOSAA	IS	55.7	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFDoA	IS	74.4	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1
13C2-PFTeDA	IS	88.2	50 - 150		B8B0157	27-Feb-18	0.122 L	11-Mar-18 01:24	1

DL - Detection Limit      LOD - Limit of Detection      LCL-UCL- Lower control limit - upper control limit      When reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
 LOQ - Limit of quantitation      Results reported to the DL      Only the linear isomer is reported for all other analytes

see 51301.8

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
SDG: 1800356  
Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
Date: May 30, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-SB-FB-022018	1800356-01	Water
2	WI-AF-EB11-SO-0218	1800356-02	Water
3	WI-AF-SB611-OH01-0218	1800356-03	Soil
4	WI-AF-SB611-0103-0218	1800356-04	Soil
5	WI-AF-SB611P-0103-0218	1800356-05	Soil
6	WI-AF-SB611-1213-0218	1800356-06	Soil

A full data validation was performed on the analytical data for four soil samples, one aqueous field blank sample, and one aqueous equipment blank sample collected on February 20, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis

PFCs (Soil)  
PFCs (Water)

Method References

VAL Method PFAS  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

**Organics**

- Date Completeness, Case Narrative & Custody Documentation



- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

### Perfluorinated Compounds (PFCs)

### Data Completeness, Case Narrative & Custody Documentation

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### Holding Times

- All water samples were extracted within 14 days and analyzed within 28 days, and all soil samples were extracted within 28 days and analyzed within 30 days except for the following.

EDS Sample ID	Date Collected	Date Extracted	Compound	# Days	Qualifier
1	02/20/18	03/19/18	PFDOA	27	UJ
2	02/20/18	03/19/18	PFDOA	27	UJ

### LC/MS Tuning

- All criteria were met.

### Initial Calibration

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### Continuing Calibration

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-SB-FB-022018	None - ND	-	-	-
WI-AF-EB11-SO-0218	None - ND	-	-	-

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples were not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria except for the following.

EDS Sample ID	Compound	%R	Qualifier
3	13C3-PFBS	47.6%	UJ - Associated Cmpd
	18O2-PFHxS	49.2%	UJ - Associated Cmpd

**Target Compound Identification**

- All mass spectra and quantitation criteria were met.

**Compound Quantitation**

- All criteria were met.

**Field Duplicate Sample Precision**

- Field duplicate results are summarized below. The precision was acceptable.

Compound	WI-AF-SB611-0103-0218 ng/g	WI-AF-SB611P-0103-0218 ng/g	RPD	Qualifier
None	ND	ND	-	-

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed:  Dated: 6/1/18  
Nancy Weaver  
Senior Chemist

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.





**Sample ID: WI-AF-SB-FB-022018** **Modified EPA Method 537**

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800356-01	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	20-Feb-18 10:50	Date Received:	23-Feb-18 09:35		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.90	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFHxA	ND	2.32	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFHpA	ND	0.629	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFHxS	ND	1.01	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFOA	ND	0.692	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFOS	ND	0.858	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFNA	ND	0.861	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFDA	ND	1.58	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
MeFOSAA	ND	1.75	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFUnA	ND	1.12	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
EtFOSAA	ND	1.46	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFDoA	ND <i>WJ</i>	0.902	5.68	9.11		B8C0111	19-Mar-18	0.110 L	20-Mar-18 16:56	1 <i>HT</i>
PFTTrDA	ND	0.525	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
PFTeDA	ND	0.803	5.30	8.51		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	108	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C2-PFHxA	IS	89.2	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C4-PFHpA	IS	97.9	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
18O2-PFHxS	IS	89.5	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C2-PFOA	IS	91.1	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C8-PFOS	IS	81.2	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C5-PFNA	IS	71.5	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C2-PFDA	IS	73.4	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
d3-MeFOSAA	IS	76.3	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C2-PFUnA	IS	78.0	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
d5-EtFOSAA	IS	82.9	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1
13C2-PFDoA	IS	58.4	50 - 150		B8C0111	19-Mar-18	0.110 L	20-Mar-18 16:56	1
13C2-PFTeDA	IS	99.2	50 - 150		B8B0163	28-Feb-18	0.118 L	08-Mar-18 10:45	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

NW 513018

Sample ID: WI-AF-EB11-SO-0218

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800356-02	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	20-Feb-18 11:00	Date Received:	23-Feb-18 09:35		

