



Fire & Rescue NSW
Armidale Fire Training Facility
Phase 2 Environmental Site Assessment - PFAS

October 2017

Executive summary

Fire and Rescue NSW (FRNSW) commissioned GHD Pty Ltd (GHD) to undertake a Phase 2 environmental site assessment (ESA) (the Project) for a land parcel identified within Lot 1 and Lot 2 DP 1068131, located at 2-16 Mann Street Armidale, NSW 2350. The area has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The foams used may have contained per- and polyfluoro alkyl substances (PFAS) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

Previous investigations undertaken by GHD during 2016 and 2017 reported concentrations of PFAS in soils, sediments, surface waters and groundwater on and around the site. The overall objective this stage of works was to further assess the extent of the PFAS impacts identified in previously by GHD, and to assess whether human and ecological receptors on the site and in the surrounding area may be at risk from site impact.

The scope of works included drilling and installation of five groundwater monitoring wells and three soil bores, collection of sediment samples from 24 locations, collection of 16 surface water samples and a groundwater monitoring event (GME) including the collection and analyses of groundwater samples from nine monitoring locations.

A water use survey was conducted by GHD as part of this program of works. The water use survey was aimed at understanding local water use within the broader investigation area. Of the six responses provided to the survey, all indicated that their properties are supplied by town water however one response noted the use of bore water in addition to town water. The response indicated that bore water used for stock and watering vegetable gardens. One response indicated the use of surface water / dam water for stock watering. One response indicated that local creeks are used for recreational purposes.

Summary of key findings:

Concentrations of soils on site were reported below the nominated PFAS screening criteria for both human health and ecological receptors based on a direct contact scenario for commercial / industrial landuse. Soils bores and monitoring wells located around the main fire training ground reported the highest concentrations of PFAS with SB02_0.9-1.0 with the highest concentration of PFAS (sum of total) at 0.348 mg/kg. PFAS concentrations within the soil bore decrease with depth throughout the soil profile.

PFAS were reported in sediments collected from on-site drainage lines running through the site. All on-site drainage lines converge at one central point before draining under Mann Street through a concrete culvert. The highest PFAS concentration in sediment was at SS02 collected from the retention pond on-site. SS03 was collected from the drainage line draining from the rural fire service facility adjacent to the site.

No off-site soil bores reported detects of PFAS above the laboratory limit of reporting (LOR). However, all off-site sediment samples located in the drainage lines or surface water dams reported detections of PFAS. This indicates that PFAS is likely to be migrating off-site via the surface water drainage pathways. Despite the low concentration of PFAS in all soil and sediment samples, leachate testing completed on a number of these samples shows that there is potential for the release of PFAS to groundwater and surface water environments and the presence of PFAS in soils represents a likely on-going source to the environment.

Groundwater contours indicate that the groundwater is flowing generally to the north. PFAS has been detected on the FRNSW site, within the wider training facility and off-site in both surface

waters and groundwater at concentrations greater than the adopted assessment criteria for the protection of drinking water, ecological, and recreational receptors.

PFAS in surface water – on site: PFAS was detected in surface water drainage on the FRNSW site and in the wider training facility including concentrations above the nominated investigation levels. The detection of PFAS at SW04 (point of exit from the training facility) at concentrations exceeding the nominated criteria, coupled with the presence of elevated PFAS in surface water further downgradient of the site, suggests that PFAS has migrated from the FRNSW site to off-site receptors. The results of surface water sampling from the areas up-gradient of the training areas, including drainage lines running onto the FRNSW, suggest an alternative source of PFAS which has not yet been identified.

PFAS in surface water – off site: PFAS was reported in the unnamed tributary running down gradient of the site. Attenuation of PFAS in the surface water was noted, and the PFAS concentration generally decreased with each consecutive down gradient sample. Surface water locations located to the north of Grafton Road reported further attenuated PFAS concentrations. The PFAS concentrations remained similar between the sampling events (December and June).

PFAS In groundwater on-site: Analytical data indicates that the training area is likely to be acting as source of contamination to groundwater, corresponding with the results of the surface water soil and sediment investigations. The second fire training area and skid pan are not considered source areas for groundwater contamination migrating off-site and concentrations of PFAS in groundwater down-gradient of these areas were below the nominated investigation levels.

PFAS in groundwater off-site: PFAS concentrations in three off-site bores (MW07, MW08 and private bore GW966477) were reported above the nominated screening criteria for the protection of drinking water quality. Concentrations were below the limit of reporting in MW09. GHD understands that that the private bore sampled is not in use and has not been used for a number of years.

Conclusions and recommendations

Based on the scope of works presented in Section 1.3 of this report, the findings of the investigation and subject to the limitations presented in Section 10, the following conclusions are made:

- The site is the main source of PFAS contamination in the surrounding properties.
- The surface water has the highest potential to rapidly migrate offsite and should be the main focus of immediate management.
- Soil on site represents an ongoing source of groundwater contamination.
- Groundwater is impacted by PFAS but its migration appears to be limited. However, insufficient wells are present to fully understand the extent of groundwater impact.
- The surface water bodies also provide an ongoing source of contamination to terrestrial animal – wild and domestic.

Based on the findings of these works, the following recommendations are made:

- Consideration of immediate management actions which can be implemented to address the mass of PFAS present on site and minimise further migration. Given the elevated concentrations of PFAS in the site dams and its presence downstream, management of the site dams is considered a priority. Mass reduction from these sources will eventually have a flow-on impact on downstream water sources. Consideration should also be given to diverting all drainage from the site back onto the site for retention and remediation.

- Further assessment of the use of surface water at the site and surrounding sites to assess the risk to human populations and ecosystems. Develop management strategies for off-site surface water. These might include:
 - Assess and implement measures to stop the retention basin on the FRNSW site overflowing, and restrict access/use of the water currently in this dam.
 - Removal of existing water and sediment in the three neighbouring residential properties and consideration of options to either remove impacted sediments or re-line the dams to prevent further contact with PFAS impacted sediments.
 - Isolate the dams from the current unnamed Tributary (see above).
 - Drainage channels between the dams could be cleared out to remove soils and sediments which are likely to act as potential leaching sources.
 - Removal and/or isolation of impacted soils around the fire training ground on the FRNSW site to remove the primary source zone
- Additional sampling should be undertaken following the implementation of any management actions. Sampling should be undertaken to accommodate seasonal fluctuation and, for example, following rainfall events to enable assessment of the areas where surface water collects from the ponds.
- Assessment of the risk of groundwater migration to local receptors. This may require additional wells.

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1. Introduction

Fire and Rescue NSW (FRNSW) commissioned GHD Pty Ltd (GHD) to undertake a Phase 2 environmental site assessment (ESA) (the Project) for a land parcel identified within Lot 1 and Lot 2 DP 1068131, located at 2-16 Mann Street Armidale, NSW 2350. The site locations is shown on Figure 1, Appendix A.

The area has previously been used for the training of firefighters, which has potentially included the use of aqueous film forming foams (AFFF). The foams used may have contained per- and poly-fluoro alkyl substances (PFAS) including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which are potentially harmful to human health and the environment.

A preliminary site investigation (PSI) was undertaken by GHD in 2016 to identify potential sources of contamination and areas of potential concern and develop a sampling and analytical plan for further intrusive investigations. The findings of the PSI are reported in:

- GHD (2016) Armidale PFAS Investigation, Preliminary Site Investigation and Sampling and Analysis Quality Plan. Draft Report, August 2016 (the PSI report).

Following the PSI, an ESA was undertaken by GHD in 2016. The aim of the investigation was to characterise impacts from PFAS on the site and the surrounding environment. The findings of the ESA are report in:

- GHD (2017), *Fire & rescue NSW, Armidale Training Facility Environmental Site Assessment – PFAS*. April 2017 (the ESA report)

This report documents the outcomes of further intrusive investigations undertaken as part of the second stage of works. For full details on the site history, reference is made to the PSI report. For completeness, all historical analytical data from the 2016 ESA are tabulated in Appendix B.

The NSW Environment Protection Authority (EPA) reviewed the ESA report and were in general support of the recommendations made by GHD (2017). On 31 March 2017, EPA issued a letter to FRNSW (Fire & Rescue NSW Firefighting training sites - *Albion Park, Armidale, Deniliquin and Greenacre* (NSW EPA 2017) dated 31/3/2017) providing the following recommendations:

- Further desktop analysis to include
 - *Investigate / confirmation of potential human receptors based on surface water and groundwater pathways, including investigation of possible consumption of local livestock, vegetables, and fish/yabbies*
 - *Investigation to identify the potential for sensitive ecological receptors to exist in the downstream environment of Dumaresq Creek*
- Further sampling and monitoring to include:
 - *Surface water and sediment sampling in relevant creeks and dams potentially receiving surface water runoff from the site*
 - *Temporal sampling to identify variability in PFAS concentrations in the environment should be included as ongoing monitoring*
 - *Further groundwater sampling at off-site locations along a plausible groundwater flow direction, to better delineate the groundwater plume.*

1.1 Site background

The wider training facility is owned by Armidale Regional Council and is now used by the Lions Club and the NSW Rural Fire Service. It was previously used by the Armidale traffic education centre.

A portion of the property (the majority of Lot 1 DP 1068131) is currently leased by FRNSW for use as a firefighting training facility, but it is understood that FRNSW also uses other portions of the wider training facility. The site investigation area included the wider training facility as well as the FRNSW site (Figure 1, Appendix A). Investigation locations outside of the wider training facility are henceforth considered off-site.

The site is currently used by FRNSW as office space, meeting areas for crewing staff, storage and fire training.

The area of the wider training facility is approximately 200,000 m² (20 hectares) and the FRNSW site is approximately 15,500 m² (1.5 hectares). The wider training facility is bound by rural residential properties to the north, east and west, and south.

GHD understands the use of AFFF and other firefighting foams potentially containing PFASs were used at a number of FRNSW locations in NSW for firefighting training purposes. For this reason, PFAS may have been released to the environment at the site, which may have resulted in contamination.

1.2 Objective

The overall objective of the intrusive investigation was to further assess the extent of the PFAS impacts identified in the ESA report (GHD, 2017), and to assess whether human and ecological receptors on the site and in the surrounding area may be at risk from site impact.

To address the investigation objectives and, based on the data gaps identified in the conceptual site model (CSM, Table 8-1 in GHD, 2017), this stage of investigation has been designed to target:

- PFAS impact off-site in groundwater down gradient of MW04 to assess potential off site migration and risk to possible receptors.
- PFAS impact in surface water and sediments along the drainage lines on and off site and risks to down gradient to Dumaresq Creek.

1.3 Scope

The scope of work comprised:

- Review of the EPA comments of the previous ESA report (GHD 2017)
- Update of a Health, Safety and Environment Plan (HSEP) and site specific Job Safety and Environmental Analysis (JSEA)
- Service location including a review of site plans (where available), dial before you dig (DBYD) plans, and scanning using ground penetrating radar to identify the presence of underground services
- Drilling and installation of five groundwater monitoring wells (MW05 to MW09) and three soil bores (SB13 to SB15)
- Collection of 24 sediment samples (SS01 to SS24) and 16 surface water samples (SW01 to SW16).

- A groundwater monitoring event (GME) of the nine groundwater wells (MW01 to MW09) and one groundwater bore (GW966477).
- Laboratory analysis of selected soil, sediment, surface water and groundwater samples for chemicals of potential concern (COPC).
- Laboratory analysis of a selection of soil samples for Australian standard leaching procedure (ASLP) and toxicity characteristics leaching procedure (TCLP).
- A quality control and quality assurance (QA/QC) program.
- Surveying of newly installed wells.
- Removal of waste soil and groundwater drums (combined Phases 1 and 2 waste collection).
- Preparation of this detailed site investigation report.

1.4 Limitations

This report is subject to the limitations provided in Section 10.

2. Site setting

2.1 Site identification

The following provides a summary of key site information as reported previously by GHD. For full details on site environmental setting, site history and key findings of the works, reference should be made to the PSI report (GHD, 2016) and the previous ESA report (GHD, 2017).

A summary of site identification details and environmental setting is provided in Table 2-1. The site location is presented in Figure 1 in Appendix A.

Table 2-1 FRNSW site identification summary

Information	Details
Street Address	2-16 Mann Street, Armidale NSW 2350 (Portion of Lot 1 DP 1068131)
FRNSW Site Area	Approximately 15,500 m ²
Local Government Area and land use zoning	Armidale Regional Council SP2 – Infrastructure: Emergency Services Facility & Educational
Current Land Use	Firefighting training facility
Ownership	Land parcel owned by Armidale Regional Council. A portion of the property is leased by FRNSW for use as a training facility. The lease area has been occupied by FRNSW since 1997.

2.2 Surrounding land use and environment

The surrounding land uses and local environment are summarised below in Table 2-2. For further details on each characteristic, refer to the PSI (GHD, 2016) and ESA (GHD, 2017) reports.

Table 2-2 Surrounding land uses and environment

Aspect	Details
Surrounding land uses	<ul style="list-style-type: none"> North: Residential properties with small quantities of livestock and zoned R1 – General residential. South: The skid pan used by the Rotary club and the site. Followed by residential properties and zoned RE1 – Public recreation, IN2 – General industrial, R5 – Large lot residential and SP2 – Infrastructure: Emergency Services Facility & Educational East: Residential properties with small quantities of livestock and zoned R5 – Large lot residential. West Council soil stockpiling, Rural Fire Services and residential and zoned R1 – General residential, RE2 – Private recreation
Topography	The wider training facility has an elevation of approximately 990 m Australian Height Datum (AHD), according to NSW Globe from Land and Property Information. The regional topography appears to gently fall to the north from the FRNSW site towards Mann Street and then toward the Dumaresq Creek (as shown on Figure 3, Appendix A)

<p>Soils and Acid sulphate soils</p>	<p>According to eSPADE from Office of Environment & Heritage, the wider training facility and FRNSW site is within the Kellys Plains 'kp' soil landscape. The Kellys Plains soil landscape has the following characteristics:</p> <p>Landscape: gently undulating lower slopes, footslopes and colluvial fans on basalt and basalt-related colluvium and some other sediments (Armidale Beds/Sandon Beds). Local relief mostly 0–30 m, slopes 1–8%, elevation 960–1210 m. Broadly concave to flat transferral slopes. Extensively cleared open woodland.</p> <p>Soils: moderately deep, deep (>80 cm) to occasionally very deep (>150 cm), moderately well drained Haplic Eutrophic Black and Red Chromosols and Ferrosols (Chocolate Soils) are widespread. Yellow and Grey Chromosols (Lateritic Podzolic Soils) occur in some areas in association with metasediments. Black Vertosols/Black Dermosols (Black Earths/Weisenbodens) occur on the sometimes flatter, lower portions of slopes. Minor Ferrosols/Dermosols (Krasnozems) occur on some upper footslopes.</p> <p>Limitations: mass movement (localised), productive arable land (with appropriate land management techniques), high run-on, sheet erosion risk, gully erosion risk, engineering hazard, rock outcrop (localised), dieback. Stoniness (localised), low wet bearing strength (localised), high organic matter (localised), acidity (localised), high shrink-swell potential, slow permeability (localised), high permeability (localised).</p> <p>The acid sulphate soil class is Class Bn(p4) (ASRIS, 2013), which indicates a low potential for the presence of acid sulphate containing soils. There are no other soil classes located within 500 m of the wider training facility.</p>
<p>Hydrology</p>	<p>Surface water flow is expected to follow the local topography on the FRNSW site and flow north. Dial before you dig underground utilities information did not provide an indication of stormwater infrastructure through the FRNSW site. However, it appeared during the site visit that the majority of onsite drainage was aboveground in man-made channels.</p> <p>The closest water bodies are Black Gully and Dumaresq Creek, which are both located approximately 1 km away to the north and north east of the FRNSW site. The FRNSW site does not appear to be within the Black Gully catchment, which is a tributary of Dumaresq Creek. However, there is a small tributary (drainage channel) that flows through the wider training facility, potentially discharging to Dumaresq Creek approximately 1 km north of the property.</p> <p>Refer to Section 2.5 for further detail.</p>

2.3 Geology

The 1:250,000 geological sheet series for Dorrigo-Coffs Harbour suggests that regional geology of the area includes Sandon Beds from the Carboniferous Period. Sandon Bed consists of greywacke, argillite, chert, jasper and basic volcanics. Tertiary Cainozoic Group sediments that include tholeiitic and alkaline basalts with minor trachyte and dolerite, conglomerate, greybilly, sandstone and claystone are located immediately to the south of the area.

2.4 Hydrogeology

2.4.1 Aquifers

The *1:2,000,000 Groundwater in New South Wales, Assessment of Pollution Risk Map* indicates the area is likely to be underlain by fractured mainly igneous and metamorphic rocks with a low to moderate potential for groundwater movement. Groundwater salinity is expected to range up to 1000 mg/L, which is considered suitable for stock, domestic and some irrigation purposes.

Work summary reports from the registered groundwater bores state that the groundwater is considered suitable for potable use.

2.4.2 Existing Groundwater Bores

GHD conducted a review of existing groundwater borehole records using the NSW Department of Primary Industries, Office of Water, groundwater database. The search was conducted to identify registered groundwater boreholes in close proximity to the site and to record information such as use and standing water level. As shown in Table 2-3, only one groundwater bore was identified within a 500 metre radius of the FRNSW site. Other bores within a one kilometre radius, or potentially down hydraulic gradient of the wider training facility have been included in Table 2-3.

Table 2-3 Review of existing groundwater data

Borehole ID	Authorised purpose	Property owner or address	Depth (m)	Standing Water Level (m)	Approx. Distance from Site
GW966477	Stock (converted)	5 Mann Street, Armidale	20.0	6.0	320 m north
GW047498	Irrigation, domestic, industrial (active)	Pembroke Caravan park	45.7	3.7	640 m north west
GW301016	Stock, Domestic (active)	-	30.5	9.0	833 m west
GW033493	Domestic (active)	-	50.3	-	775 m north-east
GW060774	Stock, domestic (active)	-	52.0	-	1000 m north-east
GW058964	Stock, domestic (active)	-	32.7	-	1050 m north-east
GW306198	Domestic (active)	Carinya, 312 Grafton Road, Armidale	94.2	4.9	1240 m north-east
GW965655	Domestic (active)	Lot 22, 56 Gungurru Road, Armidale	86.6	18.3	1150 m east
GW300073	Domestic (active)	Prater's 54 Gungurru Road, Armidale	42.0	-	1290 m east
GW044994	Domestic, stock (active)	Edmonds' 312 Grafton road, Armidale	41.1	-	1330 m east

2.5 Hydrology

An unnamed side tributary of Dumaresq Creek runs through the wider training facility. The tributary enters in the south-eastern portion of the area and exits in the north of the wider training facility.

2.5.1 Surface water features within the wider training facility

There are several drainage lines through the wider training facility as shown on Figure 2, Appendix A. All the drainage lines join the unnamed tributary along the northern boundary of the

wider training facility which is directed underneath Mann Street before entering a neighbouring property on the northern side of Mann Street.

In addition to the tributary which bisects the wider training facility, surface water bodies relevant to the FRNSW site include:

- Surface water retention dam located to the north of the training area on the FRNSW site.
- Surface water retention dams located along the tributary line in the wider training facility area.
- Retention dam to the north of the skid pan in the wider training facility, receiving water from the skid pan and recycling its use for training purposes on the skid pan via a pump and sprinkler system. Excess surface water run off is re-captured in the retention pond.

2.5.2 Off-site surface water features

Hydraulically down gradient (north) of Mann Street, surface water flows to a surface dam located within a residential property (3-5 Mann Street). The dam is located approximately 50 metres from the street. A drainage line continues from the dam, flowing north through the neighbouring properties to another surface water dam located on 76-94 Grafton Road. The drainage line flows to a culvert before being directed underneath Grafton Road, beyond which the drainage line continues to flow along private properties.

The drainage line north of Grafton Road appears to have been subject to historical alignment, including the removal of two surface water dams.

The drainage line eventually drains to a large dam. When overflowing, the dam would likely drain into Dumaresq Creek, approximately 900 metres north of the site.

2.6 Water Use Survey

GHD Stakeholder Engagement professionals worked alongside FRNSW to update the local community on the works being undertaken. This included consulting with individual property owners in the area immediately surrounding the Armidale fire training facility to understand water use within the investigation area. This involved the distribution of fact sheets, and the hosting of meetings and an information session. A *water use survey* was also distributed to a sample set of landowners within the Armidale area. A water use survey report was produced from the questionnaire and is included in Appendix C. There were 28 mail outs of the questionnaire with six responses. Key findings are summarised as follows:

- Majority of property owners indicated their property is private residential, with two categorising their property as residential and agricultural, and another as industrial/commercial agricultural.
- All of respondents indicated that their property is supplied by town water, however two indicated they were also supplied with rain water, and another one, bore water in addition to town water.
- One respondent indicated that they used to use bore water on their property. This bore water was previously used for stock, as well as watering vegetable gardens.
- One respondent indicated that they use surface / dam water for stock watering.
- One respondent indicated that they use local creeks for recreational purposes.

2.7 Site layout and key site features

A site inspection was undertaken initially by GHD in June 2016. Observations made during the site inspection are presented in GHD (2016). Table 2-4 provides a summary of details including the layout and key features.

Table 2-4 Key features

Item	Summary observations
Fencing and access	A main cyclone fence encompasses the wider training facility. A second, inner fence delineates the FRNSW site. The FRNSW site is secure access, for authorised entry only. These boundaries are presented in Figure 2, Appendix A.
FRNSW site features	Key features of the area occupied by FRNSW include: <ul style="list-style-type: none"> - Administration buildings and site offices. - Main fire training area located to the west of the main driveway to the site. The fire training area comprises hardstand of concrete and asphalt. The concrete was reportedly laid approximately 5 to 10 years ago. - Second fire training area located towards the south eastern corner of the FRNSW property. Second training ground reportedly only used for water based training activities. - Surface water retention ponds, receiving water draining from the fire training areas and skid pan.
Key features of the wider training facility	Key features of the wider training facility, outside of the FRNSW fenced area, include: <ul style="list-style-type: none"> - Skid pan, located to the south of the FRNSW site. AFFF was reportedly historically used on the skid pan - Soil stockpiles located to the west of the FRNSW site. Material reportedly associated with roadworks and comprises clean materials - NSW Rural Fire Service located to the west of the FRNSW site - Surface water retention pond, receiving and recycling water from the skid pan.

2.8 Conceptual site model

A preliminary conceptual site model (CSM) was prepared by GHD in the PSI report (GHD 2016) and refined in the ESA report (GHD, 2017). A summary of the preliminary CSM is provided below. The CSM was used as the basis for the current investigation works. For further information about the transport mechanisms of PFAS, refer to *section 8.3.1* of the ESA report (GHD, 2017). An updated version of the CSM, based on the outcome of these additional works, is provided in Section 7.3.1 of this report.

2.8.1 Sources

GHD understands that AFFF containing PFAS is no longer used at the site.

Based on the findings of the PSI (GHD, 2016) and the results of intrusive investigations, the following primary sources of contamination and associated COPCs have been identified:

- Western firefighting training area on the FRNSW site, which included storage locations for AFFF liquids, where extinguishers were filled, and the wash down areas after foam was

used for fire training (gravel surface). PFAS (including PFOS and PFOA) was detected in groundwater, soil and sediment samples on the FRNSW site and in drainage lines associated with this area.

- The retention basin located on the FRNSW site adjacent to the western firefighting training area. PFAS (including PFOS and PFOA) was detected in surface water, sediment and groundwater around this area.
- The concrete skid pad on the southern area of the wider training facility (minor source). Low concentrations of PFAS were detected in soils and concrete samples.
- Retention basins in the wider training facility (minor source). Low levels of PFAS were detected in surface water and sediments associated with these areas.

Impacted soils and sediments which have migrated from the main source zones (including to off-site locations), with subsequent leaching of PFAS, represent a secondary source of contamination.

Other potential historical COPC included total recoverable hydrocarbons (TRHs), BTEX (benzene, toluene, ethylbenzene, xylenes) and polycyclic aromatic hydrocarbons (PAHs) from fire accelerants and motor oils from vehicles (historic and current). However, analytical results for these compounds indicated concentrations were generally low or below the laboratory level of reporting (LOR) in soil, sediment (except SS01), surface water and groundwater samples, indicating that they are unlikely to be an ongoing source of contamination.

2.8.2 Receptors

When evaluating potential adverse health / environmental effects from exposure to a contaminated site, all potentially exposed populations should be considered. For this investigation, the key populations or receptors of interest are considered to include those identified in the previous ESA Report (GHD, 2017), namely:

- FRNSW and wider training facility commercial workers associated with the council yards and Rural Fire Service.
- Potential intrusive maintenance workers on and off-site
- Off-site hydraulically down-gradient residential receptors north of the site.
- Recreational users of surface waters down hydraulic gradient from the site.
- Beneficial uses of groundwater, including domestic/stock use groundwater resources.
- Terrestrial and ecological receptors on and off-site in land based ecosystems and surface water bodies (including those recharged by groundwater).

2.8.3 Exposure pathways

The primary pathways by which receptors could be exposed to the sources of contamination outlined above are considered to be:

- Incidental ingestion of contaminated soils and water.
- Inhalation of contaminated soils or dust.
- Direct contact or ingestion of groundwater and/or surface water.
- Dermal contact with contaminated shallow soil, sediments and dust (noting that dermal sorption is not likely to be a major exposure pathway).
- Vertical and horizontal migration of contaminated liquid through the unsaturated zone into the saturated zone, and subsequent horizontal migration within the groundwater and

subsequent discharge to surface waters. The US EPA (2014) notes that PFAS are water soluble and can migrate readily from soil to groundwater, where they can be transported long distances.

- Surface runoff and sediment transport into storm water drainage and subsequent transport and discharge to surface waters.

Schedule B2 of the NEPM (2013) states that “*As a preliminary screening measure, the potential for a vapour intrusion risk should be considered where the Henry’s law constant for a substance is greater than $1 \times 10^{-5} \text{ atm/m}^3/\text{mol}$ and its vapour pressure is $> 1 \text{ mm Hg}$ at room temperature*”. US EPA (2014) list Henry’s law constants for PFOS and PFOA of $3.05 \times 10^{-9} \text{ atm/m}^3/\text{mol}$ and ‘not measurable’ respectively, which based on the NEPM (2013) recommendation, suggests inhalation of vapours from these contaminants is unlikely to represent a human health risk at the site.

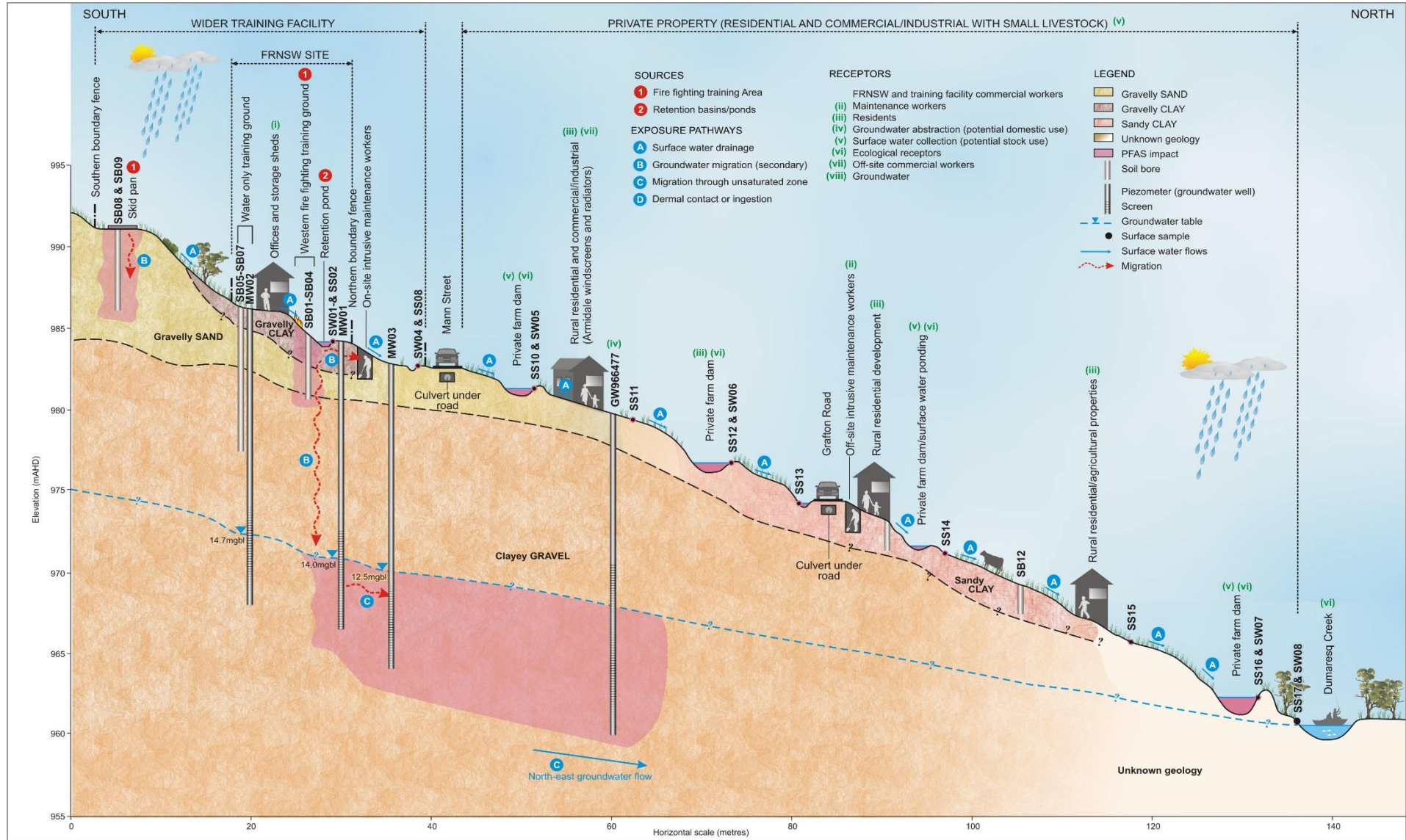
US EPA (2014) notes that once PFOS and PFOA are released to the atmosphere they are expected to absorb on to particles and settle to the ground through wet and dry deposition. This also suggests that soil impacts from PFAS may be spatially related to some extent by the prevailing wind direction of the site, particularly during training events.

2.8.4 Source-pathway-receptor linkages

The ESA report (GHD, 2017) presents the preliminary CSM for on-site sources of contamination. The visually representation of this (from *Figure 8, Appendix A* of the ESA report – GHD, 2017) is presented below.

This investigation is focused primarily on PFAS contamination and other potential sources of contamination identified during the PSI and ESA associated with general site activities are not considered further as part of these works. Reference to these sources is provided in the CSM in GHD 2017.

Figure 2-1 Conceptual Site Model



3. Data Quality Objectives

The Data Quality Objectives (DQOs) for the investigation are based on guidance presented in:

- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 – Schedule B1, Guideline on Investigation Levels for Soil and Groundwater*.
- The DQOs establish a framework for contamination investigations, which incorporates a seven stepped continuum that defines the problem at the site. A series of stages then optimises the design of the investigation.
- An overview of the DQOs for the investigation are presented in the following steps.

Step 1: State the problem

The area has previously been used for the training of firefighters, which has potentially included the use of AFFF. The AFFF used may have contained PFAS including PFOS and PFOA, which are potentially harmful to human health and the environment.

The problem as it stands is that the use of AFFF containing PFAS has resulted in contamination of soil, surface water, groundwater and sediments both on site and surrounding land to an unknown extent.

Step 2: Identify the decision/goal of the study

The key study questions to be answered as part of the works is:

- Are contaminants present on the site at concentrations which pose a potentially unacceptable risk to human health or the environment under the current land use (training facility commercial / industrial) and down-gradient land-uses (including residential / rural land use) based on new screening criteria?
- Is the data obtained of an acceptable quality to enable appropriate conclusions to be made in relation to the overall risks to human health and/ or the environment?

Should contamination present at the site pose a potentially unacceptable risk to human health for the current land uses or the environment based on concentrations of PFAS in soils, sediments, groundwater, surface waters, and/or site infrastructure (including concrete) the other decisions to be made are:

- Is the extent of the impact adequately delineated off-site?
- Is further assessment or remediation/management required?

Step 3: Identify the information inputs

The following inputs are required for the decision:

- The location of potential PFAS contamination sources
- The concentrations of PFAS in soil, sediment, leachate (Australian standard leaching procedure (ASLP)), groundwater and surface water from laboratory analysis.
- Identify potential exposure routes and contamination migration pathways.
- The likelihood of PFAS migrating to groundwater off-site.

Step 4: Define the boundaries of the study

Boundaries of the investigation are summarised in Table 3-1.

Table 3-1 Investigation boundaries

Boundary	Definition
Spatial boundaries	The spatial boundaries for the site are identified as the lateral extent of the groundwater monitoring bore network as shown in Figure 4A and Figure 4B, Appendix A, and down to a depth of approximately 27.0 m bgl, which is the maximum intrusive investigation depth.
Temporal boundaries	The timeframe for this investigation's scope of work primarily defined to the period of works undertaken in the investigation area as part of this assessment; namely May and June 2017.
Scale of decision making	The scale of the decision making is limited to the boundaries of the wider training facility and identified off-site receptors

Step 5: Decision rules

The degree of impact by contaminants and the decisions associated with accepting data will be assessed with reference to the chosen site investigation levels, which were established within the framework of guidelines made or approved by the NSW EPA.

The criteria used for screening analytical results are presented in Section 5.

The decision rule was considered to be:

- If concentrations of the PFAS in soil, surface water, or groundwater on or off-site exceed the nominated criteria for permissible land use(s) (as per current zoning), then further assessment of the risks may be required which may lead to adopting an appropriate management strategy.
- Conversely, no further action may be required in the event that concentrations are below adopted site criteria.

Step 6: Tolerable limits on decision errors

Data generated during this investigation must be appropriate to allow decisions to be made with confidence.

Specific limits for this investigation have been adopted in accordance with the appropriate guidance from the AS4482.1-2005, which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures). The pre-determined DQIs established for the investigation are discussed in Appendix D.

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Step 7: Optimisation of the data collection process

This step involves identifying the most resource effective sampling and analysis design which is required to satisfy the DQOs. The sampling and analysis plan which was developed to meet this objective is summarised in Section 4.

4. Methodology

4.1 General

The scope of work is summarised in Section 1.3. The tables in Section 4.2 to 4.5, summarise the groundwater well installation and soil sampling, sediment sampling, groundwater sampling and surface water sampling methodologies. In summary, the following activities were conducted in May and June 2017:

- 29 May to 2 June 2017 – installation of five new groundwater wells, drilling of three soil bores and associated soil sampling (MW06 to MW09, and SB13 to SB15)
- 13 to 16 June 2017 – groundwater sampling of all monitoring wells (MW01 to MW09), and surface water at 16 locations (SW01 to SW16) located on and off-site. Sediment sampling at 24 locations on and off-site (SS01 to SS24).

Sampling methodologies were completed with reference to the procedures outlined in the following references:

- NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*
- NSW DEC (2006) *Contaminated Sites: Guidelines for NSW Site Auditor Scheme*
- NSW DECC (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*
- NSW EPA (2011) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*
- NEPM (2013) *National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1)*, National Environment Protection Council (NEPC)
- Western Australia Department of Environment Regulation (WA DER) 2017 *Interim Guideline on the assessment and management of perfluoroalkyl and polyfluoroalkyl substances Appendix 1* (PFAS specific sample collection methods, equipment and equipment decontamination methods).

NOTE – all sampling equipment and laboratory supplied sample jars/bottles were Teflon-free.

4.2 Groundwater well installation and soil sampling

Table 4-1 Groundwater well installation methodology (including soil and soil bore sampling)

Item	Description
Date of fieldwork	29 May to 2 June 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	National Uniform Drillers Licensing Committee (2011) Minimum Construction Requirements for Water Bores in Australia (Edition 3, 2012) and the WA DER 2017 sampling procedures.
Ground clearance	Scanning using electromagnetic locating prior to mechanical drilling.
Drilling technique	Following hand auguring, push tubes and solid flight augers were employed until refusal and that was then followed by air hammer.
Bore logging	All field observations and subsurface conditions were recorded on lithological logs Appendix E).

Item	Description
Field screening	Field screening for volatiles was undertaken prior to collection of soil samples for laboratory analysis using a PID, the results of which are included in Appendix E. PID calibration data is presented in Appendix H.
Soil sampling	Discrete soil samples were collected from the surface and from each lithological zone. Samples for VOC screening were collected in separate snap lock bags. Additionally, soil was sampled into laboratory supplied jars.
Sample Analysis	Soil samples from each borehole were submitted for laboratory analysis of COPC including PFAS and total organic carbon (TOC). Aluminium and silica was analysed on selected samples.
Sample handling and transport	Following collection, soil samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a chain of custody (COC) form Appendix F.
QA/QC	A QA/QC sampling procedure was implemented and further details are described in Section 3 and Appendix D. QA/QC sampling included one intra-laboratory and one inter-laboratory duplicate samples, two field blanks and five rinsates (one per day).
Well construction	Wells were installed with the following general characteristics: <ul style="list-style-type: none"> - 50 mm polyvinyl chloride (PVC) Class 18 blank and screened casings - Primary filter pack material comprising a chemically inert material which was well rounded, with a high coefficient of uniformity and extended at least 0.5 m above the screened PVC casing - Bentonite pellets used as annular sealant which extended at least 0.5 m above the filter pack, followed by a cement slurry to the ground surface - Monitoring wells were finished with trafficable gatic covers or monuments and concrete
Development	Well development occurred following installation using air sparging until: <ul style="list-style-type: none"> - No further noticeable sand or silt was recovered - The water was relatively clear when removed from the well - All water was removed from the well
Surveying	Following well installation, all newly installed were surveyed by a registered surveyor. The survey report for the wells is provided in Appendix G.
Waste disposal	Soil cuttings and purged groundwater was transferred to 205 L drums and stored on site. Six of the eight waste drums have been transferred to a licenced waste facility, with waste disposal documentation provided in Appendix I. The waste disposal included both Phase 1 and 2 waste.

4.3 Sediment sampling

Table 4-2 Sediment sampling methodology

Item	Description
Date of fieldwork	13 to 16 June 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures and the WA DER 2017 sampling procedures.
Sampling	Samples were collected by hand using a trowel and were placed directly into laboratory supplied sample jars.
Sample handling and transport	Following collection, sediment samples were immediately placed on ice and stored in an insulated container prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix F).
Decontamination	Prior to and following the collection of each sediment sample, all non-disposable sampling equipment underwent decontamination including: Washing of equipment with tap water to clean away debris and then rinsed with deionised water.
Sample analysis	All sediment samples were submitted for laboratory analysis of COPC including PFAS and total organic carbon (TOC).
Quality assurance and quality control (QA/QC)	QA/QC sampling included one intra-laboratory duplicate sample.

4.4 Groundwater sampling

Table 4-3 Groundwater sampling methodology

Item	Description
Date of fieldwork	13 to 16 June 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	ASTM D6771–02, Standard practice for low-flow purging and sampling for wells and devices used for groundwater quality investigations, ASTM International Australian Standard 5667:1998 Water Quality – Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS 5667.1:1998) Australian Standard 5667:1998 Water Quality – Sampling, Part 11: Guidance on the Sampling of Groundwaters (AS 566.11:1998) WA DER 2017 sampling procedures.
Gauging	On-site monitoring wells (MW01 to MW06), three off-site monitoring wells (MW07 to MW09) and a private groundwater bore (GW966477) were gauged using an oil/water interface probe to measure standing water levels (SWL) and assess for the potential presence of light non-aqueous phase liquid (LNAPL). LNAPL was not encountered, therefore no LNAPL sampling was required.
Field chemistry	Field measurements were taken using a calibrated water quality meter and flow through cell, with measurements of temperature, pH, electrical conductivity (EC), dissolved oxygen (DO) and oxidation-reduction potential (REDOX) recorded. Field sampling sheets are presented in Appendix H.
Sampling	All monitoring wells were low flow sampled using a micropurge pump.

Item	Description
Sample handling and transport	Following collection, the groundwater samples were immediately placed on ice and stored in a cool, dark environment (esky) prior to being forwarded to the analytical laboratory within the specified holding times along with a COC form (Appendix F).
Decontamination	Prior to and following the collection of each groundwater sample, all non-disposable sampling equipment underwent decontamination including: Washing of equipment with tap water and rinsing of equipment with deionised.
Sample analysis	All groundwater samples were submitted for laboratory analysis of COPC including PFAS and total dissolved solid (TDS) with the three newly installed off-site wells sampled for major ions and alkalinity. Laboratory certificates of analysis and COC included in Appendix F.
Quality assurance and quality control (QA/QC)	QA/QC sampling included the collection of one inter-laboratory duplicate sample.
Waste disposal	Purged groundwater was transferred into 205 L sealed drums which were stored on the FRNSW site. Six of the eight waste drums have been transferred to a licenced waste facility, with waste disposal documentation provided in Appendix I. The waste disposal included both Phase 1 and 2 waste.

4.5 Surface water sampling

Table 4-4 Surface water sampling methodology

Item	Description
Date of fieldwork	13 to 16 June 2017
Work clearance	JSEA including daily pre-work assessment and hazard identification
Technical guideline	GHD's Standard Field Operating Procedures and the WA DER 2017 sampling procedures.
Field chemistry	Field parameters temperature, pH, electrical conductivity (EC), dissolved oxygen (DO), reduction-oxidation potential (REDOX) and temperature of the surface water were also recorded at each sample point using a water quality meter placed directly into a bucket of water from the water body. Field sampling sheets are presented in Appendix H.
Sampling	Surface water samples were collected from locations close to the water's edge using a hand held water sampler fitted with a laboratory provided plastic unpreserved container that was changed between locations.
Sample handling and transport	The surface water samples were then transferred into laboratory provided bottles. placed in an ice filled cool box for sample preservation prior to and during shipment to the sampling laboratory. A chain of custody form was completed, and forwarded with the samples to the testing laboratory.
Decontamination	Dedicated sample bottles will be used to collect surface water samples, eliminating the need for decontamination of equipment and rinsate samples.
Sample analysis	All surface water samples were submitted for laboratory analysis of COPC including PFAS and total suspended solids. Previously unsampled locations included major ions and alkalinity (SW09 to SW16). Laboratory certificates of analysis and COC included in Appendix F.
Quality assurance and quality control (QA/QC)	QA/QC sampling included the collection of one intra-laboratory duplicate sample.

5. Assessment criteria

5.1 Basis for assessment

Screening criteria for the assessment of PFAS impacted sites are still in the process of development in Australia. Only a few values have been published by Australian regulatory agencies, some of which are interim, draft or are “to be reviewed”. The office of environment and heritage (OEH) released a Draft PFAS Screening Criteria (May 2017) that provides guidelines values to be used. The OEH on behalf of the EPA also reviewed the Stage 1 ESA (GHD 2017) and provided advice on screening criteria to be used for future assessments at the site.

Published guideline documents currently available and considered as part of this review include:

- CRC CARE 2017. Assessment, management and remediation guidance for perfluorooctanesulfonate (PFOS) and perfluorooctanoic acid (PFOA) – Part 2: Health screening levels, CRC CARE Technical Report no. 38, CRC for Contamination Assessment and Remediation of the Environment, Newcastle, Australia.
- Department of Environment and Energy (DoEE), October 2016. DRAFT *Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFAS)*
- EC 2017. Canadian Environmental Protection Act, 1999 Federal Environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS). Environment and Climate Change Canada, February 2017.
- Health 2017. Release of Food Standards Australia New Zealand’s (FSANZ) report on: Perfluorinated chemicals in food Supporting Information. Australian Government Department of Health, 31 March 2017.
- OEH/NSW Health 2017. Calculation of Tier I human health PFAS screening values for soil and fish. In preparation.
- Western Australia Department of Environment Regulation (WA DER) 2017 *Interim Guideline on the assessment and management of perfluoroalkyl and polyfluoroalkyl substances*.

For the purpose of the assessment of data collected from the site, a number of guidelines and information sources have been reviewed in order to identify the most appropriate and current site assessment criteria at the time of preparation of this report. GHD notes that the criteria used differ slightly to those outlined in the letter from the EPA to FRNSW (dated 31/03/2017) as new documentation and guidance has been published since the receipt of that letter. The screening criteria documented herein supersede any criteria previously specified in the site PSI (GHD, 2016) and ESA (GHD, 2017).

It is noted that the assessment of PFAS impacted sites is a rapidly developing field and consequently site assessment criteria are continually under review and may be revised as new scientific information becomes known.

5.2 Rationale for assessment criteria

The assessment criteria were selected to allow decisions to be made for the following identified receptors (from Section 2.8.2):

- FRNSW and wider training facility commercial workers associated with the council yards and Rural Fire Service.
- Potential intrusive maintenance workers on and off-site
- Off-site hydraulically down-gradient residential receptors north of the site.
- Recreational users of surface waters down hydraulic gradient from the site.
- Beneficial uses of groundwater, including domestic/stock use groundwater resources.
- Terrestrial and ecological receptors on and off-site in land based ecosystems and surface water bodies (including those recharged by groundwater).

Following review of the previous ESA (GHD, 2017), NSW EPA noted that commercial / industrial land use is not applicable to fire training activities, as site activities are likely to involve greater contact with soil. However, interviews conducted with staff at these facilities state that most training is conducted on hard surfaces and appropriate work wear is required whilst training to limit exposure to the water during training. Therefore, there is minimal exposure to soil during these trainings. GHD understands that no personnel live at the site. In addition to this, these training grounds are not in use every day of the week and therefore there is limited exposure to contaminants that are present in the soil, sediment and surface water on the site. GHD therefore considers that the commercial / industrial scenario is applicable to this site and that investigation levels based on a more sensitive land use setting would be overly conservative since workers are not being exposed daily and nor are they eating food grown on the site or directly being exposed to soils.

The retention pond that is the main source of PFAS on the site has been taped-off and therefore there is no direct contact for the fire fighters using the site.

The OEH/NSW Health residential criteria for soils (off-site) are included in the summary analytical tables presented in Appendix B, however this guideline is for comparison to sediments and off-site soils only (refer to Section 5.3.2).

5.3 Nominated PFAS assessment criteria

5.3.1 Soil

The nominated assessment criteria and screening levels for PFAS are outlined in, and are shown on Table A, Appendix B.

Table 5-1 Nominated screening criteria for soil

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Health Based			
Residential	0.009 mg/kg	0.1 mg/kg	Criteria adopted from OEH and NSW Health <i>Calculation of Tier 1 human health PFAS screening values for soil and fish (2017 – in preparation)</i> to account for different landuse activity on and off the site.
Commercial / industrial	20 mg/kg	100 mg/kg	
Ecological based			
Soil (off site locations) – indirect Commercial/ Industrial	0.14 mg/kg (PFOS only)	NE	This value accounts for bioaccumulation and/or off-site transport and is recommended by the OEH C&R (NSW EPA 31/3/17) and is from the Canadian Environmental Protection Act, 1999 Federal environmental Quality Guidelines Perfluorooctane Sulfonate (PFOS), (EC 2017).
Soil – Off-site Agricultural land	0.01 mg/kg (PFOS only)	NE	Criteria adopted from CRC Care (2017) and only can be used for soil screening on-site as per the OEH C&R document (NSW EPA 31/3/17)
NE – not established			

As per the NSW EPA guidance, there are no reliable values available for sediment and leachate.

5.3.2 Sediment

According to *Sediment quality assessment: a practical guide* (Simpson and Batley, 2016), a sediment is defined as ‘unconsolidated mineral and organic particulate material that has settled to the bottom of aquatic environments’. Sediment samples that were collected from drainage lines are not considered to be from ‘aquatic environments’ and therefore represent a similar exposure scenario to in situ soils. Therefore, these sediment samples (SS01 to SS16, SS19, SS20 and SS23) were assessed against the adopted soil assessment criteria outlined in Section 5.3.1 i.e. commercial/industrial for on-site sediments and *OEH/NSW Health 2017 Residential off-site, Soil Indirect - Agricultural land, residential and parkland off-site* for off-site sediments.

Sediment samples SS17, SS21 and SS22 were collected from Dumaresq Creek and are therefore considered ‘sediments’. There are no applicable screening criteria for sediments.

5.3.3 Surface water and groundwater

The nominated assessment criteria and screening levels for PFAS are outlined in Table 5-2, and are shown on Table C, Appendix B.

In accordance with NSW EPA (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*, contaminants identified in groundwater have been screened against the adopted screening criteria which protect the following environmental values:

- Drinking water
- Aquatic ecosystems

On the basis that groundwater and surface water discharges to a fresh water system (Dumaresq Creek, located approximately 900 m north of the site) fresh waters screening criteria have been adopted. Additionally, recreational receptors and associated criteria have also been considered as part of this investigation.