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	1.87	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFHxA	ND	2.28	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFHpA	ND	0.617	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFHxS	ND	0.989	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFOA	ND	0.680	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFOS	ND	0.843	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFNA	ND	0.846	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFDA	ND	1.56	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
MeFOSAA	ND	1.72	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFUnA	ND	1.10	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
EtFOSAA	ND	1.43	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFDoA	ND uJ	0.845	5.34	8.54		B8C0111	19-Mar-18	0.117 L	20-Mar-18 17:07	1 HT
PFTeDA	ND	0.516	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
PFTeDA	ND	0.789	5.21	8.36		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	102	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C2-PFHxA	IS	95.5	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C4-PFHpA	IS	93.8	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
18O2-PFHxS	IS	92.1	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C2-PFOA	IS	95.8	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C8-PFOS	IS	102	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C5-PFNA	IS	86.9	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C2-PFDA	IS	76.7	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
d3-MeFOSAA	IS	70.5	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C2-PFUnA	IS	75.5	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
d5-EtFOSAA	IS	62.3	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1
13C2-PFDoA	IS	73.4	50 - 150		B8C0111	19-Mar-18	0.117 L	20-Mar-18 17:07	1
13C2-PFTeDA	IS	122	50 - 150		B8B0163	28-Feb-18	0.120 L	08-Mar-18 10:57	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL - Lower control limit - upper control limit  
Results reported to the DL

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

new 5/30/18

Sample ID: WI-AF-SB611-0H01-0218											VAL - PFAS
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Soil	Lab Sample:	1800356-03	Column:	BEH C18			
Project:	NAS WI-AULT FIELD		Date Collected:	20-Feb-18 10:55	Date Received:	23-Feb-18 09:35					
					% Solids:	86.2					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	<del>ND</del> <i>uJ</i>	0.397	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	<i>ISL</i>
PFHxA	ND	0.222	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFHpA	ND	0.224	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFHxS	<del>ND</del> <i>uJ</i>	0.339	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	<i>ISL</i>
PFOA	ND	0.258	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFOS	ND	0.925	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFNA	ND	0.195	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFDA	ND	0.280	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
MeFOSAA	ND	0.331	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFUnA	ND	0.388	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
EtFOSAA	ND	0.351	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFDoA	ND	0.302	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFTTrDA	ND	0.134	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
PFTeDA	ND	0.217	1.09	2.19		B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	47.6	50 - 150		H	B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFHxA	IS	60.1	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C4-PFHpA	IS	61.6	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
18O2-PFHxS	IS	49.2	50 - 150		H	B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFOA	IS	68.4	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C8-PFOS	IS	72.9	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C5-PFNA	IS	67.6	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFDA	IS	63.1	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
d3-MeFOSAA	IS	59.9	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFUnA	IS	73.2	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
d5-EtFOSAA	IS	74.2	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFDoA	IS	79.8	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	
13C2-PFTeDA	IS	75.0	50 - 150			B8B0151	27-Feb-18	1.06 g	08-Mar-18 06:09	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

*rw 5/30/18*

Sample ID: WI-AF-SB611-0103-0218

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800356-04	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	20-Feb-18 11:05	Date Received:	23-Feb-18 09:35		
				% Solids:	94.0		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.361	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFHxA	ND	0.202	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFHpA	ND	0.204	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFHxS	ND	0.308	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFOA	ND	0.235	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFOS	ND	0.841	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFNA	ND	0.177	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFDA	ND	0.255	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
MeFOSAA	ND	0.300	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFUnA	ND	0.352	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
EtFOSAA	ND	0.319	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFDoA	ND	0.275	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFTeDA	ND	0.121	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
PFTeDA	ND	0.197	0.995	1.99		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	104	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFHxA	IS	90.4	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C4-PFHpA	IS	91.0	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
18O2-PFHxS	IS	86.7	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFOA	IS	80.3	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C8-PFOS	IS	88.2	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C5-PFNA	IS	84.5	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFDA	IS	79.6	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
d3-MeFOSAA	IS	66.4	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFUnA	IS	70.1	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
d5-EtFOSAA	IS	78.7	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFDoA	IS	66.9	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1
13C2-PFTeDA	IS	66.1	50 - 150		B8B0151	27-Feb-18	1.07 g	08-Mar-18 06:21	1