GHD notes that direct toxicity for freshwater ecology has been adopted for this assessment. OEH (2017) recommends that secondary poisoning and bioaccumulation should be assessed using biota sampling/analysis (instead of using water) and the wildlife diet screening values provided by Canadian guidelines. This was not considered appropriate for this stage of the assessment, as the extent of contamination was not yet delineated in aquatic environments and more information is required around the uses of Dumaresq Creek.

Table 5-2 Nominated screening criteria for surface water and groundwater

Exposure Scenario	PFOS / PFHxS	PFOA	Basis for nomination of criteria
Drinking water quality	0.07 µg/L	0.56 µg/L	Criteria adopted from the Australian Government Department of Health <i>Release of Food Standards Australia New Zealand report on perfluorinated chemicals in food supporting information</i> (Health, 2017) as recommended by NSW OEH. Drinking water is not extracted on site and no registered domestic use groundwater bores were located in a 500 metre radius of the site. However, the potential for localised use of groundwater for domestic or stock purposes should not be discounted, and as such drinking water criteria are considered for the purpose of this initial screening.
Recreational water quality	0.7 µg/L	5.6 µg/L	Criteria adopted from DER (2017) freshwater criteria for high conservation value systems (99% species protection). Whilst the receiving ecosystem from the FRNSW site is not considered high conservation value, the draft guidelines recommend that the 99% level of protection is used for slightly to moderately disturbed systems as PFAS and PFOA have been shown to bioaccumulate in wildlife.
Ecological - freshwater	0.13 µg/L (PFOS only)	220 µg/L	Criteria adopted for direct toxicity assessment from the Draft Commonwealth Environmental Management Guidance on Perfluorooctane Sulfonic Acid (PFOS) and Perfluorooctanoic Acid (PFOA) (Australian Government Department of the Environment and Energy (DoEE), 2016). As directed by NSW EPA (2017), a 95% species protection level has been adopted (slightly to moderately disturbed ecosystems).

6. Results

6.1 General

This section presents the results of all soil, groundwater, sediment and surface water investigations undertaken on the site by GHD in May and June 2017.

Analytical results and groundwater/surface water field parameters are summarised in the following tables in Appendix B:

- Table A: Soil and sediment analytical results - Phase 2
- Table B: ASLP analytical results - Phase 2
- Table C: Groundwater and surface water analytical results and field parameters - Phase 2
- Table D: Soil and sediment analytical results – Phase 1 and 2
- Table E: Leachate ASLP analytical results – Phase 1 and 2
- Table F: Groundwater and surface water analytical results – Phase 1 and 2

6.2 Quality assurance and quality control

An evaluation of the field and laboratory data quality was undertaken in accordance with the NEPM – Schedule B2, Assessment of data quality.

In summary, the review of the QA/QC program indicates that the soil, groundwater, surface water and sediment analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts to groundwater, surface water, sediment and soil.

6.3 Soil results

Soil was examined by GHD during drilling works at newly installed groundwater wells (MW05 to MW09) and soil bores (SB13 to SB15). Descriptions of the lithology including visual and olfactory observations, sample identifications along with the well construction details and elevations are presented in borehole logs contained in Appendix D.

An additional monitoring well was to be installed in the road reserve of Cookes Road. However, this well was unable to be drilled due to access restrictions and overhead power lines.

6.3.1 Soil profile

The observed lithology at across the eight investigation locations completed during this scope of works is summarised in Table 6-1 and are consistent with the previous profiles from the locations completed during the 2016 ESA (GHD 2017).

Table 6-1 Generalised lithology encountered

Depth range (m)	Lithology
0.0 – 0.3	Gravelly SAND, pale brown (fill)
0.2 - 0.3 to 1.6 - 1.7	CLAY dark brown (natural)
0.4 – 1.7 to 1.6 - 2.7	Gravelly CLAY, grey and brown (natural)
1.5 to 6.0 - 16.5	Recovered as gravelly and or sandy CLAY (natural bedrock)
6.0 – 27.0 (maximum depth)	Basalt, grey / dark grey (natural bedrock)

6.3.2 Soil analytical results

Soil samples were collected from five monitoring wells (MW05 to MW09) installed at various locations on and off site, and three soil bores (SB13 to SB15). The locations and associated exceedances of the nominated criteria are presented in Figures 5A and 5B in Appendix A for on and off-site locations, respectively. Laboratory analytical results are presented in Table A, Appendix B. Laboratory certificates of analysis are presented in Appendix F.

On-site

Monitoring wells MW05 and MW06 were installed to the south of the FRNSW site but within the bounds of the wider training facility. All soil results were below the nominated screening criteria for all COPC. Concentrations of PFAS in soil samples were generally low, with the concentration of the majority of PFAS analytes below the laboratory limit of reporting (LOR) at each location. The highest total PFAS concentration in soil was reported in shallow soils at location SB15_0.0-0.1 (sample FD01) with a total PFAS concentration of 0.0749 mg/kg. This consisted predominantly of PFOS (0.0571 mg/kg).

Off-site

Monitoring wells MW07 to MW09 were installed on private properties located to the north of the FRNSW site. All soil concentrations were below the laboratory LOR and there were no exceedances of the assessment criteria.

6.4 Sediment results

Sediment samples were collected at locations SS01 to SS24. The sediment laboratory results for on-site and off-site sampling locations are presented on Figure 5A and Figure 5B in Appendix A and Table A, Appendix B. Laboratory certificates of analysis are presented in Appendix F.

Sediment samples (SS01 to SS16, SS19, SS20 and SS23) were assessed against the adopted soil assessment criteria. All on site sediment samples had PFAS concentrations below the assessment criteria. Off site sediment samples exceeding the adopted assessment criteria are summarised in Table 6-2. The highest concentrations of PFAS (sum of total) was located at off-site sampling location SS11 (0.119 mg/kg). The sample was collected off-site and within a dam on a private property.

There are no applicable screening criteria for samples classified as 'sediments' (SS17, SS21 and SS22) which were collected from Dumaresq Creek. However, each of these locations reported concentrations of PFAS (sum of total) above the laboratory LOR, potentially representing an on-going source of PFAS to the ecology of Dumaresq Creek.

Table 6-2 Summary sediment exceedances (assessed against the adopted soil criteria)

Analyte	Guideline Exceedance	Monitoring locations
PFHxS and PFOS (sum of total)	OEH / NSW Health 2017 Residential off-site	SS10, SS11, SS12, SS14, SS18
PFOS	Soil Indirect - Agricultural Land, residential and parkland - OFFSITE	SS10, SS11, SS12, SS18

Two stockpiles of dredged sediment were identified on private property during the course of the works. GHD understands that the materials had been removed from a dam on the property (at a previous, unknown time) located closest to the Dumaresq Creek. Samples SS16 and SS24 were collected from the stockpiled materials. Both samples reported PFAS concentration below the laboratory LOR.



Stockpile of SS16 – south of dam



Stockpile SS24 – north of dam

6.5 ASLP analytical results

Seven soil samples and 24 sediment samples were submitted for ASLP testing for PFAS. The leachate laboratory results are presented in Table B, Appendix B and the locations are shown on Figure 4, Appendix A. Laboratory certificates of analysis are presented in Appendix F.

No assessment criteria were adopted for ASLP assessment as per EPA guidance.

Concentrations of PFAS (sum of total) in leachate from the soil samples showed higher concentrations in the shallow samples with the concentrations decreasing with depth of the profile.

SS02 reported the highest concentration of PFAS (sum of total) with 2.69 µg/L in sediment. The sample was collected from the retention pond on-site. The two sediment samples that were collected from the dredged from the dam (SS16 and SS24) were below the laboratory LOR.

6.6 Groundwater and surface water results

6.6.1 Groundwater gauging results

Gauging results are summarised in Table 6-3. The top of casing (TOC) elevation was determined by a professional surveyor and was used to calculate the groundwater elevation in metres Australian Height Datum (AHD).

Table 6-3 Groundwater Gauging Data

Well ID	Depth of well (m)	Depth to groundwater (m bTOC)	TOC (m AHD)	Corrected groundwater elevation (m AHD)
MW01	16.54	13.90	983.876	969.976
MW02	17.78	14.66	985.469	970.809
MW03	18.04	12.50	982.440	969.940
MW04	18.64	12.77	982.921	970.151
MW05	23.98	18.00	990.862	972.862
MW06	26.99	26.82	987.435	DRY
MW07	21.65	12.48	981.381	968.901
MW08	20.11	14.18	982.827	968.647
MW09	17.12	9.01	977.975	968.965

Note: TOC = top of casing

A groundwater contour map showing the interpolated groundwater contours and the inferred groundwater flow direction is presented on Figure 7 in Appendix A. Groundwater contours were calculated based on groundwater elevations using an inbuilt ArcGIS interpolation tool to derive the contours with a kriging method.

The local groundwater flow was interpreted to be in a north to north westerly direction towards the Dumaresq Creek system, however GHD notes that this is based on small number of data points.

6.6.2 Groundwater quality

Prior to groundwater sample collection, field parameters and observations were recorded during the purging of the well. Field parameters are summarised in Table 6-4.

Table 6-4 Summary of groundwater quality field parameters

Parameter	Results and Comments
pH	pH range was 5.9 (MW01) and 7.69 (MW03)
Temp (°C)	Temperature was between 14.3°C (MW07) and 19.6°C (MW03)
EC (µS/cm)	EC ranged between 852 µS/cm (MW04) and 2,801 µS/cm (MW07)
DO (mg/L)	DO ranged between 2.44 mg/L (MW01) and 6.89 mg/L (MW02)
ORP* (mV)	Field redox ranged between -20 mV (MW03) and 376 mV (MW01)

* Oxidation Reduction Potential – field values adjusted by +205

No sheen was observed, however a sulphur odour was noted at MW03. The purged groundwater was brown and turbid.

Field parameters were also collected prior to collection of the surface water grab sample. The field parameters have been presented in Table C, Appendix B and notes of the water collected are provided on the field recorded in Appendix H.

6.6.3 Analytical results

Samples were collected from eight groundwater wells located on-site and off-site (MW01 to MW05, MW07 to MW09) MW06 was dry and therefore could not be sampled. Additionally, a sample was collected from one off-site private groundwater bore (GW977466). The groundwater laboratory results are summarised in Table C, Appendix B. Laboratory certificates of analysis are presented in Appendix F.

Groundwater and surface water COPC reported in excess of the nominated screening criteria are summarised in Table 6-4, and are shown on Figure 6 in Appendix A. Further discussion pertaining to these exceedances is provided in Section 7.

Table 6-5 Summary groundwater and surface water exceedances

Analyte	Guideline Exceedance	Monitoring locations
PFHxS and PFOS (sum of total)	Drinking water (human health) - FSANZ	GW966477 MW01, MW02, MW03, MW07, MW08 SW01 to SW07, SW09, SW10, SW13 to SW16
	Recreational (human health) - FSANZ	MW01, MW02, MW03 SW01 to SW07, SW09, SW10 SW13, SW16
PFOS	Fresh water (ecological) - FSANZ	GW966477 MW01, MW02, MW03 SW01 to SW07, SW09, SW10, SW13 to SW16

7. Discussion

Historical results from the previous ESA (GHD, 2017) have been included on the results tables D (soil and sediment), E (leachate) and F (groundwater and surface water) provided in Appendix B and have been used as a comparison for the current PFAS results. This stage of works is focused primarily on PFAS contamination associated with historical use of AFFF. Other contaminants of concern, initially considered during the previous ESA (GHD, 2017) are not discussed further in this report.

7.1 Soil and sediment

7.1.1 PFAS in soils and sediment– on site

No on-site soil results exceeded the adopted PFAS screening criteria for both human health and ecological receptors based on a direct contact scenario for commercial / industrial landuse.

The concentration of PFAS in on-site soils were low with the results generally being less than the laboratory LOR and/or several orders of magnitude below the nominated investigation levels under commercial/industrial land use scenarios.

Soils bores and monitoring wells located around the main fire training ground reported the highest concentrations of PFAS with SB02_0.9-1.0 with the highest concentration of PFAS (sum of total) at 0.348 mg/kg. PFAS concentrations within the soil bore decrease with depth throughout the soil profile.

The skid pan in the southern corner of the wider facility is another source of PFAS. During the previous ESA (GHD, 2017), the concrete from the skid pan reported a concentrations of PFHxS + PFOS of 0.182 mg/kg with underlying soil concentrations two orders of magnitude lower. Two soil sampling locations were completed within the footprint of the skid pan area (SB08 and SB09), both of which reported detections of PFAS throughout the soil profile, albeit at relatively low concentrations, to the maximum sampling depth of 5 metres.

No detects of PFAS were reported in samples SB05 to SB07, collected from the general training area located in the south eastern corner of the FRNSW site where it is understood no fire training activities potentially using AFFF have occurred.

The sediments collected on-site were along drainage lines that run through the site. All these drainage lines meet at one central point before draining under Mann Street through a concrete culvert. All sediment samples collected on-site had detections of PFASs, The highest PFAS concentration in sediment was at SS02 collected from the retention pond on-site. SS03 was collected from the drainage line that drains from the rural fire service.

7.1.2 PFAS in soils and sediment – off site

No off-site soil bores reported detects above the laboratory LOR for PFAS. However, all off-site sediment samples located in the drainage lines or surface water dams reported detections of PFAS. This indicates that PFAS is likely to be migrating off-site via the surface water drainage pathways.

The concentration of PFAS in off-site sediment samples is overall decreasing with distance from site as shown on Chart 1.

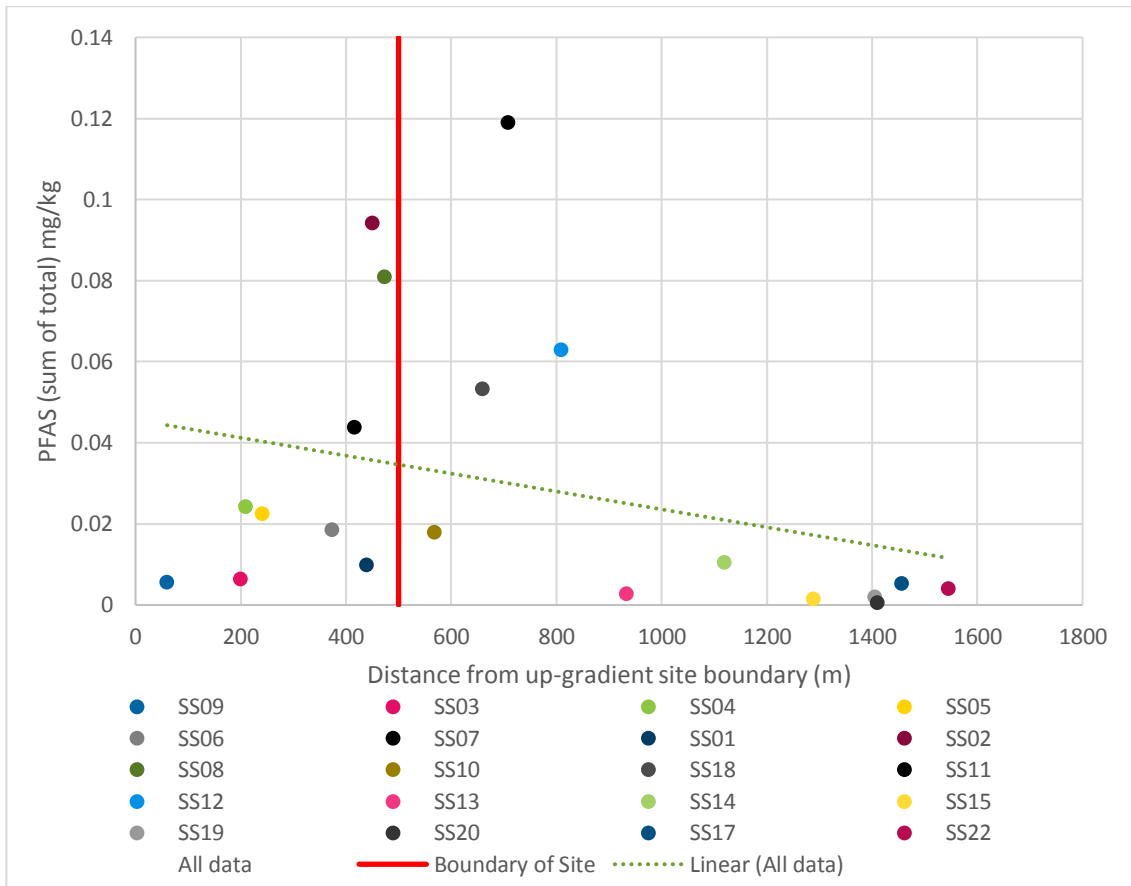


Chart 1 Sediment PFAS (sum of total) concentrations with distance from up-gradient site boundary

7.1.3 PFAS leachability from soils

One of the primary processes by which PFASs present in soil may pose a risk to people or the environment is contamination of surface and groundwater’s from leaching from soils or sediments (NSW EnRiskS, 2016).

Despite the low concentration of PFAS in all soil and sediment samples, leachate testing completed on a number of these samples shows that there is potential for the release of PFAS to groundwater and surface water environments and the presence of PFAS in soils represents a likely on-going source to the environment.

Soil samples collected from on-site locations SB01 and MW05 report elevated PFAS concentrations in leachate. SB01 is located immediately down-gradient of the main fire training area and up-gradient of the retention pond. All soil samples collected at and around this area report elevated PFAS (sum of total) in leachate samples. The highest off-site concentration of PFAS (sum of total) in leachate samples was reported in sample SS10 (1.07 µg/L). This location was collected from the first surface water dam on private property.

Based on the findings of these works, the main fire training area and the ski pan are considered likely to be ongoing sources of PFAS contamination to surface water and groundwater and that the impacted sediments both on and off site may continue to pose a risk to ecological aquatic receptors.

7.2 Groundwater and surface water

Groundwater contours indicate that the groundwater is flowing generally to the north. This aligns with the expected groundwater flow from the regional topography, geology and hydrogeology. Without a detailed investigation of the hydrogeology, further conclusions with respect to flow through the fracture system are unable to be drawn.

PFAS has been detected on the FRNSW site, within the wider training facility and off-site in both surface waters and groundwater at concentrations greater than the adopted assessment criteria for the protection of drinking water, ecological, and recreational receptors.

7.2.1 PFAS in surface water – on site

All surface water samples exceeded the FSANZ drinking water and DoEE ecological assessment criteria. The highest concentration PFAS (sum of total) was reported during the November 2016 sampling event in Sample SW01, collected from the surface water retention pond adjacent to the fire training ground (29.9 µg/L) on the FRNSW site. The concentration of total PFAS (sum of total) in sample SW01 following the recent June 2017 sampling event was 12.1 µg/L.

SW03 and SW02, (retention basins in the wider training facility) both contained (in the December and June sampling rounds) relatively low concentrations of PFAS, indicating potentially lower mass of PFAS in these ponds compared to the FRNSW retention pond

Three additional surface water samples were collected during the June 2017 sampling event. SW13 was located up-gradient along a drainage line that runs from the Rural Fire Service area and SW14 and SW15 are along the main drainage line (unnamed Tributary) that runs through the site. Sample SW13 had a PFAS (sum of total) concentration of 11.9 µg/L which is the third highest location concentration. The concentration of PFAS (sum of total) in sediment sample SS03 (collected at the same location as SW13) was 0.0064 mg/kg, which is noted to be second lowest on site. A comparison of all surface water and corresponding sediment samples indicated there is no clear proportional relationship between PFAS in both media (refer to Chart 2).

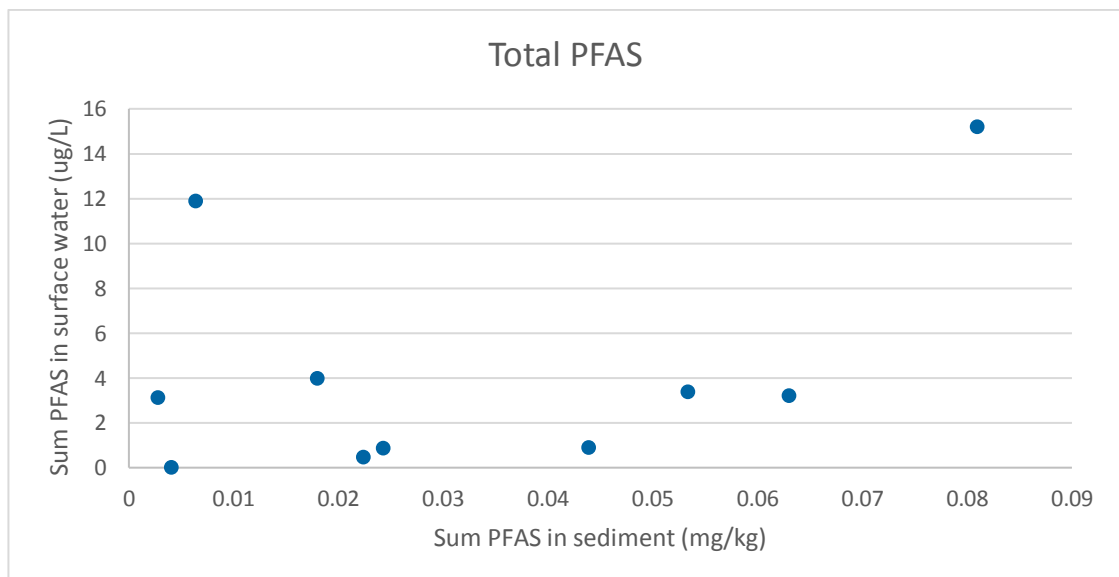


Chart 2 Total PFAS in sediment and corresponding surface water samples

PFAS was detected in surface water drainage on the FRNSW site and in the wider training facility. SW04, located at the point of exit from the wider training facility on the northern boundary, reported the second highest concentrations of PFAS compared to all the water samples collected. The detection of PFAS at SW04 at concentrations exceeding the nominated criteria, coupled with the presence of elevated PFAS in surface water further downgradient of the site, suggests that PFAS has migrated from the FRNSW site to off-site receptors.

7.2.2 PFAS in surface water – off site

Once off-site, PFAS concentrations were detected in the unnamed tributary in the three neighbouring properties down gradient of the site. PFAS concentrations were relatively similar in the five surface water locations between the site and Grafton Road (SW05, SW09, SW16, SW06 and SW10), ranging from 3.11 to 3.97 µg/L total PFAS.

Surface water locations located to the north of Grafton Road were lower. Water from the large pond adjacent to Dumaresq Creek (SW07) reported total PFAS of 1.21 µg/L. Water taken from Dumaresq Creek reported total PFAS of between 0.02 and 0.04 µg/L (SW08, SW11, SW12). This may reflect attenuation of the PFAS along the trace of the surface water or simple dilution in larger water bodies.

The farm dam adjacent to Dumaresq Creek is relatively large in size and roughly 305 m in diameter and 2 m deep. There is no drainage line from the dam to Dumaresq Creek, however in prolonged rainfall this dam may overflow to the creek. The sediment and the surface water within the dam are impacted with PFAS and should this dam overflow, then PFAS contamination may potentially enter into Dumaresq Creek. The dam currently appears to be acting as a buffer between the surface water drains and the creek.

There are four private properties with dams with one owner using the water in the dam for stock watering. The other three properties do not use the water in the dams. FRNSW have been in discussions with the owner of the farm dam that was to use the water in the dam for topping up the troughs for horses. However, the landowner and FRNSW have come to an agreement to not use the water in the dam until further notice.

7.2.3 PFAS in groundwater – on site

The concentration of PFOS in groundwater samples MW01, MW02 and MW03 exceeded the freshwater ecological guidelines, drinking water and recreational guidelines. MW04 and MW05 did not exceed any of the adopted screening criteria and MW06 was dry (well installed to 26.2 mbgs). Both MW03 and MW01 are located immediately down gradient of the western firefighting training area on the FRNSW. The training area is therefore likely to be acting as a source of contamination to groundwater, which corresponds with the results from surface water and soil/sediment samples. MW02 is located in the other fire training area and hydraulically down-gradient of the skid pan. The presence of PFAS in this well suggests the fire training area is acting as a source of groundwater contamination. MW04 is located 130 m down-gradient of MW02 and yet has reported no PFAS impact.

Very low PFAS concentrations were reported in MW05, adjacent to the skid pan suggesting the skid pan area may be contributing PFAS to the groundwater.

The pattern of PFAS occurrence on-site is complex and suggests multiple source zones and multiple PFAS plumes. Currently there are insufficient wells on-site to delineate the extent, flow paths and interactions of these plumes.