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

Only the linear isomer is reported for all other analytes

new 5/30/18

Sample ID: WI-AF-SB611P-0103-0218											VAL - PFAS
Client Data					Laboratory Data						
Name:	CH2M Hill		Matrix:	Soil	Lab Sample:	1800356-05	Column:	BEH C18			
Project:	NAS WI-AULT FIELD		Date Collected:	20-Feb-18 11:10	Date Received:	23-Feb-18 09:35					
					% Solids:	93.6					
Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	0.334	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFHxA	ND	0.187	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFHpA	ND	0.189	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFHxS	ND	0.286	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFOA	ND	0.217	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFOS	ND	0.778	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFNA	ND	0.164	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFDA	ND	0.236	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
MeFOSAA	ND	0.278	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFUnA	ND	0.326	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
EtFOSAA	ND	0.296	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFDoA	ND	0.254	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFTTrDA	ND	0.112	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
PFTeDA	ND	0.182	0.921	1.84		B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	103	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFHxA	IS	86.8	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C4-PFHpA	IS	87.2	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
18O2-PFHxS	IS	88.3	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFOA	IS	76.7	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C8-PFOS	IS	88.6	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C5-PFNA	IS	79.6	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFDA	IS	101	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
d3-MeFOSAA	IS	76.2	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFUnA	IS	78.9	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
d5-EtFOSAA	IS	87.8	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFDoA	IS	77.3	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	
13C2-PFTeDA	IS	70.9	50 - 150			B8B0151	27-Feb-18	1.16 g	08-Mar-18 06:32	1	

DL - Detection Limit

LOD - Limit of Detection

LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit

The results are reported in dry weight

The sample size is reported in wet weight

Results reported to the DL

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

Only the linear isomer is reported for all other analytes



Sample ID: WI-AF-SB611-1213-0218

VAL - PFAS

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Soil	Lab Sample:	1800356-06	Column:	BEH C18
Project:	NAS WI-AULT FIELD	Date Collected:	20-Feb-18 14:15	Date Received:	23-Feb-18 09:35		
				% Solids:	88.2		

Analyte	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	ND	0.374	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFHxA	ND	0.209	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFHpA	ND	0.211	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFHxS	ND	0.319	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFOA	ND	0.243	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFOS	ND	0.871	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFNA	ND	0.183	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFDA	ND	0.264	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
MeFOSAA	ND	0.311	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFUnA	ND	0.365	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
EtFOSAA	ND	0.331	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFDoA	ND	0.284	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFTeDA	ND	0.126	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
PFTeDA	ND	0.204	1.03	2.06		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	111	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFHxA	IS	95.0	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C4-PFHpA	IS	96.4	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
18O2-PFHxS	IS	94.7	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFOA	IS	86.6	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C8-PFOS	IS	96.3	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C5-PFNA	IS	95.4	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFDA	IS	84.5	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
d3-MeFOSAA	IS	82.0	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFUnA	IS	67.2	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
d5-EtFOSAA	IS	88.8	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFDoA	IS	76.0	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1
13C2-PFTeDA	IS	72.8	50 - 150		B8B0151	27-Feb-18	1.10 g	08-Mar-18 06:44	1

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.

LOQ - Limit of quantitation

The results are reported in dry weight

Only the linear isomer is reported for all other analytes

The sample size is reported in wet weight

Results reported to the DL

ms/30/18

**DATA VALIDATION SUMMARY REPORT  
NAS WHIDBEY ISLAND, WASHINGTON**

Client: CH2M HILL, Inc., Corvallis, Oregon  
SDG: 1800410  
Laboratory: Vista Analytical Laboratory, El Dorado Hills, California  
Site: NAS Whidbey Island, Ault Field, CTO-4041, Washington  
Date: May 30, 2018

PFCs			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	WI-AF-FB01-030118	1800410-01	Water
2	WI-AF-MW-615-0318	1800410-02	Water
3	WI-AF-EB01-030118	1800410-03	Water
4	WI-AF-MW-611-0318	1800410-04	Water

A full data validation was performed on the analytical data for two water samples, one aqueous field blank sample, and one aqueous equipment blank sample collected on March 1, 2018 by CH2M HILL at the NAS Whidbey Island Ault Field site in Washington. The samples were analyzed under the EPA Method "Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS)".