7.2.4 PFAS in groundwater - off site

MW07 is 50 m down-gradient of MW03 located on private property. Groundwater concentrations in MW07 and MW08 exceeded drinking water criteria as well as the private bore (GW966477). MW09 groundwater results were all below the laboratory LOR for PFAS.

The water use survey for the area reported that the private bore is not in use and has not been used for a number of years. There is another private bore located in the caravan park located on the corner of Grafton Road and Cookes Road (north). Access was not given to GHD to sample this well during the investigation undertaken in June.

7.3 Refined CSM

7.3.1 Source-pathway-receptor linkages

Based on the additional information collected in May 2017, the following CSM has been refined for potential on site sources of contamination in Table 7-1.

Table 7-1 Updated CSM

Potential source	Primary pathway	Receptor	Pathway present?
Soils in firefighting training areas (main fire training area and skid pan) contaminated with PFAS	Dermal contact	FRNSW and wider training facility commercial workers and Intrusive maintenance workers	Unlikely – PFAS impact detected in shallow soil samples from these areas, however impact below adopted assessment criteria
	Vertical/horizontal migration of leachate through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Possible – PFAS impact in MW01, MW03, MW07, private bore and MW08, down gradient of training facility and off-site in private residential properties. While the PFAS is leachable, the mass of PFAS in the surface water could be the main contributing factor for PFAS to the groundwater
	Surface runoff and sediment transport	Surface waters (including drainage systems – secondary pathway)	
Off-site rural residential and commercial properties			Yes – sediment samples at the northern boundary and along drainage line contain PFAS
Off-site ecological			Yes – off-site dams indicated PFAS impact above ecological screening criteria, which is likely to be associated with this area in the FRNSW site
Soils in firefighting training areas (water use only area)	Vertical/horizontal migration of leachate through unsaturated zone	Groundwater and surface waters	Possible – PFAS detected detected in soil samples soil bores and sediments in the FRNSW site area. Leachate results indicate that leaching of PFAS from these samples is possible, and impact observed in down-gradient groundwater sample (MW01)
	Dermal contact	FRNSW and wider training facility commercial workers and/or Intrusive maintenance workers	No – no contamination detected in soil samples from this area

Potential source	Primary pathway	Receptor	Pathway present?
	Surface runoff and sediment transport	Surface waters and subsequent off site receptors	Possible – PFAS detected in soil samples from soil bores and sediments in the FRNSW site area. Leachate results indicate that leaching of PFAS from these samples is possible.
Surface water retention basin located to the north of the main fire training area (FRNSW site) contaminated with PFAS	Dermal contact and ingestion	FRNSW and wider training facility commercial workers	Unlikely – PFAS impact present greater than drinking water and recreational criterion at SW01. However, the area has been cordoned off with warning signs in place.
	Vertical/horizontal migration of water through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Yes – PFAS impact in MW01, MW03, MW07, private bore and MW08, down gradient of training facility and off-site in private residential properties
		Down gradient surface waters	Yes – Private dams down gradient report PFAS impact
	Surface water flows when overflowing	Down gradient surface waters, which may be used for stock watering	Yes – Private dams down gradient report PFAS impact greater than the ecological screening criteria
Surface water retention basin (wider training facility) contaminated with minor levels of PFAS	Dermal contact and ingestion	FRNSW and wider training facility commercial workers	Possible – PFAS above the recreational assessment criteria at SW02, SW03, SW04 and SW13 and greater than the drinking water criteria at SW14 and SW15.
	Vertical/horizontal migration of water through unsaturated zone	Groundwater – subsequent migration in groundwater (secondary)	Unlikely – groundwater at MW04 contained low levels of PFAS in 2016, and was less than the LOR in 2017.
		Down gradient surface waters	Unlikely – Private dams down-gradient report PFAS impact, however these dams are unlikely to be the major contributing source (low levels of PFAS)
	Surface water flows when overflowing	Down gradient surface waters, which may be used for stock watering	Possible – Private dams down gradient report PFAS impact however these dams are unlikely to be the major contributing source (low levels of PFAS)
Surface water retention basins off-site on private properties (secondary sources) contaminated with PFAS	Surface water flows when overflowing	Down gradient surface water storage, which may be used for stock watering	Yes – PFAS detected in all off-site dam sample locations above recreational criteria (SW05, SW09, SW16, SW06 and SW07).
		Down gradient ecological receptors	Yes – SW08, SW11 and SW12 samples collected in Dumaresq Creek had detectable levels of PFAS but were below both human health and ecological assessment criteria. Creek not directly hydraulically connected to unnamed tributary/drainage lines but

Potential source	Primary pathway	Receptor	Pathway present?
			could be in times of high flow/rainfall.
Contaminated groundwater	Vertical/horizontal migration	Down gradient surface waters recharged by groundwater	Unlikely – groundwater levels are below the surface water dams and are therefore not in connection. Connection with Dumaresq Creek is highly likely but water results (SW08, SW11 and SW12) are below adopted screening criteria.
		Abstraction bores (stock and/or domestic use)	Yes – Impact above adopted assessment criteria detected in private bore off-site and MW07 and MW08.

7.4 EPA gaps to be addressed

Surface water pathways: Samples for surface water and sediment were co-located where possible. No samples were undertaken on Black Gully Creek as the topography suggests there is no plausible pathway to this Creek from the site except where the Creek meets Dumaresq Creek. Samples were collected from Dumaresq Creek and the area surrounding and therefore negated the need to sample from this Creek. All dams and surface water was sampled along all potential drainage paths both on and off-site. Sampling has now been undertaken in summer and winter to gain an understanding of seasonal variation.

Groundwater pathways: Three additional groundwater wells were installed off-site. An additional groundwater wells was proposed on Cookes Road near Brown Street. However, due to overhead wires and water logged ground surface, no monitoring well could be installed. The groundwater flow direction is towards the Dumaresq Creek. There is a slight flow direction off-site to the north north-west due to the natural topography and based on the distance to the receptor and the hydraulic gradient to the water depth of Dumaresq Creek the groundwater is highly likely to be in connection with this creek. There is a private bore located within the caravan park that is a potential receptor based on groundwater flow. However, access was not given to sample the bore during the sampling event. PFAS concentrations in groundwater at MW09 (located off-site to the north) were less than the LOR and therefore has delineated the groundwater PFAS plume in that direction. However, there is nothing down-gradient of MW08 and the private bore. The PFAS concentrations within these wells (MW08 and GW966477) shows that concentrations have attenuated from MW03 and MW07.

Receptors / human dietary consumption: There are five private properties located down-gradient along the drainage pathway. Each of these properties have private dams that receive water through the drainage channel from on-site and the owners have completed water use surveys. Following discussions with owners of these properties, GHD understands that water in the dams is not used for watering plants or home grown produce. The start of a redevelopment project is noted to be occurring west of the drainage line. This could have further implications on the proximity of residential receptors.

Dam water use: Two owners keep horses and Shetland ponies on their property which have access to water in the dams. At the time of issue of this report, GHD understands that access to the surface water dam on the property with horses has been restricted and an alternative water

supply has been provided for the horses. No alternative arrangements had been made for water supply on the property with Shetland ponies at the time of issue of this report.

Recreational fishing in local area: From the water use survey, one survey respondent indicated use of local creeks for recreational purposes although they did not specify what kind of recreational activities they used these water sources for. Another respondent indicated that they used the dams on their property for swimming. These respondents will need to be followed up for further clarification to these responses.

Potential ecosystem receptors: The PFOS concentrations in the surface water samples collected in Dumaresq Creek (SW02, SW11 and SW12) are below the ecological screening criteria and therefore not currently a potential risk. However, during periods of flood or if the last dam located before Dumaresq Creek was to overflow there is a potential risk to Dumaresq Creek. It is likely however that large rain event may also result in a dilution of the PFAS in the creek.

8. Conclusions and recommendations

8.1 Conclusions

Based on the scope of works presented in Section 1.3 of this report, the findings of the investigation and subject to the limitations presented in Section 10, the following conclusions are made:

- The site is the main source of PFAS contamination in the surrounding properties.
- The surface water has the highest potential to rapidly migrate offsite and should be the main focus of immediate management.
- Soil on site represents an ongoing source of groundwater contamination.
- Groundwater is impacted by PFAS but its migration appears to be limited. However, insufficient wells are present to fully understand the extent of groundwater impact.
- The surface water bodies also provide an ongoing source of contamination to terrestrial animal – wild and domestic.

8.2 Recommendations

Based on the findings of these works, the following recommendations are made:

- Consideration of immediate management actions which can be implemented to address the mass of PFAS present on site and minimise further migration. Given the elevated concentrations of PFAS in the site dams and its presence downstream, management of the site dams is considered a priority. Mass reduction from these sources will eventually have a flow-on impact on downstream water sources. Consideration should also be given to diverting all drainage from the site back onto the site for retention and remediation.
- Further assessment of the use of surface water at the site and surrounding sites to assess the risk to human populations and ecosystems. Develop management strategies for off-site surface water. These might include:
 - Assess and implement measures to stop the retention basin on the FRNSW site overflowing, and restrict access/use of the water currently in this dam.
 - Removal of existing water and sediment in the three neighbouring residential properties and consideration of options to either remove impacted sediments or re-line the dams to prevent further contact with PFAS impacted sediments.
 - Isolate the dams from the current unnamed Tributary (see above).
 - Drainage channels between the dams could be cleared out to remove soils and sediments which are likely to act as potential leaching sources.
 - Removal and/or isolation of impacted soils around the fire training ground on the FRNSW site to remove the primary source zone
- Additional sampling should be undertaken following the implementation of any management actions. Sampling should be undertaken to accommodate seasonal fluctuation and, for example, following rainfall events to enable assessment of the areas where surface water collects from the ponds.
- Assessment of the risk of groundwater migration to local receptors. This may require additional wells.

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10. Limitations

This report has been prepared by GHD for Fire & Rescue NSW and may only be used and relied on by Fire & Rescue NSW for the purpose agreed between GHD and the Fire & Rescue NSW as set out in this report.

GHD otherwise disclaims responsibility to any person other than Fire & Rescue NSW arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Where data supplied by Fire & Rescue NSW or other external sources, including previous site investigation data and site plans, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by GHD for incomplete or inaccurate data supplied by others.

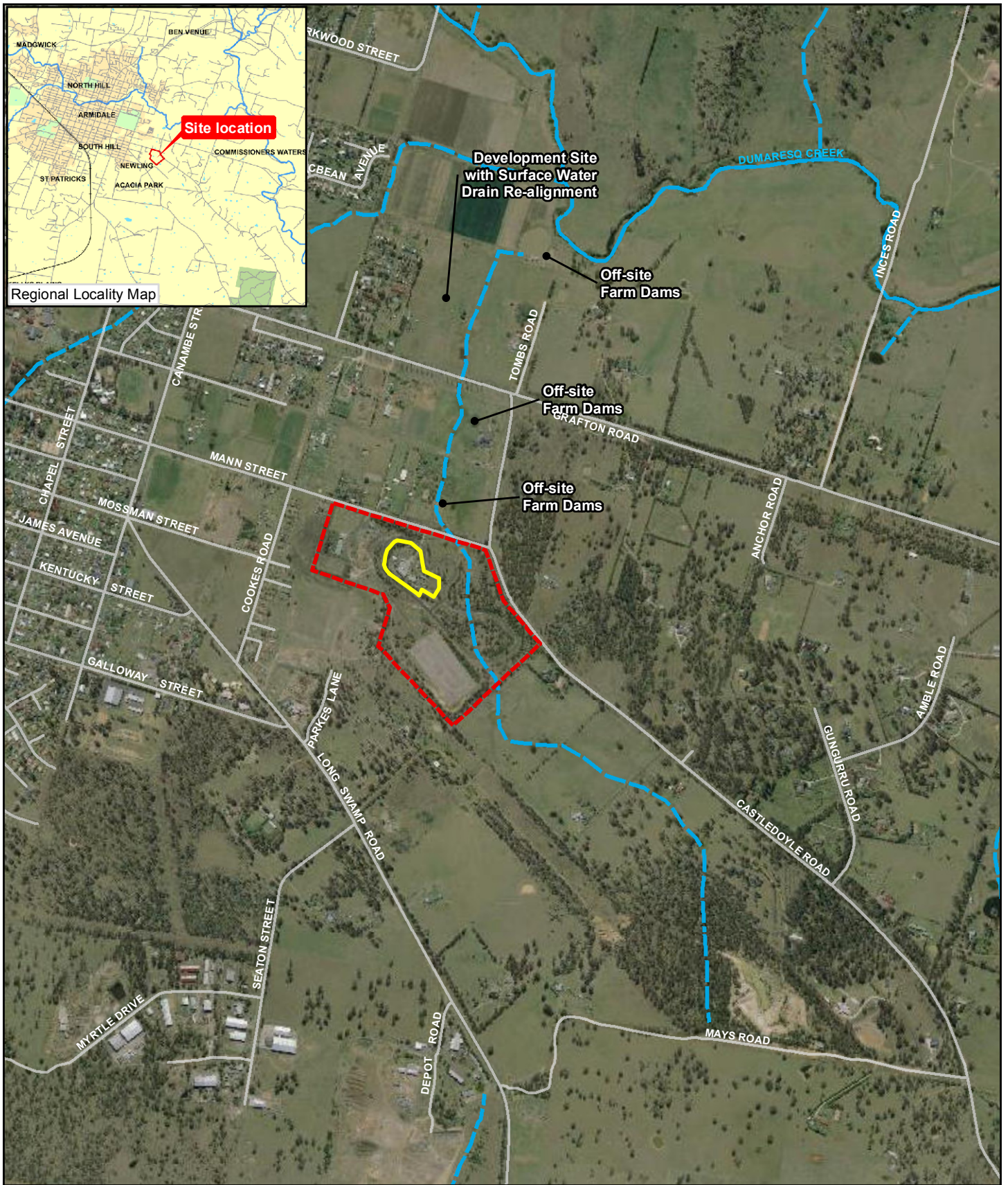
The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

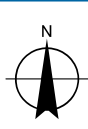
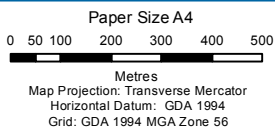
Appendices

Appendix A – Figures



LEGEND

- FR NSW Site
- Wider Training Facility
- Streets
- Major Waterways
- Minor Waterways

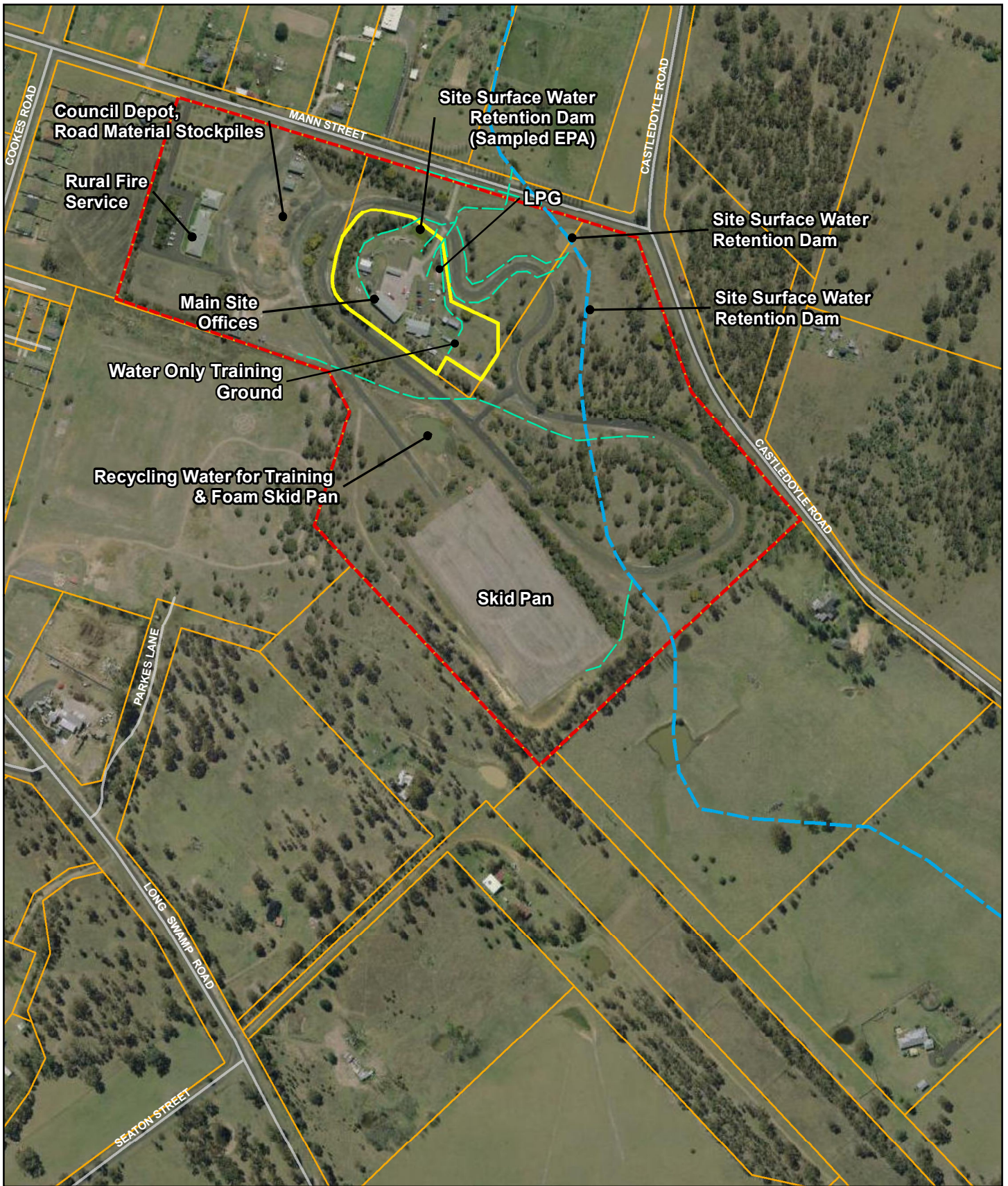


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Armidale Site Investigation

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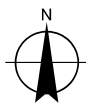
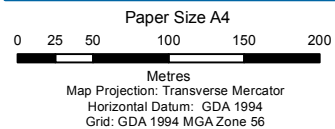
**Site Location and Key
Off-site Receptors**

Figure 1



LEGEND

- FR NSW Site
- Wider Training Facility
- Cadastre
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage



Fire & Rescue NSW
Armidale Site Investigation

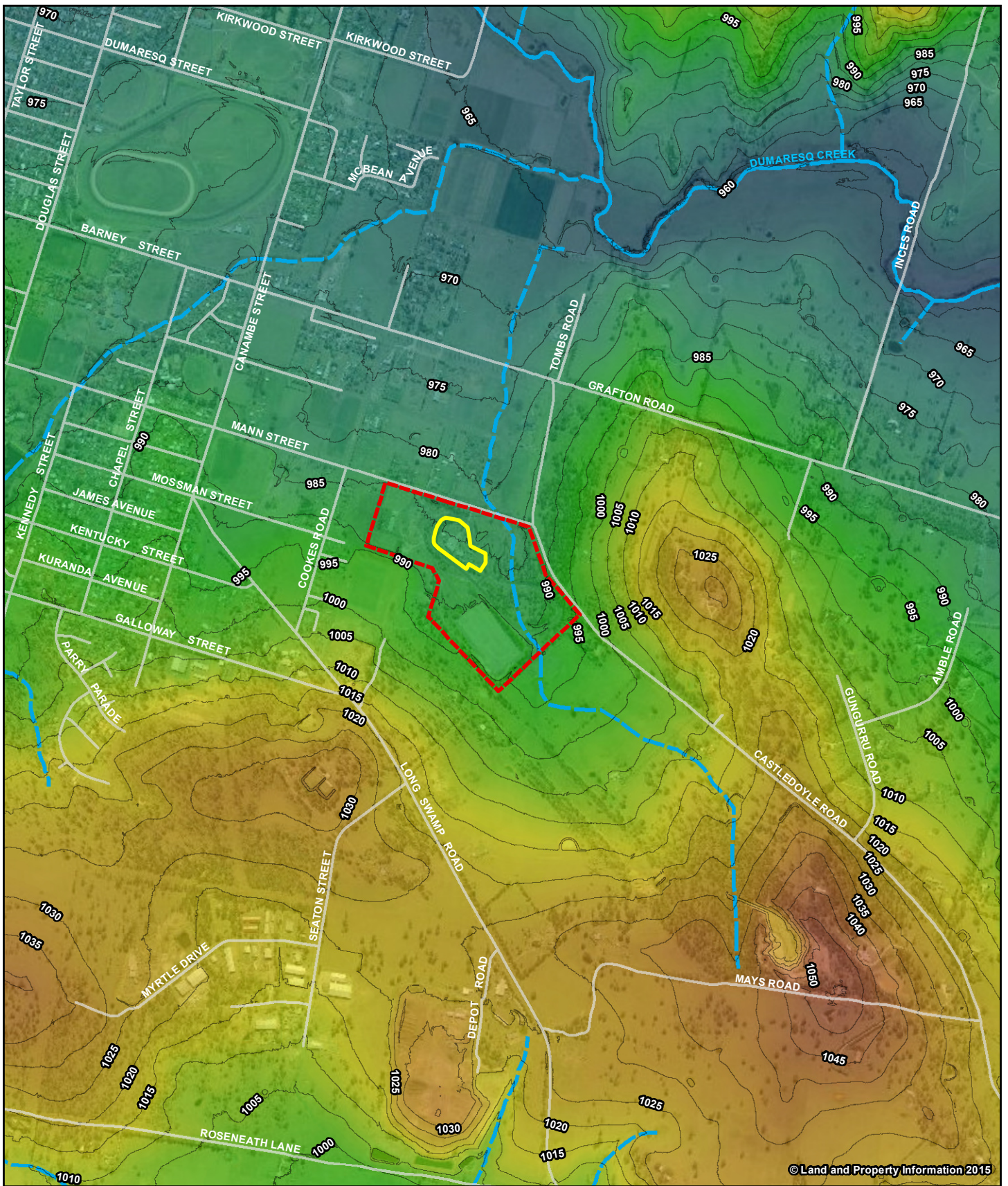
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Site Layout

Figure 2

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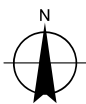
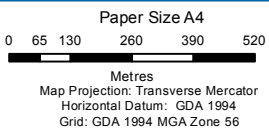
Data source: Imagery - ©Land and Property Information (Extracted: 17/07/17); Streets, Waterways - NSW LPI 2015 DTDB. Created by:jprice



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LEGEND

- FR NSW Site
- Wider Training Facility
- Streets
- Contours
- Major Waterways
- Minor Waterways
- Elevation (mAHd)**
High : 1055.43
Low : 955.072

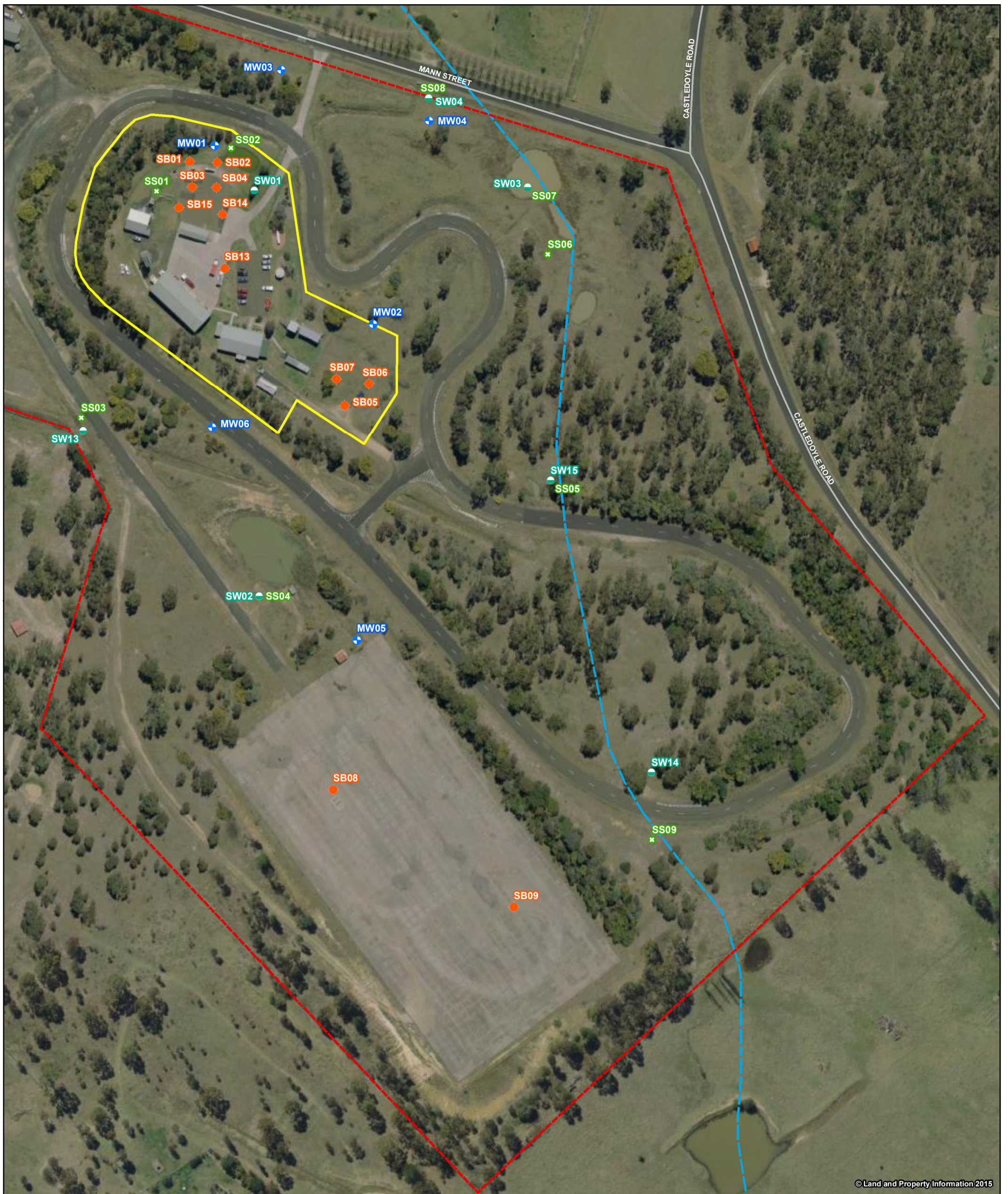


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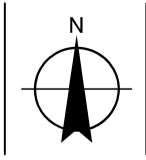
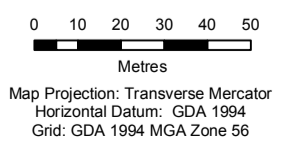
Elevation

Figure 3



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- LEGEND**
- FR NSW Site
 - Wider Training Facility
 - Streets
 - Major Waterways
 - Minor Waterways
 - + Groundwater Monitoring Well (GHD, 2016)
 - + Existing Private Groundwater Well
 - Soil Borehole (GHD, 2016)
 - * Sediment Sample Location (GHD, 2016)
 - Surface Water Sample Location (GHD, 2016)

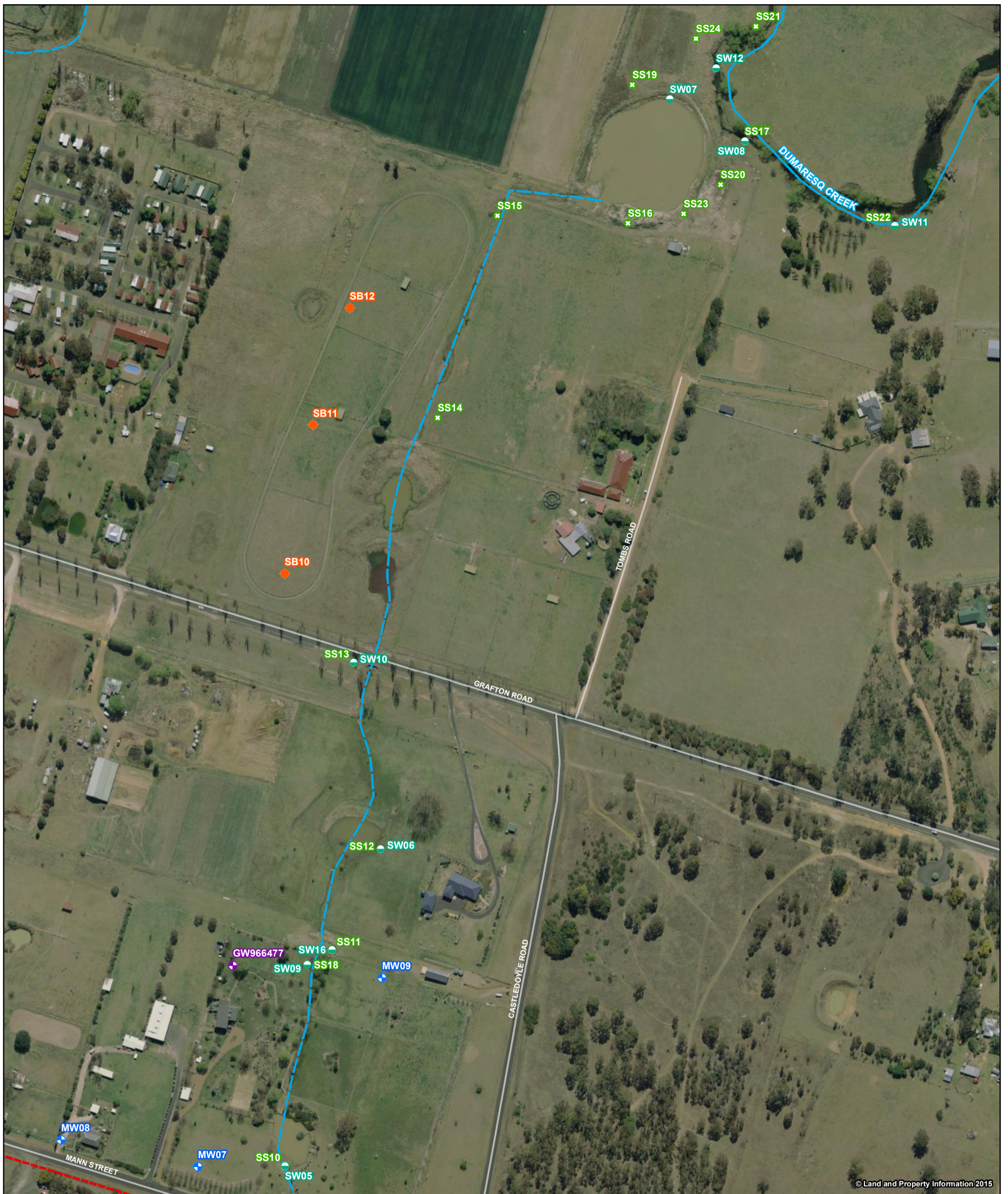


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Revision | A
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Investigation Locations (Within the Wider Training Facility)

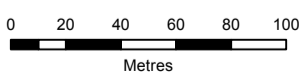
Figure 4A



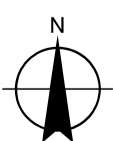
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LEGEND

- FR NSW Site
- Wider Training Facility
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage
- + Groundwater Monitoring Well (GHD, 2016)
- * Existing Private Groundwater Well
- Soil Borehole (GHD, 2016)
- * Sediment Sample Location (GHD, 2016)
- Surface Water Sample Location (GHD, 2016)



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

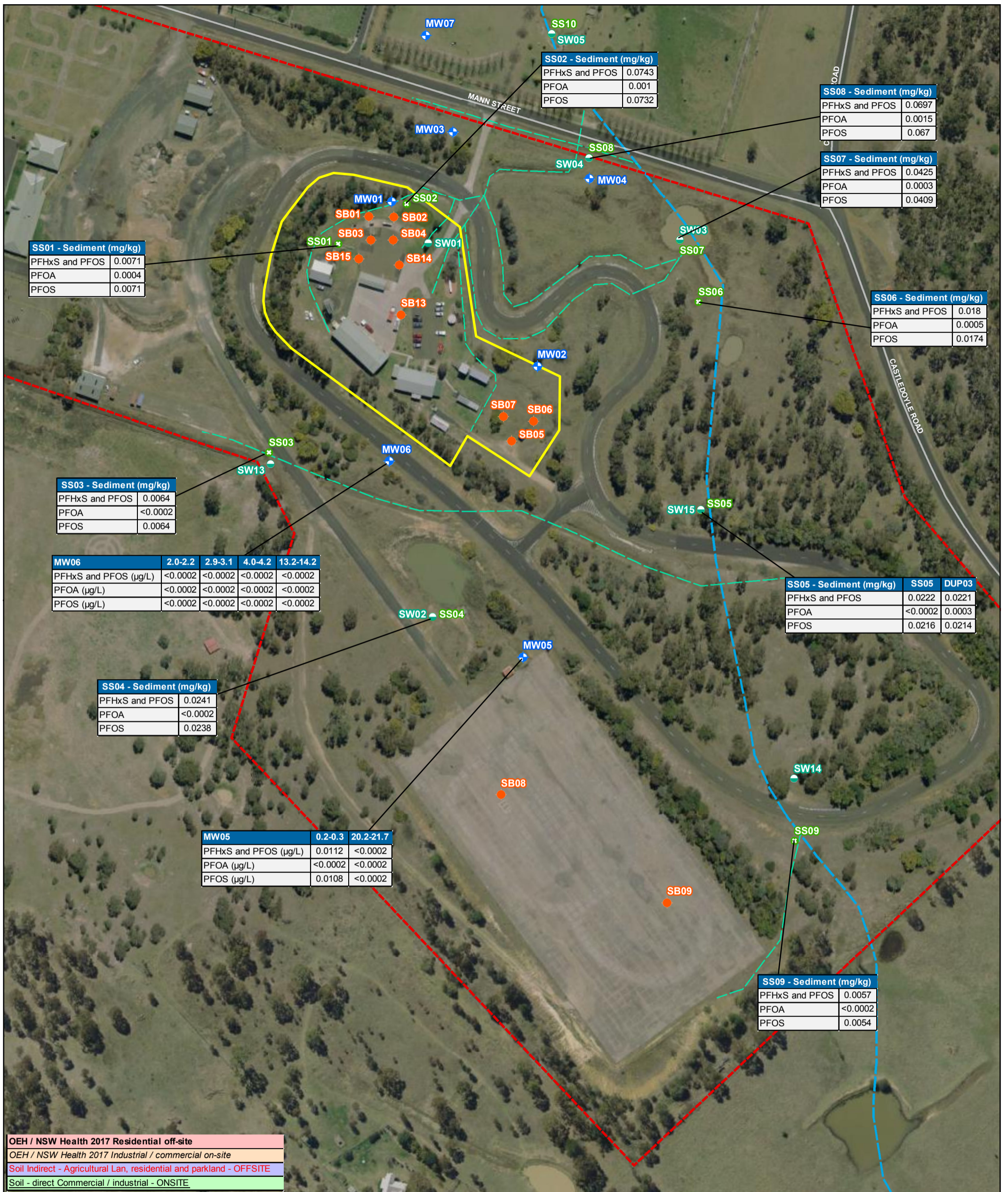


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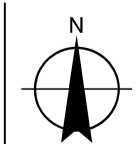
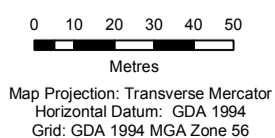
Investigation Locations (Outside the Wider Training Facility)

Figure 4B



LEGEND

- FR NSW Site
- Wider Training Facility
- + Groundwater Monitoring Well (GHD, 2016)
- + Existing Private Groundwater Well
- Soil Borehole (GHD, 2016)
- + Sediment Sample Location (GHD, 2016)
- Surface Water Sample Location (GHD, 2016)
- Streets
- Major Waterways
- Minor Waterways
- Inferred Surface Drainage

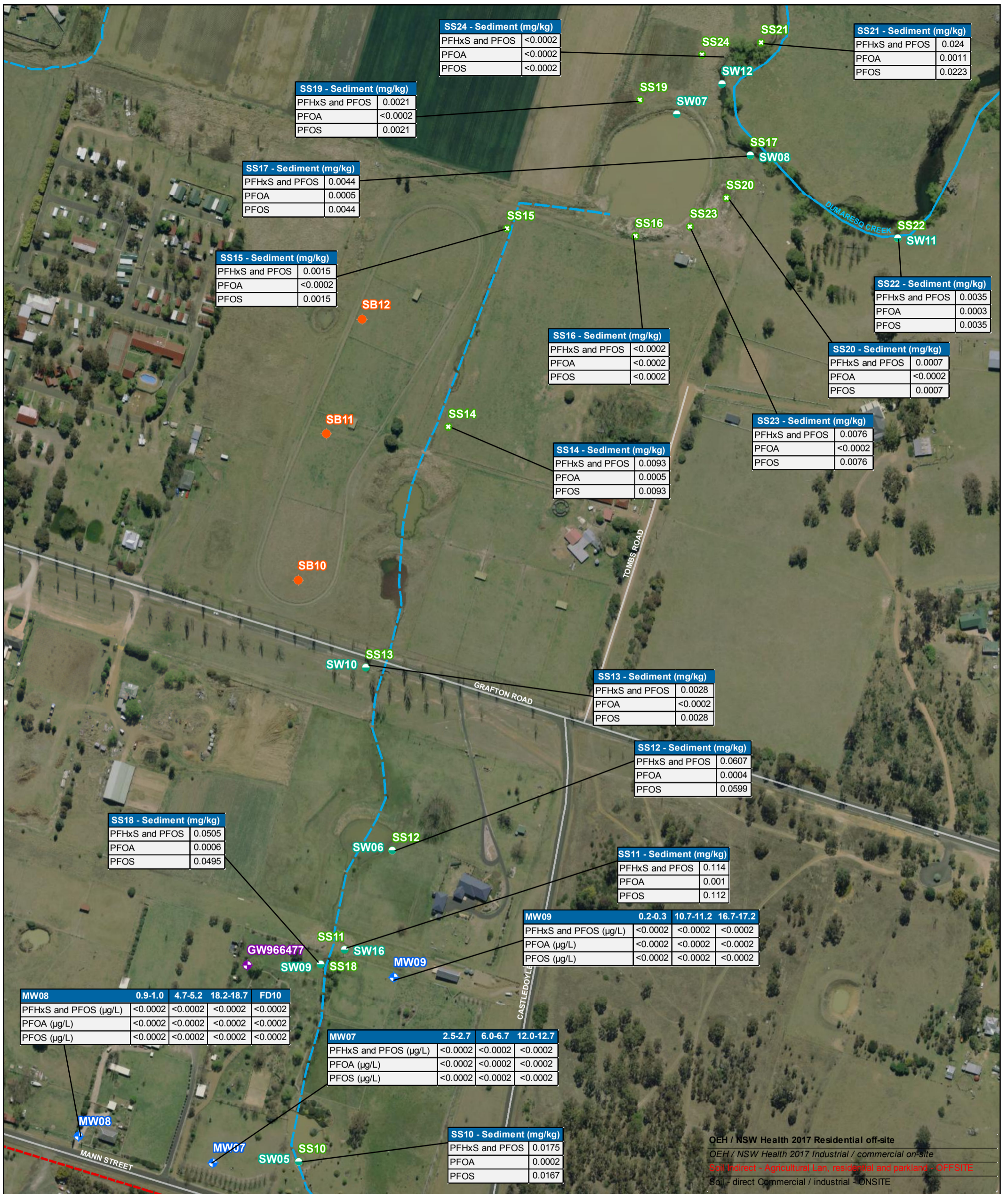


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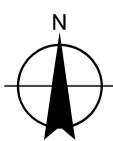
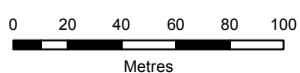
Soil Exceedances - Onsite

Figure 5A



LEGEND

- FR NSW Site
- Wider Training Facility
- Streets
- Major Waterways
- Inferred Surface Drainage
- Minor Waterways
- ◆ Groundwater Monitoring Well (GHD, 2016)
- ◆ Existing Private Groundwater Well
- Soil Borehole (GHD, 2016)
- * Sediment Sample Location (GHD, 2016)
- Surface Water Sample Location (GHD, 2016)



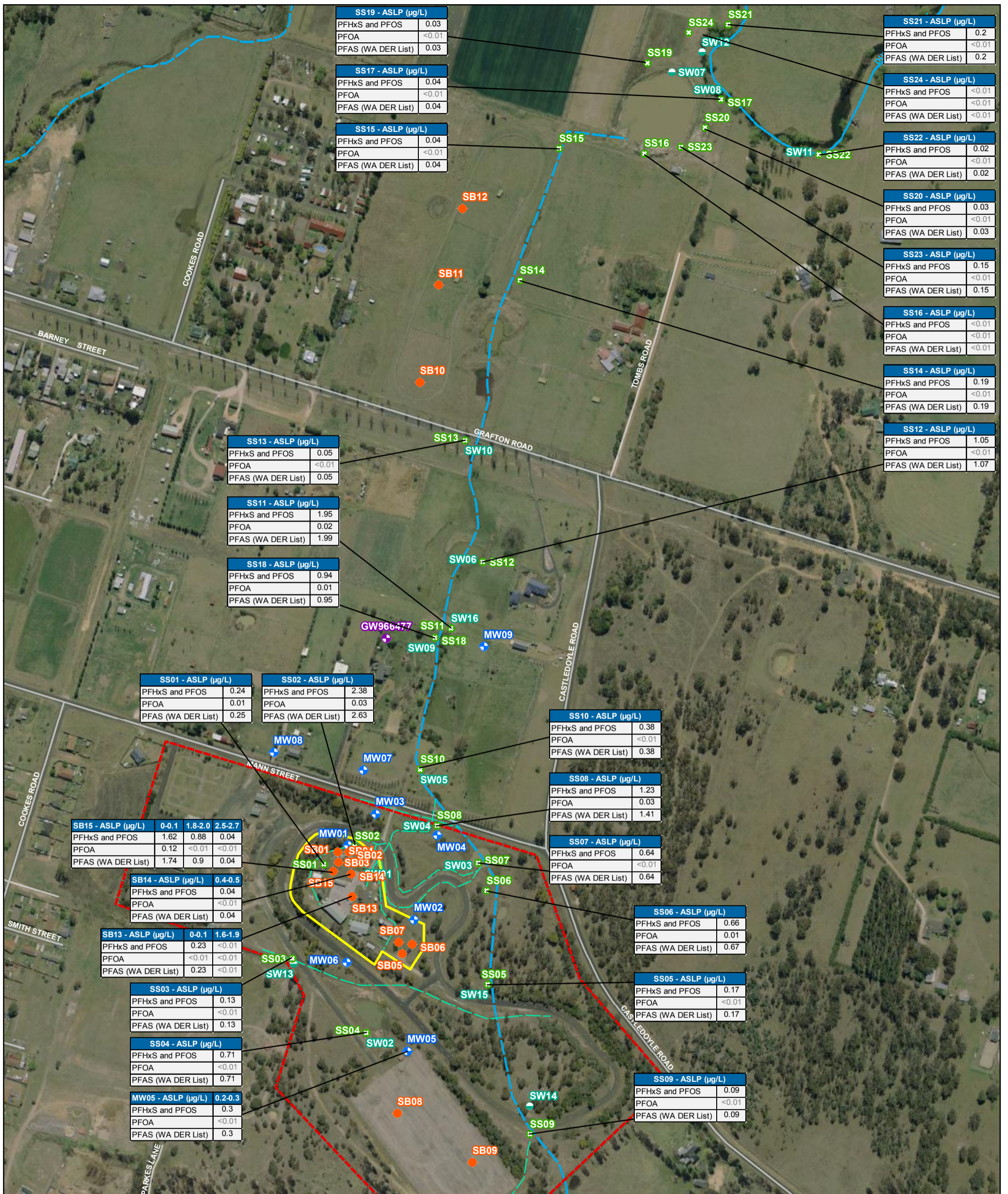
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

Fire & Rescue NSW
Armidale Site Investigation

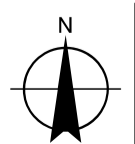
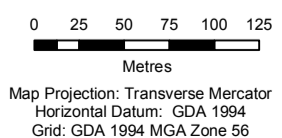
Job Number | 21-25583
Revision | A
Date | 17 Oct 2017

Soil Exceedances - Offsite

Figure 5B



- LEGEND**
- FR NSW Site
 - Wider Training Facility
 - Streets
 - Major Waterways
 - Minor Waterways
 - Inferred Surface Drainage
 - + Groundwater Monitoring Well (GHD, 2016)
 - + Existing Private Groundwater Well
 - Soil Borehole (GHD, 2016)
 - + Sediment Sample Location (GHD, 2016)
 - Surface Water Sample Location (GHD, 2016)

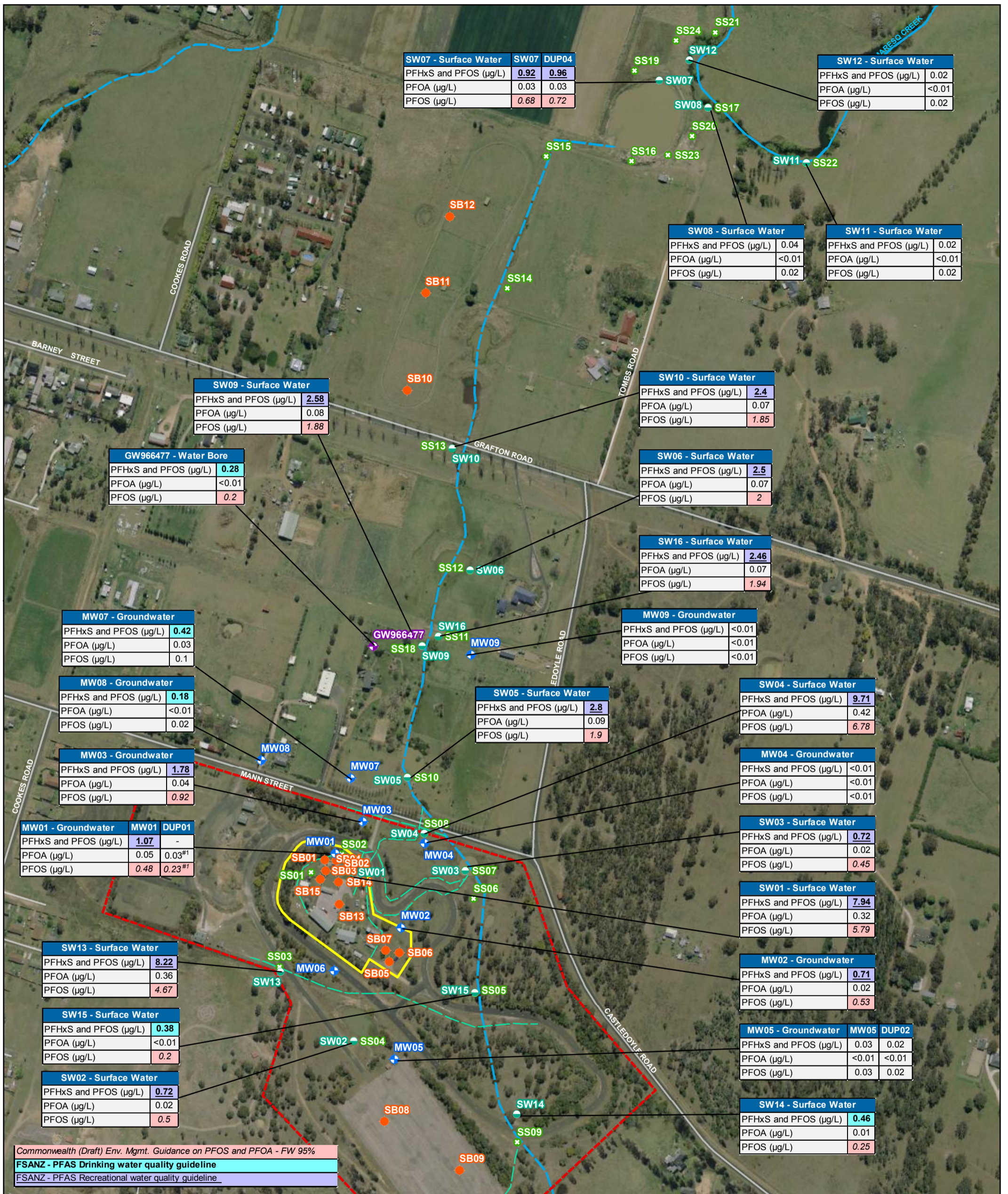


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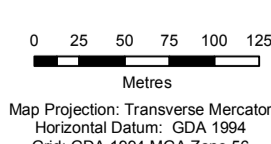
Job Number | 21-25583
Revision | A
Date | 17 Oct 2017