Specific method references are as follows:

Analysis  
PFCs

Method References  
USEPA Method 537 Modified

The data have been validated according to the protocols and quality control (QC) requirements of the analytical method, the Final Sampling and Analysis Plan Phase I Site Investigation for Per- and Polyfluoroalkyl Substances in Soil and Groundwater Ault Field, February 2018, and the USEPA National Functional Guidelines for Organic Data Review as follows:

- The USEPA "Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following data quality indicators were reviewed for this report:

***Organics***

- Date Completeness, Case Narrative & Custody Documentation
- Holding times
- Liquid Chromatography/Mass Spectrometry (LC/MS) Tuning

- Initial and continuing calibration summaries
- Method blank and field QC blank contamination
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification
- Compound Quantitation
- Field Duplicate sample precision

A full (Level IV) data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

### **Data Usability Assessment**

There were no rejections of data.

Overall the data is acceptable for the intended purposes. There were no qualifications.

### **Perfluorinated Compounds (PFCs)**

### **Data Completeness, Case Narrative & Custody Documentation**

- The case narrative and chain-of-custody documentation were included in the data package as required. All criteria were met.

### **Holding Times**

- All samples were extracted within 14 days for water samples and analyzed within 28 days.

### **LC/MS Tuning**

- All criteria were met.

### **Initial Calibration**

- All relative standard deviation (%RSD) and/or correlation coefficients criteria were met.

### **Continuing Calibration**

- All percent difference (%D) and RRF criteria were met.

### Method Blank

- The method blanks were free of contamination.

### Field QC Blank

- Field QC samples were free of contamination.

Blank ID	Compound	Conc. ng/L	Qualifier	Affected Samples
WI-AF-FB01-030118	None - ND	-	-	-
WI-AF-EB01-030118	None - ND	-	-	-

### Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples were not analyzed.

### Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

### Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

### Target Compound Identification

- All mass spectra and quantitation criteria were met.

### Compound Quantitation

- All criteria were met.

### Field Duplicate Sample Precision

- Field duplicate samples were not collected.

Please contact the undersigned at (757) 564-0090 if you have any questions or need further information.

Signed: Nancy Weaver  
Nancy Weaver  
Senior Chemist

Dated: 6/1/18



Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.



Sample ID: WI-AF-FB01-030118					Modified EPA Method 537						
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800410-01	Column:	BEH C18			
Project:	695610.04.F1,FS	Date Collected:	01-Mar-18 11:00		Date Received:	03-Mar-18 10:15					
Location:	Field Blank										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.91	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFHxA	ND	2.33	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFHpA	ND	0.632	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFHxS	ND	1.01	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFOA	ND	0.696	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFOS	ND	0.863	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFNA	ND	0.866	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFDA	ND	1.59	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
MeFOSAA	ND	1.76	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFUnA	ND	1.12	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
EtFOSAA	ND	1.46	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFDoA	ND	0.847	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFTeDA	ND	0.528	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
PFTeDA	ND	0.807	5.34	8.55		B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	105	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFHxA	IS	88.4	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C4-PFHpA	IS	88.1	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
18O2-PFHxS	IS	83.5	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFOA	IS	87.1	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C8-PFOS	IS	91.7	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C5-PFNA	IS	82.4	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFDA	IS	71.0	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
d3-MeFOSAA	IS	64.6	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFUnA	IS	78.6	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
d5-EtFOSAA	IS	71.7	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFDoA	IS	62.4	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	
13C2-PFTeDA	IS	69.4	50 - 150			B8C0085	14-Mar-18	0.117 L	16-Mar-18 05:43	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL- Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes

NW 5/30/18

Sample ID: WI-AF-MW-615-0318

Modified EPA Method 537

Client Data				Laboratory Data			
Name:	CH2M Hill	Matrix:	Aqueous	Lab Sample:	1800410-02	Column:	BEH C18
Project:	695610.04.F1.FS	Date Collected:	01-Mar-18 11:40	Date Received:	03-Mar-18 10:15		
Location:	MW-615						

Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	89.1	1.97	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFHxA	51.7	2.40	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFHpA	8.41	0.650	5.48	8.80	J	B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFHxS	123	1.04	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFOA	7.85	0.716	5.48	8.80	J	B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFOS	3.37	0.888	5.48	8.80	J	B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFNA	ND	0.891	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFDA	ND	1.64	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
MeFOSAA	ND	1.82	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFUnA	ND	1.16	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
EtFOSAA	ND	1.51	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFDoA	ND	0.871	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFTTrDA	ND	0.543	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
PFTeDA	ND	0.831	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	113	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFHxA	IS	96.2	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C4-PFHpA	IS	85.2	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
18O2-PFHxS	IS	102	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFOA	IS	96.3	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C8-PFOS	IS	79.0	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C5-PFNA	IS	82.1	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFDA	IS	87.3	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
d3-MeFOSAA	IS	87.5	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFUnA	IS	93.8	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
d5-EtFOSAA	IS	84.3	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFDoA	IS	78.0	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1
13C2-PFTeDA	IS	81.0	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 05:55	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

LCL-UCL- Lower control limit - upper control limit  
Results reported to the DL

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

1800410

Sample ID: WI-AF-EB01-030118						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous			Lab Sample:	1800410-03	Column:	BEH C18		
Project:	695610.04.F1.FS	Date Collected:	01-Mar-18 14:00			Date Received:	03-Mar-18 10:15				
Location:	Equipment Blank										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	1.97	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFHxA	ND	2.40	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFHpA	ND	0.650	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFHxS	ND	1.04	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFOA	ND	0.716	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFOS	ND	0.888	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFNA	ND	0.891	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFDA	ND	1.64	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
MeFOSAA	ND	1.81	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFUnA	ND	1.15	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
EtFOSAA	ND	1.51	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFDoA	ND	0.871	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFTeDA	ND	0.543	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
PFTeDA	ND	0.830	5.48	8.80		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution		
13C3-PFBS	IS	109	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFHxA	IS	99.5	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C4-PFHpA	IS	93.8	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
18O2-PFHxS	IS	89.8	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFOA	IS	86.6	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C8-PFOS	IS	106	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C5-PFNA	IS	89.0	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFDA	IS	79.5	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
d3-MeFOSAA	IS	63.3	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFUnA	IS	71.2	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
d5-EtFOSAA	IS	62.1	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFDoA	IS	58.5	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		
13C2-PFTeDA	IS	67.0	50 - 150		B8C0085	14-Mar-18	0.114 L	16-Mar-18 06:06	1		

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitationLCL-UCL- Lower control limit - upper control limit  
Results reported to the DLWhen reported, PFHxS, PFOA and PFOS include both linear and branched isomers  
Only the linear isomer is reported for all other analytes

س 5130118



Sample ID: WI-AF-MW-611-0318						Modified EPA Method 537					
Client Data					Laboratory Data						
Name:	CH2M Hill	Matrix:	Aqueous		Lab Sample:	1800410-04	Column:	BEH C18			
Project:	695610.04.F1.FS	Date Collected:	01-Mar-18 15:20		Date Received:	03-Mar-18 10:15					
Location:	MW-611										
Analyte	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	ND	2.02	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFHxA	ND	2.47	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFHpA	ND	0.669	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFHxS	ND	1.07	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFOA	ND	0.736	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFOS	ND	0.913	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFNA	ND	0.916	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFDA	ND	1.69	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
MeFOSAA	ND	1.87	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFUnA	ND	1.19	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
EtFOSAA	ND	1.55	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFDoA	ND	0.896	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFTeDA	ND	0.559	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
PFTeDA	ND	0.854	5.63	9.05		B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBS	IS	93.7	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFHxA	IS	96.6	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C4-PFHpA	IS	91.3	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
18O2-PFHxS	IS	86.9	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFOA	IS	89.8	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C8-PFOS	IS	89.2	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C5-PFNA	IS	90.3	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFDA	IS	79.9	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
d3-MeFOSAA	IS	71.2	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFUnA	IS	81.1	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
d5-EtFOSAA	IS	78.6	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFDoA	IS	87.3	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	
13C2-PFTeDA	IS	90.0	50 - 150			B8C0085	14-Mar-18	0.111 L	16-Mar-18 06:18	1	

DL - Detection Limit

LOD - Limit of Detection

LCL-UCL - Lower control limit - upper control limit

When reported, PFHxS, PFOA and PFOS include both linear and branched isomers

LOQ - Limit of quantitation

Results reported to the DL

Only the linear isomer is reported for all other analytes.

new 5/30/18