ASLP Results

Figure 6



- LEGEND**
- FR NSW Site
 - Wider Training Facility
 - Streets
 - Major Waterways
 - Minor Waterways
 - Inferred Surface Drainage
 - + Groundwater Monitoring Well (GHD, 2016)
 - + Existing Private Groundwater Well
 - Soil Borehole (GHD, 2016)
 - * Sediment Sample Location (GHD, 2016)
 - Surface Water Sample Location (GHD, 2016)

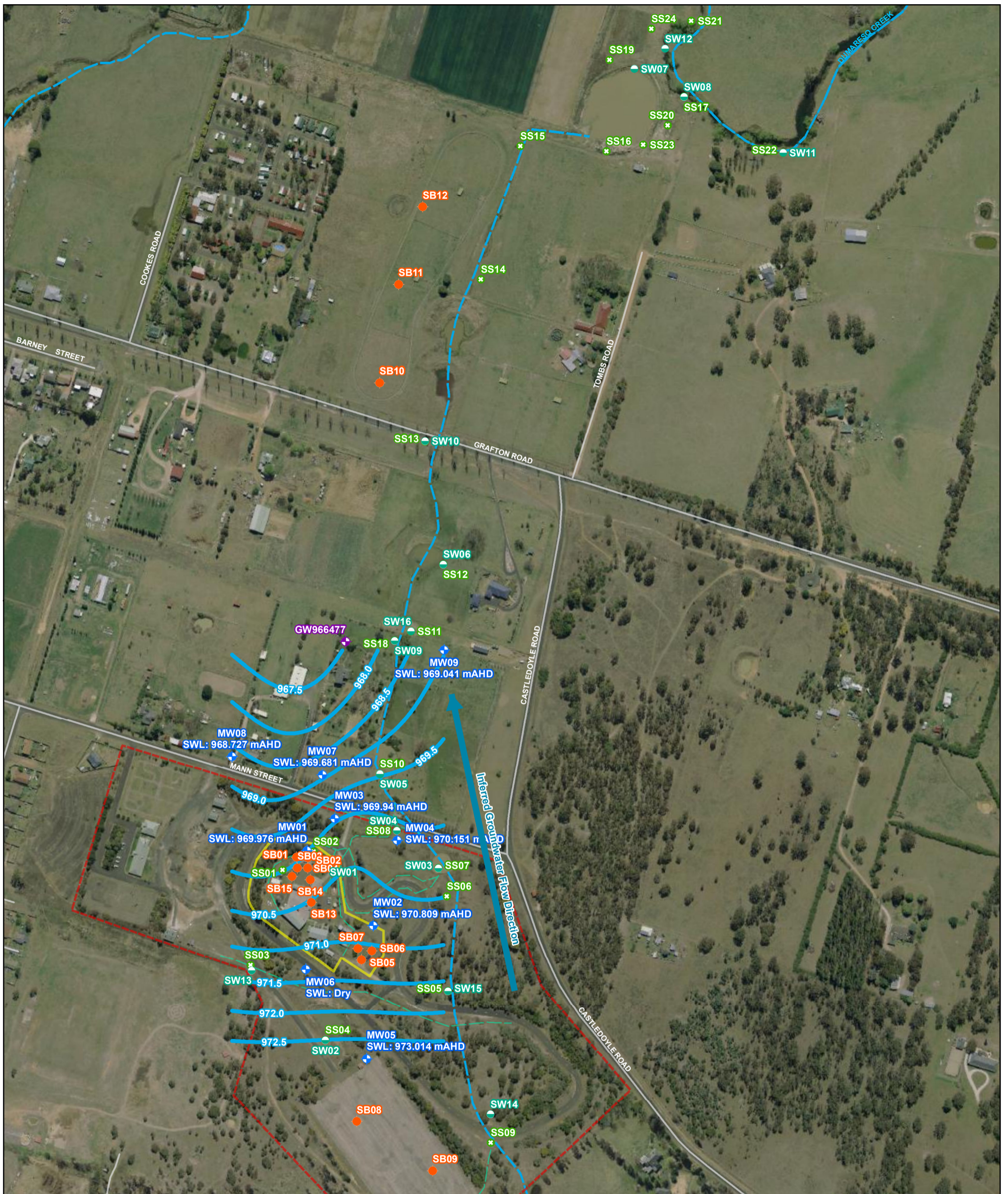


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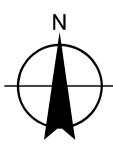
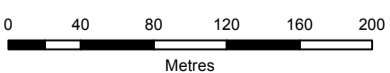
Groundwater and Surface Water Exceedances

Figure 7



LEGEND

- ◆ Groundwater Monitoring Well (GHD, 2016)
- ◆ Existing Private Groundwater Well
- Soil Borehole (GHD, 2016)
- ✱ Sediment Sample Location (GHD, 2016)
- Surface Water Sample Location (GHD, 2016)
- Groundwater Elevation Contours (mAHd)
- FR NSW Site
- Wider Training Facility
- Streets
- Inferred Surface Drainage
- Major Waterways
- Minor Waterways

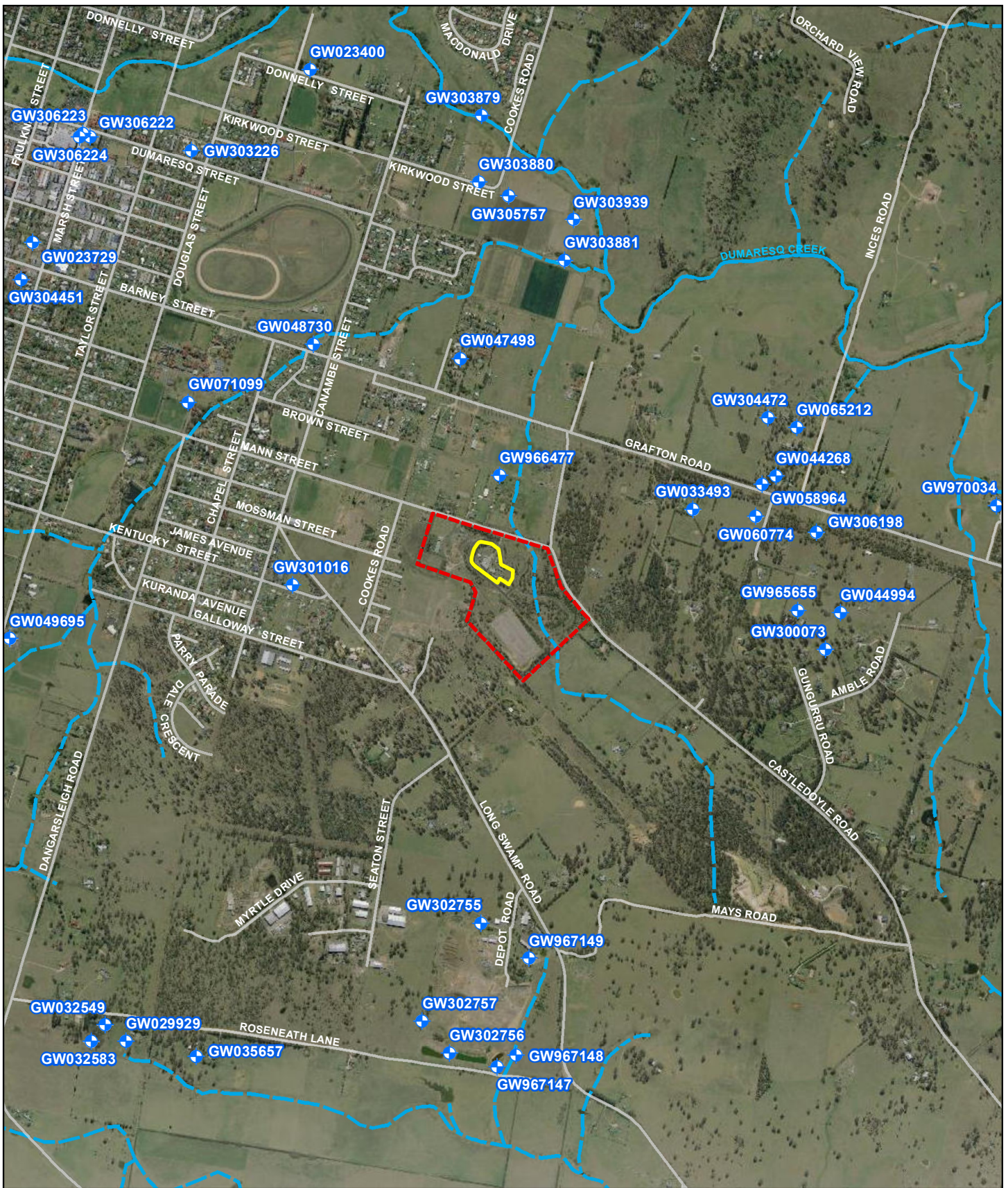


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Date | 17 Oct 2017

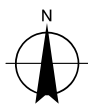
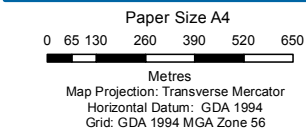
Groundwater Elevation Contours

Figure 8



LEGEND

- ◆ Registered Groundwater Bores
- Major Waterways
- ▭ FR NSW Site
- - - Minor Waterways
- ▭ Wider Training Facility
- Streets



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Armidale Site Investigation

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Revision | A
Date | 04 Aug 2017

Registered Bore Locations

Figure 9

Appendix B – Analytical results summary tables



Appendix B
Table C
Groundwater and Surface Water Analytical Results - Phase 2

	Perfluorooctane sulfonamide (FOSA)						Alkalinity					Major Ions									
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	Alkalinity (Carbonate as CaCO3)	Alkalinity (Hydroxide as CaCO3)	Alkalinity (total as CaCO3)	Bicarbonate Alkalinity as CaCO3	Hardness as CaCO3 (Filtered)	Fluoride	Sulfate as SO4 - Turbidimetric (Filtered)	Calcium (Filtered)	Chloride	Magnesium (Filtered)	Anions Total	Potassium (Filtered)	Sodium (Filtered)	Cations Total	Ionic Balance
EQL	0.02	0.05	0.02	0.02	0.01	0.01	1	1	1	1	1	0.1	1	1	1	1	0.01	1	1	0.01	0.01
<i>Commonwealth (Draft) Env. Mgmt. Guidance on PFOS and PFOA - FW 95%</i>																					
FSANZ - PFAS Drinking water quality guideline																					
FSANZ - PFAS Recreational water quality guideline																					

SampleCode	Field_ID	Location_Code	Sampled_Date																					
ES1715278058	GW966477	GW966477	15-Jun-17	<0.02	<0.05	<0.02	<0.02	0.34	0.32	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278001	MW01	MW01	13-Jun-17	<0.02	<0.05	<0.02	<0.02	3.27	2.86	-	-	-	-	-	-	-	-	-	-	-	-	-		
S17-Jn23251	DUP01	MW01	13-Jun-17	<0.05	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278002	MW02	MW02	13-Jun-17	<0.02	<0.05	<0.02	<0.02	0.93	0.89	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278029	MW03	MW03	15-Jun-17	<0.02	<0.05	<0.02	<0.02	4.08	3.34	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278023	MW04	MW04	14-Jun-17	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278011	MW05	MW05	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278012	DUP02	MW05	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-		
ES1715278027	MW07	MW07	15-Jun-17	<0.02	<0.05	<0.02	<0.02	1.31	1.19	<1	<1	239	239	1360	0.3	851	359	409	114	34	6	182	35.4	1.92
ES1715278028	MW08	MW08	15-Jun-17	<0.02	<0.05	<0.02	<0.02	0.48	0.4	<1	<1	371	371	797	0.2	143	194	398	76	21.6	3	112	20.9	1.72
ES1715278030	MW09	MW09	15-Jun-17	<0.02	<0.05	<0.02	<0.02	<0.01	<0.01	<1	<1	223	223	443	<0.1	219	105	62	44	10.8	2	59	11.5	3.21
ES1715278003	SW01	SW01	13-Jun-17	<0.02	<0.05	<0.02	<0.02	12.1	11.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278010	SW02	SW02	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.87	0.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278020	SW03	SW03	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.9	0.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278021	SW04	SW04	14-Jun-17	<0.02	<0.05	<0.02	<0.02	15.2	14.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278031	SW05	SW05	15-Jun-17	<0.02	<0.05	<0.02	<0.02	3.97	3.73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278036	SW06	SW06	16-Jun-17	<0.02	<0.05	<0.02	<0.02	3.2	3.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278038	SW07	SW07	16-Jun-17	<0.02	<0.05	<0.02	<0.02	1.17	1.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278056	DUP04	SW07	16-Jun-17	<0.02	<0.05	<0.02	<0.02	1.21	1.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278040	SW08	SW08	16-Jun-17	<0.02	<0.05	<0.02	<0.02	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ES1715278034	SW09	SW09	16-Jun-17	<0.02	<0.05	<0.02	<0.02	3.39	3.21	<1	<1	44	44	34	<0.1	3	7	6	4	1.11	3	9	1.15	-
ES1715278037	SW10	SW10	16-Jun-17	<0.02	<0.05	<0.02	<0.02	3.11	2.96	<1	<1	41	41	30	<0.1	3	7	5	3	1.02	3	9	1.06	-
ES1715278039	SW11	SW11	16-Jun-17	<0.02	<0.05	<0.02	<0.02	0.02	0.02	<1	<1	104	104	108	0.1	13	22	21	13	2.94	4	20	3.14	3.27
ES1715278041	SW12	SW12	16-Jun-17	<0.02	<0.05	<0.02	<0.02	0.02	0.02	<1	<1	105	105	114	0.1	12	21	21	15	2.94	4	18	3.17	3.73
ES1715278009	SW13	SW13	14-Jun-17	<0.02	<0.05	<0.02	<0.02	11.9	10.9	<1	<1	74	74	61	<0.1	14	13	6	7	1.94	4	16	2.02	-
ES1715278014	SW14	SW14	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.56	0.53	<1	<1	33	33	25	<0.1	2	5	12	3	1.04	4	12	1.12	-
ES1715278016	SW15	SW15	14-Jun-17	<0.02	<0.05	<0.02	<0.02	0.48	0.45	<1	<1	35	35	23	<0.1	5	6	7	2	1	3	10	0.98	-
ES1715278035	SW16	SW16	16-Jun-17	<0.02	<0.05	<0.02	<0.02	3.13	2.99	<1	<1	42	42	30	<0.1	4	7	5	3	1.06	3	8	1.02	-

Statistical Summary																						
Number of Results	28	28	28	28	27	27	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	5
Number of Detects	0	0	0	0	25	25	0	0	11	11	11	4	11	11	11	11	11	11	11	11	11	5
Minimum Concentration	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<1	<1	33	33	23	<0.1	2	5	5	2	1	2	8	0.98	1.72	
Minimum Detect	ND	ND	ND	ND	0.02	0.02	ND	ND	33	33	23	0.1	2	5	5	2	1	2	8	0.98	1.72	
Maximum Concentration	<0.05	<0.05	<0.02	<0.02	15.2	14.3	<1	<1	371	371	1360	0.3	851	359	409	114	34	6	182	35.4	3.73	
Maximum Detect	ND	ND	ND	ND	15.2	14.3	ND	ND	371	371	1360	0.3	851	359	409	114	34	6	182	35.4	3.73	
Average Concentration	0.011	0.024	0.0098	0.0098	2.7	2.5	0.5	0.5	119	119	275	0.095	115	68	87	26	7.2	3.5	41	7.4	2.8	
Median Concentration	0.01	0.025	0.01	0.01	0.93	0.89	0.5	0.5	74	74	61	0.05	12	13	12	7	1.94	3	16	2.02	3.21	
Standard Deviation	0.0028	0.0038	0.00094	0.00094	4	3.8	0	0	111	111	434	0.082	254	113	158	37	11	1	56	11	0.89	
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances (Detects Only)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Env Stds Comments

Data Comments

#1 Quantification of linear and branched isomers has been conducted as a single tot



Appendix B
 Table D
 Soil and Sediment Analytical Results - Phase 1 and 2

EQL / NSW Health 2017 Residential off-site OEH / NSW Health 2017 Industrial / commercial on-site Soil indirect - Agricultural Land, residential and parkland - OFFSITE Soil - direct Commercial / industrial - ONSITE	TOC	PFAS																								
		Total Organic Carbon	PFAS																							
		%	% Moisture Content (dried @ 40°C)	N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecane sulfonic acid (PFDS)	Perfluorohexane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHS and PFOA (sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorodecane sulfonic acid	Perfluorodecanoic acid	
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
0.02	1	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002



Appendix B
Table D
Soil and Sediment Analytical Results - Phase 1 and 2

TOC		PFAS																									
Total Organic Carbon																											
%	Moisture Content (dried @ 40°C)	N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluorooctane sulfonic acid	10:2 Fluorotelomer sulfonic acid	4:2 Fluorotelomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8:2 Fluorotelomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6:2 Fluorotelomer Sulfonate (6:2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorodecane sulfonic acid	Perfluorododecanoic acid				
mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
0.02	1	0.0002	0.0002	0.0002	0.0005	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0002	0.001	0.0002	0.0002	0.0002	0.0002			
EQL		0.009																									
OEHL / NSW Health 2017 Residential off-site		0.1																									
OEHL / NSW Health 2017 Industrial / commercial on-site		20																									
Soil Indirect - Agricultural Land, residential and parkland - OFFSITE		100																									
Soil - direct Commercial / industrial - ONSITE																											
Sample Code	Field ID	Location Code	Sample Depth (m)	Sampled Date	3.5	29.4	<0.0002	-	<0.0002	<0.0005	<0.0005	<0.0002	0.0026	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Sediment - Dumaresq Creek (NO APPLICABLE CRITERIA)					ES1628450016	SS17	SS17	08-Dec-16	1.39	29	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	0.0044	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	
					ES1715278052	SS17	16-Jun-17	2.93	45.8	<0.0002	<0.0002	0.0003	<0.0005 <td><0.0005 <td><0.0002</td> <td>0.024</td> <td><0.0002</td> <td>0.0017</td> <td><0.0002</td> <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td></td></td></td></td></td>	<0.0005 <td><0.0002</td> <td>0.024</td> <td><0.0002</td> <td>0.0017</td> <td><0.0002</td> <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td></td></td></td></td>	<0.0002	0.024	<0.0002	0.0017	<0.0002	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td></td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td>0.0011</td> </td></td>	<0.0005 <td><0.0005 <td>0.0011</td> </td>	<0.0005 <td>0.0011</td>	0.0011	
					ES1715278053	SS21	16-Jun-17	4.24	41.6	<0.0002	<0.0002	<0.0002	<0.0005 <td><0.0005 <td><0.0002</td> <td>0.0035</td> <td><0.0002</td> <td><0.0002</td> <td><0.0002</td> <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td></td></td></td></td></td>	<0.0005 <td><0.0002</td> <td>0.0035</td> <td><0.0002</td> <td><0.0002</td> <td><0.0002</td> <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td></td></td></td></td>	<0.0002	0.0035	<0.0002	<0.0002	<0.0002	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td></td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td></td>	<0.0005 <td><0.0005 <td><0.0005 <td>0.0003</td> </td></td>	<0.0005 <td><0.0005 <td>0.0003</td> </td>	<0.0005 <td>0.0003</td>	0.0003
Statistical Summary					63	107	108	92	108	108	108	108	107	108	108	108	108	108	110	110	108	108	108	16	108		
Number of Results	55	103	0	14	19	2	0	0	70	13	51	17	5	0	0	0	0	9	32	14	1	10	1	6			
Number of Detects	0.02	<1	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.001	<0.0002	<0.0002	<0.0002			
Minimum Concentration	0.02	1	ND	0.0002	0.0002	0.003	ND	ND	0.0002	0.0002	0.0002	0.0002	0.0006	ND	ND	ND	ND	0.0014	0.0002	0.0002	0.021	0.0003	0.0004	0.0002			
Minimum Detect	5.2	46.3	<0.01	<0.005	0.006	<0.005	<0.005	<0.01	0.275	0.0372	0.0758	0.0367	<0.005	<0.005	<0.005	<0.005	<0.005	0.0128	0.0124	0.0123	0.021	<0.005	0.0004	<0.005			
Maximum Concentration	5.2	46.3	ND	0.0021	0.006	0.0048	ND	ND	0.275	0.0372	0.0758	0.0367	0.0021	ND	ND	ND	ND	0.0128	0.0124	0.0123	0.021	0.0041	0.0004	0.0009			
Maximum Detect	0.76	17	0.00015	0.00024	0.00034	0.00034	0.00027	0.00015	0.016	0.00057	0.0023	0.00076	0.00031	0.00027	0.00027	0.00027	0.00027	0.00072	0.00061	0.00036	0.00071	0.00027	0.00012	0.00015			
Average Concentration	0.41	15.6	0.0001	0.0001	0.0001	0.00025	0.00025	0.0001	0.0021	0.0001	0.0001	0.0001	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.0001	0.0001	0.0005	0.0001	0.0001	0.0001			
Median Concentration	1.1	11	0.00047	0.00042	0.00088	0.00055	0.00022	0.00047	0.037	0.0036	0.0091	0.0039	0.0003	0.00022	0.00022	0.00022	0.00022	0.0017	0.0015	0.0013	0.002	0.00067	0.000075	0.00026			
Standard Deviation	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Number of Guideline Exceedances(Detects Only)	0	0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

	Perfluorooctanoic acid	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOSA)	Perfluorotetradecanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002	0.0002	0.0002
OEH / NSW Health 2017 Residential off-site										
OEH / NSW Health 2017 Industrial / commercial on-site										
Soil indirect - Agricultural Land, residential and parkland - OFFSITE				0.01						
Soil - direct Commercial / industrial - ONSITE				0.14						

SampleCode	Field ID	Location Code	Sample Depth (m)	Sampled Date										
Sediment - Dumaresq Creek (NO APPLICABLE CRITERIA)														
ES1628450016	SS17	SS17		08-Dec-16	<0.0002	<0.0002	<0.0002	0.0026	<0.0002	<0.0005	<0.0002	<0.0002	0.0026	0.0026
ES1715278052	SS17	SS17		16-Jun-17	<0.0002	<0.0002	0.0005	0.0044	<0.0002	<0.0005	<0.0002	<0.0002	0.0054	0.0049
ES1715278053	SS21	SS21		16-Jun-17	0.0002	0.0003	0.0009	0.0223	<0.0002	<0.0005	<0.0002	0.0002	0.0284	0.0256
ES1715278051	SS22	SS22		16-Jun-17	<0.0002	<0.0002	<0.0002	0.0035	<0.0002	<0.0005	<0.0002	<0.0002	0.0041	0.0038

Statistical Summary														
Number of Results	108	108	108	110	108	108	108	108	107	107				
Number of Detects	23	29	14	67	3	0	0	5	70	70				
Minimum Concentration	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002				
Minimum Detect	0.0002	0.0002	0.0002	0.0002	0.0005	ND	ND	0.0002	0.0002	0.0002				
Maximum Concentration	0.0055	0.0898	<0.005	0.228	<0.005	<0.005	<0.005	<0.005	0.406	0.387				
Maximum Detect	0.0055	0.0898	0.0016	0.228	0.0006	ND	ND	0.0006	0.406	0.387				
Average Concentration	0.00031	0.0015	0.0002	0.014	0.00014	0.00027	0.00012	0.00014	0.021	0.02				
Median Concentration	0.0001	0.0001	0.0001	0.00195	0.0001	0.00025	0.0001	0.0001	0.0021	0.0021				
Standard Deviation	0.0007	0.0089	0.00034	0.03	0.00024	0.00022	0.00023	0.00024	0.056	0.054				
Number of Guideline Exceedances	0	0	0	30	0	0	0	0	0	0				
Number of Guideline Exceedances(Detects Only)	0	0	0	30	0	0	0	0	0	0				



Appendix B
Table E
Leachate ASLP Analytical Results - Phase 1 and 2

SampleCode	Field_ID	Location_Code	Sample_Depth (m)	Sampled_Date	Matrix	PFAS																																		
						N-Ethyl perfluorooctane sulfonamidoacetic acid	Perfluorodecanesulfonic acid (PFDS)	Perfluorooctane sulfonic acid	1,0,2 Fluorotriolomer sulfonic acid	4,2 Fluorotriolomer sulfonic acid	N-Methyl perfluorooctane sulfonamidoacetic acid	PFHxS and PFOS (Sum of Total) - Lab Calc	Perfluorobutane sulfonic acid	Perfluorohexane sulfonic acid (PFHxS)	Perfluoropentanoic acid	8,2 Fluorotriolomer sulfonic acid	N-Ethyl perfluorooctane sulfonamide	N-Ethyl perfluorooctane sulfonamidoethanol	N-Methyl perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamidoethanol	6,2 Fluorotriolomer Sulfonate (6,2 FTS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid	Perfluorobutanoic acid	Perfluorodecanoic acid	Perfluorododecanoic acid	Perfluorohexanoic acid	Perfluorooctanoic acid (PFHxA)	Perfluorononanoic acid	Perfluorooctane sulfonic acid (PFOS)	Perfluorooctane sulfonamide (FOXA)	Perfluorotetradecanoic acid	Perfluorotridecanoic acid	Perfluoroundecanoic acid	PFAS (Sum of Total)	PFAS (Sum of Total)(WA DER List)				
						µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			
EQL						0.02	0.02	0.02	0.05	0.05	0.02	0.01	0.02	0.02	0.02	0.02	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01

Statistical Summary

Statistical Summary	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47		
Number of Results	0	2	4	0	0	0	44	5	27	8	1	0	0	0	0	3	15	4	0	3	0	5	11	3	44	1	0	0	0	0	44	4	4													
Number of Detects	<0.02	<0.02	<0.02	<0.05	<0.05	<0.02	<0.01	<0.02	<0.02	<0.02	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Minimum Concentration	ND	0.03	0.04	ND	ND	ND	0.02	0.03	0.02	0.03	0.08	ND	ND	ND	ND	0.06	0.01	0.02	ND	0.03	ND	0.02	0.02	0.03	0.01	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Maximum Concentration	<0.02	0.16	0.17	<0.05	<0.05	<0.02	13.6	0.14	1.76	0.46	0.08	<0.05	<0.05	<0.05	<0.05	0.85	0.23	0.16	<0.1	0.1	ND	0.07	0.6	0.04	11.8	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Maximum Detect	ND	0.16	0.17	ND	ND	ND	13.6	0.14	1.76	0.46	0.08	ND	ND	ND	ND	0.85	0.23	0.16	ND	0.1	ND	0.07	0.6	0.04	11.8	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Average Concentration	0.01	0.014	0.019	0.025	0.025	0.01	0.95	0.017	0.11	0.027	0.026	0.025	0.025	0.025	0.044	0.022	0.018	0.05	0.013	0.01	0.013	0.034	0.012	0.85	0.01	0.025	0.01	0.025	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
Median Concentration	0.01	0.01	0.01	0.025	0.025	0.01	0.24	0.01	0.02	0.01	0.025	0.025	0.025	0.025	0.025	0.005	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
Standard Deviation	0	0.022	0.033	0	0	0	2.2	0.026	0.3	0.067	0.008	0	0	0	0	0.12	0.045	0.03	0	0.014	0	0.01	0.09	0.0067	1.9	0.0015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Appendix C – Water Use Survey



Fire & Rescue NSW

PFAS Environmental Investigation Report Armidale Water Use Survey - May 2017

October 2017

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Appendices

Appendix A –Water Use Survey

1. Introduction

1.1 Background

Fire & Rescue NSW has conducted a preliminary investigation into the presence of per- and poly-fluoroalkyl substances (PFAS) on, and in the vicinity of, the FRNSW's Armidale training site.

This investigation is part of a review of a number of FRNSW sites across NSW where legacy firefighting foams containing PFAS have been stored, used and disposed of. PFAS are emerging contaminants, which means that their ecological and/or human health effects are unclear. FRNSW is investigating to better understand the nature and extent of PFAS across its sites and assess potential risks to human health or ecology, including the identification of pathways through which people may be exposed to these chemicals.

GHD was engaged to undertake this preliminary environmental investigation, commencing in June 2016 and reaching completion in February 2017. These works included a community engagement component, where GHD consulted with property owners to understand water use within the investigation area. This involved the distribution of fact sheets, and the hosting of meetings and information sessions. A *water use survey* was also distributed to a sample set of landowners within the Armidale area.

1.2 Purpose

The purpose of this report is to summarise the results from a water use survey that was distributed to a number of landowners in the Armidale area. This survey was conducted to obtain information from local Armidale landowners about water use at their properties, particularly in relation to household water use. The results detailed in this report intend to assist FRNSW in developing appropriate PFAS management strategies for the local area.

1.3 Methodology

The chosen survey method was a five page paper based questionnaire developed to acquire both qualitative and quantitative responses to 22 questions. The survey was targeted to a number of properties in the Armidale area. The survey boundary was developed based on advice from the Environmental Protection Authority (EPA) and was posted to properties that have direct contact or frontage to the water course that runs north of the FRNSW facility towards Dumaresq Creek. The survey pack delivered to local residents included a cover letter, fact sheet, survey and a postage paid return envelope to assist response.

This report is based on 6 questionnaire responses received from a mail out that was sent to 28 property owners and residents over a period of three weeks. Residents were also encouraged to complete the survey during meetings with the EPA, and during a community information session held at The Fire and Rescue Training Centre on Wednesday 10th May. The survey was also available online at: <http://www.fire.nsw.gov.au/page.php?id=9174>

A blank copy of the water use survey, the cover letter, and the fact sheet is attached to this report in Appendix A–Water Use Survey.

2. Summary of key findings

Four survey responses were received, providing the following findings into water use on properties in Armidale:

- Majority of property owners indicated their property is private residential, with two categorising their property as residential and agricultural, and another as industrial/commercial agricultural
- All of respondents indicated that their property is supplied by town water, however two indicated they were also supplied with rain water, and another one, bore water in addition to town water.
- One respondent indicated that they used to use bore water on their property. This bore water was previously used for stock, as well as watering vegetable gardens.
- One respondent indicated that they use surface / dam water for stock watering.
- One respondent indicated that they use local creeks for recreational purposes.

3. Water Use

3.1 General Property Information

3.1.1 Property type

The survey respondents were asked what type of property they owned. Out of the six respondents, three indicated their properties were private residential (50%). Two respondents indicated their property was private residential and industrial/commercial agricultural. One responded indicated their property was industrial/commercial agricultural.

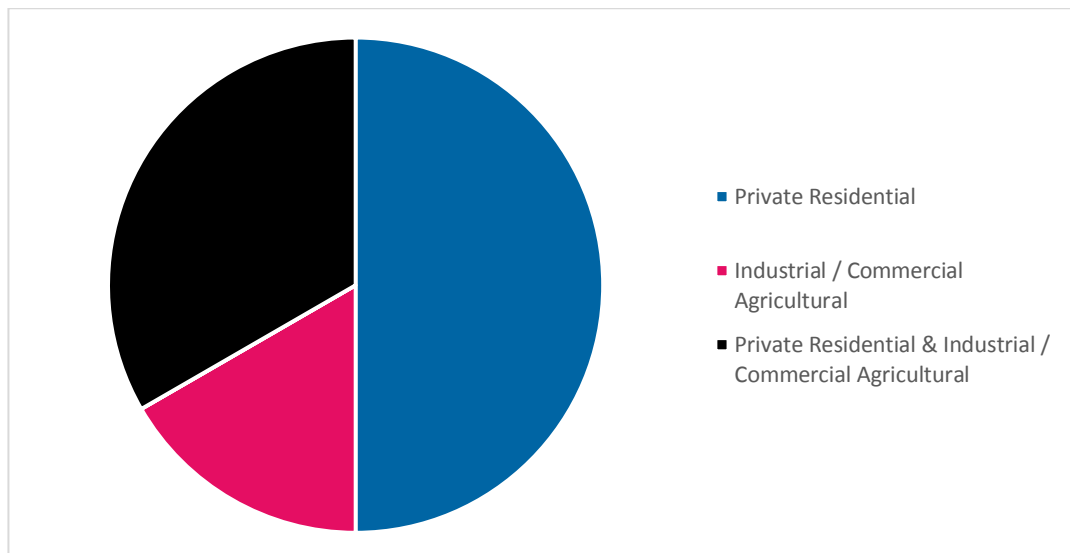


Figure 1: Breakdown of property types

3.1.2 Water source

Respondents were asked to specify how water is supplied to their property. All respondents indicated town water was supplied to their property. However, two respondents (33%) indicated that they also used rain water. One respondent has bore water supplied to their property in addition to town water.

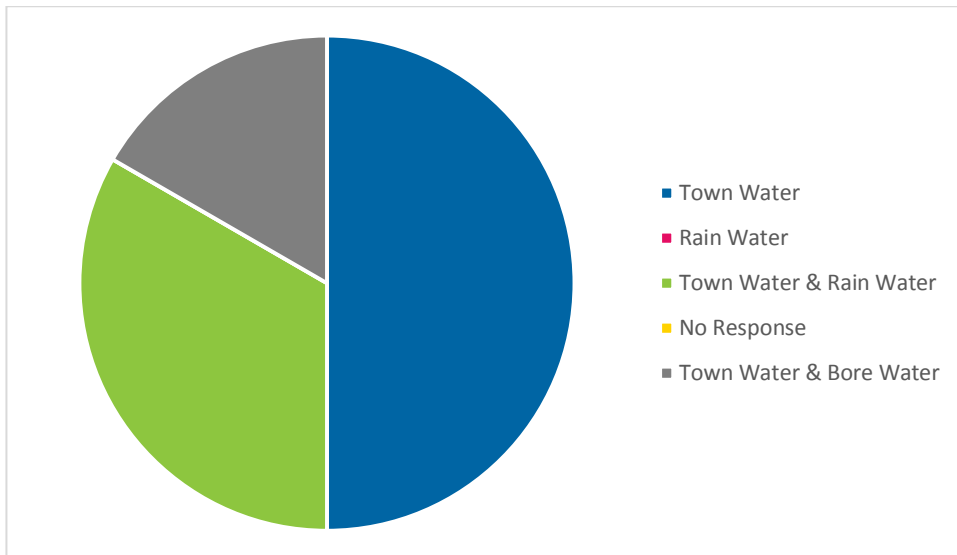


Figure 2: Breakdown of water sources

3.2 Bore water use

Survey respondents indicated their current or previous use of bore water supplied to their property.

Of the three respondents with a bore, one indicated that it is currently used. This property uses bore water for watering gardens and general home use. This water source has been used for over 17 years.

One respondent who used the bore previously indicated the water was used for watering vegetable gardens and for keeping stock. This was a primary water source for many years, but has not been used for a long time.

Another respondent indicated the bore on their property, which is licenced for 148 ML, has not been previously used, however they intend using this water source as part of their equine business.

3.3 Surface or dam water use

One respondent indicated that they use surface or dam water in their property for watering pastures that service approximately 40 stock on the property.

No other respondents indicated they used surface or dam water on their property.

3.4 Recreational use of local creeks

One survey respondent indicated use of local creeks for recreational purposes although they did not specify what kind of recreational activities they used these water sources for. Another respondent indicated they used the dams on their property for swimming.

3.5 Additional water usage comments

Some respondents made additional comments at the end of the survey:

- One respondent noted that the onsite bores and dam on their property have not been used for consumption purposes for a number of years.
- One respondent indicated plans to use the bore on his property for watering stock.

- This respondent also noted that they have a 30-block subdivision within the survey boundaries.

4. Conclusions

The results of this water use survey is designed to assist FRNSW build its understanding of the way the locals use water in the area, both currently and historically. Despite the recognised value of the data collected so far, FRNSW requires a larger response rate in order to capture a more representative understanding of water use habits in the Armidale area adjacent to the FRNSW training facility.

The respondents who undertook this survey primarily used town water as their dominant water source, with one respondent historically using bore water for vegetable watering and one respondent using surface water for watering stock.

This water use survey is a valuable tool to understanding historical and present day water use for properties in the Armidale area. Ultimately, the effectiveness of these environmental investigations is, to some extent, reliant upon local knowledge and understanding of historical use of water, and water sources. This will in turn allow FRNSW to most effectively understand the presence and extent of PFAS in in the Armidale area, and contribute to the development of mitigation measures.

As such, should the environmental investigations show elevated levels of PFAS in the study catchment area this Water Use Survey will need to be intensified to ensure a representative number of residents are surveyed to inform recommendations for ongoing domestic water use for those residents who may be exposed to pathways of potentially contaminated water sources.

Appendices

Appendix A –Water Use Survey

Fire & Rescue NSW – PFAS Environmental Investigation Project - Water Use Survey – April 2017

Fire & Rescue NSW (FRNSW) is undertaking an environmental investigation and assessment of soil, groundwater and surface water surrounding some of FRNSW's training sites.

This water use survey is designed to help FRNSW to better understand how members of the community in the field investigation area might be using bore water. This will assist FRNSW in recommending appropriate management strategies until FRNSW understands any potential offsite impacts of PFAS in the groundwater.

We have prepared this short survey to obtain information from your household water use. We encourage you to complete the survey and submit it to us via:

Email: pfasinvestigation@fire.nsw.gov.au

By Post (in enclosed envelope):

Fire & Rescue NSW - PFAS Environmental Investigation (Sally Langley); Locked Mail Bag 12, Greenacre NSW 2190

If you have any questions at all, please contact us on **1800 316 663**

or visit our project website where there is more information about this investigation available www.fire.nsw.gov.au/pfas

Name	<input type="text"/>
Phone number	<input type="text"/>
Email	<input type="text"/>
Postal address	<input type="text"/>
Property address <i>(the subject of this survey)</i>	<input type="text"/>

This information is being collected to inform FRNSW's investigation of, and response to, the potential groundwater contamination in the area adjacent to FRNSW training sites. The collection of this information is voluntary. If you choose not to provide this information, FRNSW will find it difficult to take into account your specific circumstances.



The information you provide may be shared with FRNSW's technical advisors, relevant government agencies and organisations, and business entities directly involved in the response to the potential groundwater contamination. This information will not be made publicly available.

1. How would you classify the use of your property that is in the vicinity of the FRNSW training facility?

- Private residential
- Industrial / Commercial Agricultural
- Horticultural
- Other (please specify) _____

2. How is water supplied to your property?

- Town water
- Rain water
- Bore water

3. If you have a bore on your property is it active/do you use it? *(If you don't have an active bore or use bore water at all please go to question 14).*

- Yes, I do have an active bore on the property
- No I do not use the bore, but I have used in the past.
(Please provide the year it was last active if you know it) _____
- No, I have never used the bore

4. If you answered yes to question 3, how many bores do you have on your property (in working condition).

- 1
- 2
- Please specify: _____

5. Are these bores licensed/registered?

- Yes
- No
- Unsure

6. What volume of water are you permitted to extract under your licence?

- Please specify: _____
- Unsure

7. What activities do you currently use bore water for on your property?





- Domestic (home) use
- Crop irrigation
- Cattle, stock, horse watering
- Vegetable watering
- Fruit tree watering
- Swimming pools
- Other. *Please specify:* _____

8. If you use or have used the bore water in your home please select the use/s?

- Drinking
- Other household (*please circle use*). Cooking, swimming, showering, washing, gardening, domestic animal washing/feeding.
- Other use not listed _____ (*please specify.*)
- Flushing toilets only.

9. How long have you been using bore water for the purpose(s) noted above?

10. If you use bore water for crop irrigation, please specify the type of crops irrigated and the approximate area irrigated

11. If you use bore water for cattle / stock / horse watering, please specify the type and a approximate number of stock on your property.

12. If you use bore water for watering of vegetables / fruit trees, please specify the type of vegetables / fruit trees.

13. Do you consume any of the following produce that is grown on your property and water using bore water?

- Chicken meat
- Eggs
- Other meat. *Please specify:* _____
- Milk
- Fruit
- Vegetables

Other produce not listed. *Please specify:* _____

14. What activities do you currently use surface or dam water for on your property?





- Domestic (home) use
- Crop irrigation
- Cattle, stock, horse watering
- Vegetable watering
- Fruit tree watering
- Swimming pools
- Other. *Please specify:* _____

15. If you use or have used the surface or dam water in your home please select the use/s?

- Drinking
- Other household (*please circle use*). Cooking, swimming, showering, washing, gardening, domestic animal washing/feeding.
- Other use not listed _____ (*please specify.*)
- Flushing toilets only.

16. How long have you been using surface or dam water for the purpose(s) noted above?

17. If you use surface or dam water for crop irrigation, please specify the type of crops irrigated and the approximate area irrigated

18. If you use surface or dam water for cattle / stock / horse watering, please specify the type and approximate number of stock on your property.

19. If you use surface or dam water for watering of vegetables / fruit trees, please specify the type of vegetables / fruit trees.

20. Do you consume any of the following produce that is grown on your property and water using surface or dam water?

- Chicken meat
- Eggs
- Other meat. *Please specify:* _____
- Milk
- Fruit
- Vegetables
- Other produce not listed. *Please specify:* _____



-
21. Do you or any of your family use local creeks for recreational purposes?
- Yes *(please specify the activity)* swimming, fishing, yabbying etc.

- No

-
22. Please provide any additional comments about your water use.

Thank you for completing this survey.



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Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	C Pignatelli	B. Campany		B. Campany		24/10/2017

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Appendix D – Assessment of data quality

Quality Assurance and Quality Control Report

Data Quality Indicators

Data generated during this investigation must be appropriate to allow decisions to be made with confidence. Specific limits for this investigation have been adopted in accordance with guidance from the AS4482.1 which includes appropriate indicators of data quality (data quality indicators [DQIs] used to assess QA/QC, and GHD's Standard Field Operating Procedures).

To assess the usability of the data prior to making decisions, the data is assessed against pre-determined DQIs. The DQIs including precision, accuracy, representativeness, comparability and completeness, will be reviewed at the completion of the investigation works to assess for the presence of decision errors.

The pre-determined DQIs established for the investigation are discussed below and shown in Table 1.

- Precision - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percentage Difference (RPD) of duplicate samples.
- Accuracy - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this investigation is a measure of the closeness of the analytical results obtained by a method to the 'true' (or standard) value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- Representativeness - expresses the degree to which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- Comparability - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- Completeness - is defined as the percentage of measurements made which are judged to be valid measurements.

Table 1 Summary of quality assurance / quality control criteria for groundwater

Data quality indicator	Frequency	Data quality acceptance criteria
Precision		
Inter/ intra duplicates	1 / 10 samples	<30-50% RPD
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	<LOR
Matrix spikes	1 per lab batch	70-130%
Representativeness		

Data quality indicator	Frequency	Data quality acceptance criteria
Sampling appropriate for media and analytes	All samples	-
Samples extracted and analysed within holding times	All samples	Organics (7-14 days) Inorganics (6 months) Some exceptions to these holding times are listed below ⁽¹⁾
LORs appropriate and consistent	All samples	All samples
Comparability		
Consistent field conditions, sampling staff and laboratory analysis	All samples	All samples
Standard operating procedures for sample collection & handling	All samples	All samples
Standard analytical methods used for all analyses	All samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All Samples
Appropriate documentation	All Samples	All Samples
Satisfactory frequency and result for QA/QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Acronyms		
COC: Chain of Custody		
LOR: Limit of Reporting		
QA/QC: Quality assurance / quality control		

¹ Holding times with exception to the above include:

If any of the DQIs are not met, further investigation will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data.

Field quality assurance and quality control

The quality assurance/quality control (QA/QC) procedures are based on NSW EPA *Guidelines for the Site Auditor Scheme* (2006) and AS 4482.1 – 2005 and AS 4482.2 – 1999.

QA involves all the actions, procedures, checks and decisions undertaken to ensure the representativeness and integrity of samples and accuracy and reliability of analytical results (NEPC 2013). QC involves protocols to monitor and measure the effectiveness of QA procedures.

All fieldwork was conducted with reference to the Australian Standards AS 4482.1 – 2005 and AS 4482.2 – 1999 and GHD's Standard Field Operating Procedures which ensure all samples are collected by a set of uniform and systematic methods, as required by GHD's QA system. Key requirements of these procedures are listed below:

- Decontamination procedures – including washing and rinsing of re-useable equipment, the use of new disposable gloves and sampling tubing between each sampling location and the use of sampling containers provided by the laboratory.
- Sample identification procedures - samples were immediately transferred to sample containers of appropriate composition and preservation for the required laboratory analysis. All sample containers were clearly labelled with a sample number, job number,

and sample date. The sample containers were then transferred to a chilled insulated container for sample preservation prior to and during shipment to the analytical laboratory.

- Chain of custody information requirements - a chain of custody form was completed and forwarded to the testing laboratory with the samples.
- Inter and intra duplicate and sample frequency.
- Calibration was undertaken by the rental supplier and certificates are provided in Appendix H.
- Field instrument field checks were undertaken on the equipment:
 - Interface probe: A daily equipment check was undertaken to ensure that the equipment worked correctly when immersed in water.
 - Low flow pump: The low flow sampling equipment was provided by the equipment supplier in good working condition. The equipment was inspected by GHD at the start of each day to ensure that all parts of the equipment were in good working order. Purge volumes were recorded on the groundwater sampling field sheets for each site.

Groundwater sampling and analysis quality control

The QC samples collected during the investigation are described below.

- Intra laboratory duplicate: Intra duplicates are used to identify the variation in the analyte concentration between samples from the same sampling point and the repeatability of the laboratory's analysis.
- Inter laboratory duplicate: Inter duplicates provide an indication of the repeatability of the results between laboratories.

Table 2 Quality control (QC) sampling frequency

Sample	Recommended sampling rate	Media	No. QC samples	No. of primary samples	Total
Intra	1/10 samples	Soil	2	25	28
Inter	1/10 samples		1		
Intra	1/10 samples	Water	2	25	28
Inter	1/10 samples		1		
Intra	1/10 samples	Sediment	1	24	25

All quality control sampling frequency criteria were met during this investigation.

Relative percentage difference calculations

Relative percentage difference (RPD) calculations are used to assess how closely primary and inter/intra duplicate sample results match. RPDs are a quantitative measure of the accuracy of the analytical results and are calculated in accordance with the procedure described in AS 4482.1 – 2005 (Standards Australia 2005). According to AS 4482.1 – 2005 typical RPDs are expected to range between 30% and 50%; however, this may be higher for organics and for low concentrations of analytes. GHD adopts 30% for inorganics and 50% for organics as the general assessment criteria.

Where a result is below the laboratory limit of reporting (LOR) for one of the paired samples, the concentration assigned to that sample is the LOR. Where both results are reported below laboratory LOR the RPD is not calculated.

The QC samples analysed during the groundwater investigation are listed in Table 3.

Table 3 Analysed quality control (QC) samples

Primary sample	Duplicate type	QC sample laboratory ID	QC sample field ID	Date sampled	Lab report number	Matrix
SB15_0.0-0.1	Intra	ES1714150012	FD01	29/05/17	ES1714150	Soil
MW08_18.2-18.7	Intra	ES1714150026	FD10	01/06/17	ES1714150	Soil
SB14_0.4-0.5	Inter	S17-Jn10711	FD02	29/05/17	549869	Soil
SS05	Intra	ES1715278022	DUP03	14/06/2017	ES1715278	Sediment
MW01	Inter	S17-Jn23251	DUP01	13/06/17	551367	Water
MW05	Intra	ES1715278012	DUP02	14/06/17	ES1715278	Water
SW07	Intra	ES1715278056	DUP04	16/06/17	ES1715278	Water

RPD exceedances were reported during this investigation.

DUP01 – Primary sample MW01 - Perfluorobutane sulfonic acid 79%

Perfluorohexane sulfonic acid (PFHxS) 95%

Perfluoropentane sulfonic acid 96%

Perfluorooctane sulfonic acid (PFOS) 70%

During field works the following was collected:

- Two field blanks (water)
- One soil trip blank and one water trip blank
- 9 rinsates (one per day during drilling and water sampling)

All blanks were below the LOR for PFAS with the exception of one rinsate collected from the trowel on the 13 June 2017. This recorded a detection of 0.04 µg/L of PFOS.

Laboratory quality assurance / quality control

Laboratory methods used by the primary laboratory were suitable for environmental contaminant analysis and are based on established internationally recognised procedures such as those published by the United States Environmental Protection Agency (US EPA), American Public Health Association (APHA), AS and National Environment Protection (Assessment of Site Contamination) Measure (NEPM).

The individual testing laboratory conducted an assessment of the laboratory QC program however the results were also independently reviewed and assessed internally by GHD. Recovery targets below are defined in the ALS QA/QC section of the certificates of analysis reports. All laboratory QA/QC results are documented with the laboratory certificates of analysis in the appendices of the relevant site report.

Laboratory quality control procedures

Laboratory QC samples incorporated in the analytical process include:

Laboratory blind duplicate samples

A laboratory blind duplicate provides data on the analytical precision and reproducibility of the analytical result. The laboratory blind duplicate is created by sub sampling from one of the primary samples submitted for analysis. Laboratory blind duplicates are analysed at a rate equivalent to one in twenty samples per analytical batch, or one sample per batch if less than twenty samples are analysed in a batch.

The permitted ranges for the RPD of laboratory blind duplicates are dependent on the magnitude of the results in comparison to the level of reporting as shown in Table 4.

Table 4 Permitted laboratory blind duplicate relative percentage difference (RPD) ranges

Magnitude of result	Permitted RPD range
< 10 x limit of reporting (LOR)	No limits
10 – 20 x LOR	0% - 50%
> 20 x LOR	0% - 30%

Matrix spike recoveries

Matrix spike sample analysis is the analysis of one or more replicate portions of samples from the batch, after fortifying the additional portion(s) with known quantities of the analyte(s) of interest. The percentage recovery of target analyte(s) from matrix spike samples is used to determine the bias of the method in the specific sample matrix. Recoveries must lie between 70% and 130%.

Laboratory control sample

The laboratory control sample (LCS) analysis of either a reference material or a control matrix fortified with analytes representative of the analyte class. The purpose of LCS is to monitor method precision and accuracy independent of the sample matrix. Typically, the percentage recovery of the LCS is compared to the dynamic recovery limit based on the statistical analysis of the processed LCS analysis. The ALS acceptance criteria, indicates recoveries must lie between 70% and 130%.

Surrogate spike recoveries

Surrogate Spikes provide a means of checking that no gross errors have occurred during any stage of the analytical method leading to significant analyte loss. Surrogate recoveries are similar to the analyte of interest in terms of chemical composition, extractability, and chromatographic conditions (retention time), but which are not normally found in environmental samples. Surrogate compounds are spiked into blanks, standards and samples submitted for organic analyses by gas-chromatographic techniques prior to sample extraction. Recoveries must lie between 50% and 150% for all analytes.

Method blank samples

Method or analysis blank sample analysis is the analysis of a sample that is as free as possible of the analytes of interest, but has been prepared the same manner as the samples under investigation. The analysis is to ascertain if laboratory reagent, glassware and other laboratory consumables contribute to the observed concentration of analytes in the process batch. If below the maximum acceptable method blank (20% of the practical quantification limit), the contribution is subtracted from the gross analytical signal for each analysis before calculating the sample analyte concentration. The method blank should return analyte concentrations as 'not detected'.

The individual testing laboratory conducted an assessment of the laboratory QC program internally. However, the results were also independently reviewed and assessed by GHD.

Laboratory quality control results

All laboratory RPDs, matrix spike, LCSs and method blanks were within the ALS acceptable ranges.

Table 5 Outliers: Frequency of Quality Control Samples – six analytes

Laboratory report	Quality Control Sample	Analytes	Sample Code	results	Comment
ES1714150	Matrix Spike	Perfluorooctane sulfonic acid (PFOS)	SB15_0.0-0.1	not determined	MS recovery not determined, background level greater than or equal to 4x spike level
		Perfluorooctane sulfonic acid (PFOS)	Anonymous		
		Perfluorohexane sulfonic acid (PFHxS)	Anonymous		
		Perfluorooctane sulfonic acid (PFOS)	Anonymous		
	Frequency of quality control samples	2			
ES1715278	Matrix Spike	Perfluorooctane sulfonic acid (PFOS)	SS01	not determined	MS recovery not determined, background level greater than or equal to 4x spike level
		N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	Anonymous	140%	Recovery greater than upper data quality objective
	Laboratory control samples	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N/A	143%	Recovery greater than upper data quality objective
		N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	N/A	127%	
ES1715597	Matrix Spike	Perfluorobutane sulfonic acid (PFBS)	Anonymous	not determined	MS recovery not determined, background level greater than or equal to 4x spike level
		Perfluoropentane sulfonic acid (PFPeS)	Anonymous	not determined	
		Perfluorohexane sulfonic acid (PFHxS)	Anonymous	not determined	

Laboratory report	Quality Control Sample	Analytes	Sample Code	results	Comment
		Perfluorooctane sulfonic acid (PFOS)	Anonymous	not determined	
		Perfluorohexanoic acid (PFHxA)	Anonymous	not determined	
		Perfluorooctanoic acid (PFOA)	Anonymous	not determined	
Sample holding times					
All samples were extracted and analysed by the laboratory within holding times with the following exceptions.					

Laboratory report ES1714150:

- pH - 8 samples
- Moisture Content – 12 samples

Laboratory report ES1715278:

- pH - 11 samples
- TDS - 11 samples
- Total hardness – 11 samples
- Dissolved Major cations – 11 samples

Evaluation of DQI

To minimise the potential for decision errors, the sampling and analysis program completed at the site by GHD has been evaluated with consideration of the Data Quality Indicators (DQIs) described in Section 3, namely representativeness, completeness, comparability, precision and accuracy.

- **Data representativeness:** The sampling methodology ensured all environmental samples were collected by a set of uniform and systematic methods. Laboratory and field QA/QC procedures were carried out to ensure data representativeness. All samples were provided to the laboratory with adequate preservation and in compliant containers as stated in the laboratory sample receipt documentation. Consequently, data representativeness is considered to have been satisfied.
- **Completeness:** It is considered that the field QA/QC procedures carried out such as blind duplicate collection frequencies and the analytes tested provide completeness in terms of the required number of field duplicate samples. Laboratory QA/QC sample analysis is considered sufficient to provide a complete overview of QA/QC procedures.
- **Precision:** Field blind duplicate results reported RPDs below the adopted criterion (30% for inorganics and 50% for organics). GHD therefore considers that laboratory results are acceptable for interpretation in this report.
- **Accuracy:** Environmental sampling procedures ensured that collection, preservation and laboratory analytical techniques are appropriate for analysis of environmental contaminants.
- **Comparability:** All field work was conducted with reference to the Australian Standards, which ensured all environmental samples were collected by a set of uniform and

systematic methods, as required by GHD's QA system. GHD considers that the laboratory data are of a suitable quality for assessing the environmental status of the site.

The overall review of the QC results from the primary and secondary laboratories indicates that the current analytical data are of an acceptable quality upon which to draw meaningful conclusions regarding impacts at the site as part of this investigation.



**Appendix D
Table D1
Soil Duplicate Summary**

Field Duplicates (soil)
Filter: SDG in('ALSE-Sydney 20-Jun-17','ALSE-Sydney 07-Jun-17',

SDG Field ID	ALSE-Sydney 07-Jun-17 SB15_0.0-0.1	ALSE-Sydney 07-Jun-17 FD01	RPD	ALSE-Sydney 07-Jun-17 MW08_18.2-18.7	ALSE-Sydney 07-Jun-17 FD10	RPD	ALSE-Sydney 20-Jun-17 SS05	ALSE-Sydney 20-Jun-17 DUP03	RPD	ALSE-Sydney 07-Jun-17 SB14_0.4-0.5	13-Jun-17 FD02	RPD
Sampled Date/Time	29/05/2017 12:30	29/05/2017 12:30		1/06/2017 12:30	1/06/2017 12:30		14/06/2017 15:00	14/06/2017 15:00		29/05/2017 12:30	29/05/2017 12:30	
Chem_Grc	ChemName	Units	EQL									
	Moisture Content (dried @ 40°C)	%	1	11.6	10.9	6	4.7	5	6	43.3	46.3	7
PFAS	N-Ethyl perfluorooctane sulfonamidoacetic acid	mg/kg	0.0002 : 0.01 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002 : 0.005 (Interlab)	0.0014	0.0018	25	<0.0002	<0.0002	0	0.0002	0.0002	0
	Perfluoroheptane sulfonic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0005	0.0005	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	10:2 Fluorotelomer sulfonic acid	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	4:2 Fluorotelomer sulfonic acid	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	N-Methyl perfluorooctane sulfonamidoacetic acid	mg/kg	0.0002 : 0.01 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	PFHxS and PFOS (Sum of Total) - Lab Calc	mg/kg	0.0002	0.0501	17	<0.0002	<0.0002	0.0222	0	0.0221	0	0
	Perfluorobutane sulfonic acid	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002 : 0.005 (Interlab)	0.0028	0.0022	24	<0.0002	<0.0002	0	0.0006	0.0007	15
	Perfluoropentanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	8:2 Fluorotelomer sulfonic acid	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	N-Ethyl perfluorooctane sulfonamide	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	N-Ethyl perfluorooctane sulfonamidoethanol	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	N-Methyl perfluorooctane sulfonamide	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	N-Methyl perfluorooctane sulfonamidoethanol	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005 : 0.01 (Interlab)	0.0024	0.0027	12	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	Perfluorooctanoic acid (PFOA)	mg/kg	0.0002 : 0.005 (Interlab)	0.0024	0.0031	25	<0.0002	<0.0002	0	<0.0002	0.0003	40
	Perfluoropentane sulfonic acid	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorobutanoic acid	mg/kg	0.001 : 0.005 (Interlab)	<0.001	<0.001	0	<0.001	<0.001	0	<0.001	<0.001	0
	Perfluorodecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0033	0.0041	22	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorododecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0008	0.0009	12	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluoroheptanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0003	0.0004	29	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002 : 0.005 (Interlab)	0.0004	0.0004	0	<0.0002	<0.0002	0	<0.0002	0.0002	0
	Perfluorononanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0008	0.0009	12	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002 : 0.005 (Interlab)	0.0473	0.0571	19	<0.0002	<0.0002	0	0.0216	0.0214	1
	Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluorotetradecanoic acid	mg/kg	0.0005 : 0.005 (Interlab)	<0.0005	<0.0005	0	<0.0005	<0.0005	0	<0.0005	<0.0005	0
	Perfluorotridecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	<0.0002	<0.0002	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	Perfluoroundecanoic acid	mg/kg	0.0002 : 0.005 (Interlab)	0.0006	0.0006	0	<0.0002	<0.0002	0	<0.0002	<0.0002	0
	PFAS (Sum of Total)	mg/kg	0.0002	0.063	0.0749	17	<0.0002	<0.0002	0	0.0224	0.0226	1
	PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	0.0556	0.0661	17	<0.0002	<0.0002	0	0.0222	0.0224	1

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 50 (10-30 x EQL); 5 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory



Appendix D Table D2 Water Duplicate Summary

Field Duplicates (water)
Filter: SDG in('ALSE-Sydney 20-Jun-17','ALSE-Sydney 07-Jun-17',

SDG Field ID	ALSE-Sydney 20-Jun-17	ALSE-Sydney 20-Jun-17	RPD	ALSE-Sydney 20-Jun-17	ALSE-Sydney 20-Jun-17	RPD	ALSE-Sydney 20-Jun-17	23-Jun-17	RPD
Sampled Date/Time	MW05	DUP02		SW07	DUP04		MW01	DUP01	
	14/06/2017	14/06/2017		16/06/2017 15:00	16/06/2017 15:00		13/06/2017	13/06/2017	
Chem_Grd	ChemName	Units	EQL						
PFAS	N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoroheptane sulfonic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.02	0.04	0.02
	10:2 Fluorotelomer sulfonic acid	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0
	4:2 Fluorotelomer sulfonic acid	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0
	N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	PFHxS and PFOS (Sum of Total) - Lab Calc	µg/L	0.01	0.03	0.02	40	0.92	0.96	4
	Perfluorobutane sulfonic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.05	0.05	0
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.24	0.24	0
	Perfluoropentanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	8:2 Fluorotelomer sulfonic acid	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0
	N-Ethyl perfluorooctane sulfonamide	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	N-Methyl perfluorooctane sulfonamide	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Perfluorooctanoic acid (PFOA)	µg/L	0.01	<0.01	<0.01	0	0.03	0.03	0
	Perfluoropentane sulfonic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.04	0.04	0
	Perfluorobutanoic acid	µg/L	0.1 : 0.05 (Interlab)	<0.1	<0.1	0	<0.1	<0.1	0
	Perfluorodecanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorododecanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoroheptanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.03	0.14	0.05
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	0.08	0.08	0
	Perfluorononanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01	0.03	0.02	40	0.68	0.72	6
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02 : 0.05 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluorotetradecanoic acid	µg/L	0.05 : 0.01 (Interlab)	<0.05	<0.05	0	<0.05	<0.05	0
	Perfluorotridecanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	Perfluoroundecanoic acid	µg/L	0.02 : 0.01 (Interlab)	<0.02	<0.02	0	<0.02	<0.02	0
	PFAS (Sum of Total)	µg/L	0.01	0.03	0.02	40	1.17	1.21	3
	PFAS (Sum of Total)(WA DER List)	µg/L	0.01	0.03	0.02	40	1.11	1.15	4

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 200 (1-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory



Appendix D Table D3 Soil Blank Summary

Field Blanks (soil)
Filter: SDG in('ALSE-Sydney 20-Jun-17','ALSE-Sydney 07-Jun-17','ALSE-S)

SDG	ALSE-Sydney 20-Jun-17
Field ID	TRIP BLANK 01
Sampled_Date/Time	14/06/2017
Sample Type	Trip_B

Chem_Group	ChemName	Units	EQL	
	Moisture Content (dried @ 40°C)	%	1	<1
PFAS	N-Ethyl perfluorooctane sulfonamidoacetic acid	mg/kg	0.0002	<0.0002
	Perfluorodecanesulfonic acid (PFDS)	mg/kg	0.0002	<0.0002
	Perfluoroheptane sulfonic acid	mg/kg	0.0002	<0.0002
	10:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005
	4:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005
	N-Methyl perfluorooctane sulfonamidoacetic acid	mg/kg	0.0002	<0.0002
	PFHxS and PFOS (Sum of Total) - Lab Calc	mg/kg	0.0002	<0.0002
	Perfluorobutane sulfonic acid	mg/kg	0.0002	<0.0002
	Perfluorohexane sulfonic acid (PFHxS)	mg/kg	0.0002	<0.0002
	Perfluoropentanoic acid	mg/kg	0.0002	<0.0002
	8:2 Fluorotelomer sulfonic acid	mg/kg	0.0005	<0.0005
	N-Ethyl perfluorooctane sulfonamide	mg/kg	0.0005	<0.0005
	N-Ethyl perfluorooctane sulfonamidoethanol	mg/kg	0.0005	<0.0005
	N-Methyl perfluorooctane sulfonamide	mg/kg	0.0005	<0.0005
	N-Methyl perfluorooctane sulfonamidoethanol	mg/kg	0.0005	<0.0005
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	mg/kg	0.0005	<0.0005
	Perfluorooctanoic acid (PFOA)	mg/kg	0.0002	<0.0002
	Perfluoropentane sulfonic acid	mg/kg	0.0002	<0.0002
	Perfluorobutanoic acid	mg/kg	0.001	<0.001
	Perfluorodecanoic acid	mg/kg	0.0002	<0.0002
	Perfluorododecanoic acid	mg/kg	0.0002	<0.0002
	Perfluoroheptanoic acid	mg/kg	0.0002	<0.0002
	Perfluorohexanoic acid (PFHxA)	mg/kg	0.0002	<0.0002
	Perfluorononanoic acid	mg/kg	0.0002	<0.0002
	Perfluorooctane sulfonic acid (PFOS)	mg/kg	0.0002	<0.0002
	Perfluorooctane sulfonamide (FOSA)	mg/kg	0.0002	<0.0002
	Perfluorotetradecanoic acid	mg/kg	0.0005	<0.0005
	Perfluorotridecanoic acid	mg/kg	0.0002	<0.0002
	Perfluoroundecanoic acid	mg/kg	0.0002	<0.0002
	PFAS (Sum of Total)	mg/kg	0.0002	<0.0002
	PFAS (Sum of Total)(WA DER List)	mg/kg	0.0002	<0.0002



Appendix D
Table D4
Water Blanks Summary

Field Blanks (water)
Filter: SDG in('ALSE-Sydney 20-Jun-17','ALSE-Sydney 07-Jun-17','ALSE

SDG Field ID	Sampled_Date/Time	Sample Type	Units	EQ	ALSE-Sydney 07-Jun-17 FB01	ALSE-Sydney 07-Jun-17 FB02	ALSE-Sydney 07-Jun-17 FR01	ALSE-Sydney 07-Jun-17 FR02	ALSE-Sydney 07-Jun-17 FR03	ALSE-Sydney 07-Jun-17 FR04	ALSE-Sydney 07-Jun-17 FR05	ALSE-Sydney 20-Jun-17 RINSATE_TROWEL	ALSE-Sydney 20-Jun-17 RINSATE_PUMP1	ALSE-Sydney 20-Jun-17 RINSATE_PUMP2	ALSE-Sydney 20-Jun-17 RINSATE_TROWEL02	ALSE-Sydney 20-Jun-17 TRIP BLANK 02
Field ID	Sampled_Date/Time	Sample Type	Units	EQ	29/05/2017 Field_B	2/06/2017 Field_B	29/05/2017 12:30 Rinsate	30/05/2017 12:30 Rinsate	31/05/2017 12:30 Rinsate	1/06/2017 12:30 Rinsate	2/06/2017 12:30 Rinsate	13/06/2017 Rinsate	14/06/2017 Rinsate	15/06/2017 15:00 Rinsate	16/06/2017 15:00 Rinsate	14/06/2017 Trip_B
Chem_Group	ChemName	Units	EQ													
PFAS	N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorodecanesulfonic acid (PFDS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoroheptane sulfonic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	10:2 Fluorotelomer sulfonic acid	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	4:2 Fluorotelomer sulfonic acid	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PFHxS and PFOS (Sum of Total) - Lab Calc	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01
	Perfluorobutane sulfonic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorohexane sulfonic acid (PFHxS)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoropentanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	8:2 Fluorotelomer sulfonic acid	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamide	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamide	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Perfluorooctanoic acid (PFOA)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Perfluoropentane sulfonic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorobutanoic acid	µg/L	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Perfluorodecanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorododecanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoroheptanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorohexanoic acid (PFHxA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorononanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorooctane sulfonic acid (PFOS)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01
	Perfluorooctane sulfonamide (FOSA)	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluorotetradecanoic acid	µg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Perfluorotridecanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Perfluoroundecanoic acid	µg/L	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	PFAS (Sum of Total)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01
	PFAS (Sum of Total)(WA DER List)	µg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01

Appendix E – Borehole logs



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW05

Page 1 of 3

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 30/05/2017 - 30/05/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 23.2 Diameter (mm) 125	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL - Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing PVC (Class 18)	Screen 0.5mm Slotted PVC (Class 18)	Surface Completion Monument
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.0	HA	0.1	MW05_0.0_0.1 (FD06)				Silty SAND, fine, orange- brown, some clay (NATURAL - SOIL)	D	MD	staining staining	
0.1		0	MW05_0.2_0.3								
0.5		0.1	MW05_0.5_0.6				GRAVEL, medium to coarse, subangular	M	F	staining staining	-0.5
0.9		0.1	MW05_0.9_1.9 (FD07)				CLAY, orange- brown and mottled grey- brown	M	S	staining staining	-1
1.7	PT	0.2	MW05_1.7_3.5				CLAY, mottled brown- grey and mottled black (NATURAL - SOIL)	W	VST	staining staining	-1.5
1.8			MW05_1.8_1.9				CLAY, mottled brown- grey and mottled black (NATURAL - SOIL)	M	VST	staining staining	-2
2.4		0.1	MW05_2.4_2.6				CLAY, orange- brown mottled dark grey, some fine to medium gravel, angular gravel	M	H	staining staining	-2.5
2.9		0	MW05_2.9_3.1								
3.4		0	MW05_3.4_3.6				Silty SAND, pale yellow- brown (NATURAL - BEDROCK)	D		staining staining	-3
4.8	SFA										
5.4		0	MW05_4.8_5		Grout						
5.5	AH										
7.0							SILT, pale yellow- brown (NATURAL - BEDROCK)	D		staining staining	-7

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW05

Page 2 of 3

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10.0		0	MW05_10.0_11								-10.0
11.0											-11.0
11.5											-11.5
12.0											-12.0
12.5					Grout		SILT, dark yellow- brown (NATURAL - BEDROCK)	D		staining staining	-12.5
13.0											-13.0
13.5											-13.5
14.0											-14.0
14.5											-14.5
15.0		0	MW05_15.0_16								-15.0
15.5					Bentonite						-15.5
16.0											-16.0
16.5											-16.5
17.0							GRAVEL, grey to dark grey, subangular, medium gravel (NATURAL - BEDROCK)	D		staining staining	-17.0
17.5											-17.5
18.0											-18.0
18.5											-18.5
19.0											-19.0
19.5					Sand						-19.5
20.0											-20.0
20.5		0	MW05_20.2_21.7								-20.5
21.0											-21.0
21.5											-21.5

Notes			
GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.			
Drilling Abbreviations		Moisture Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	
		Consistency Abbreviations	
		Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard	



BOREHOLE LOG
ENVIRONMENTAL-GROUNDWATER

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
22											-22
22.5					Sand						-22.5
23											-23
23.5							Termination Depth at: 23.20 m. Refusal on bedrock.				-23.5
24											-24
24.5											-24.5
25											-25
25.5											-25.5
26											-26
26.5											-26.5
27											-27
27.5											-27.5
28											-28
28.5											-28.5
29											-29
29.5											-29.5
30											-30
30.5											-30.5
31											-31
31.5											-31.5
32											-32
32.5											-32.5
33											-33
33.5											-33.5

Notes			
GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.			
Drilling Abbreviations		Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW06

Page 1 of 3

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 29/05/2017 - 30/05/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 26.2 Diameter (mm) 125	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL - Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing PVC (Class 18)	Screen 0.5mm Slotted PVC (Class 18)	Surface Completion Monument
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0	MW06_0.0_0.1		Cement						
0.5	PT	0	MW06_0.2_0.4				Clayey GRAVEL, fine to medium, brown-grey, with silt	D	D	staining staining	
0.5							Silty CLAY, medium plasticity, fine, brown, trace sand	D	VST	staining staining	-0.5
1		0	MW06_0.7_0.9 (FD05)				CLAY, medium plasticity, fine, brown, trace silty sand	D	VST	staining staining	-1
1.5		0	MW06_1.2_2.6				Sandy CLAY, low plasticity, fine, brown, trace gravel, fine gravel	D	H	staining staining	-1.5
2		0	MW06_2.0_2.2				Silty SAND, fine to medium, pale yellow-brown, trace clay, trace gravel, fine sand (NATURAL - BEDROCK)	D	VD	staining staining	-2
2.5	AH										-2.5
3		0	MW06_3.0_3.2_904								-3
3.5											-3.5
4		0	MW06_4.0_4.2_906								-4
4.5	AH										-4.5
5					Grout						-5
5.5											-5.5
6											-6
6.5							Sandy CLAY, grey, with silt, and gravel, subangular, fine to medium gravel (NATURAL - BEDROCK)	D		staining staining	-6.5
7											-7
7.5											-7.5
8											-8
8.5											-8.5
9		0	MW06_8.7_8.9_907								-9
9.5											-9.5
10											-10

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MW06

ENVIRONMENTAL-GROUNDWATER

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10.5											-10.5
11											-11
11.5											-11.5
12											-12
12.5											-12.5
13					Grout						-13
13.5		0	MW06_13.2_14.2								-13.5
14											-14
14.5											-14.5
15											-15
15.5											-15.5
16					Bentonite						-16
16.5											-16.5
17											-17
17.5											-17.5
18											-18
18.5											-18.5
19											-19
19.5					Sand						-19.5
20											-20
20.5											-20.5
21											-21
21.5											-21.5

Notes			
GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.			
Drilling Abbreviations		Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG
ENVIRONMENTAL-GROUNDWATER

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
22											-22
22.5											-22.5
23											-23
23.5											-23.5
24											-24
24.5					Sand						-24.5
25											-25
25.5											-25.5
26											-26
26.5							Termination Depth at: 26.20 m. Target depth achieved.				-26.5
27											-27
27.5											-27.5
28											-28
28.5											-28.5
29											-29
29.5											-29.5
30											-30
30.5											-30.5
31											-31
31.5											-31.5
32											-32
32.5											-32.5
33											-33
33.5											-33.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler

Moisture Abbreviations

D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated

Consistency Abbreviations

Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense

Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 30/05/2017 - 01/06/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 21.7 Diameter (mm) 125	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL - Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing PVC (Class 18)	Screen 0.5mm Slotted PVC (Class 18)	Surface Completion Gatic
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0	HA	0	MW07_0.0_0.1		Cement		Clayey SILT, brown, some sand, fine sand	M	MD	staining staining	
0.5		0	MW07_0.4_0.5				Clayey SILT, pale grey- brown mottled orange, some sand, fine sand	SM	VST	staining staining	-0.5
1		0	MW07_0.9_1				Silty CLAY, pale grey- brown mottled brown- orange, some sand				-1
1.5							Silty CLAY, low to medium plasticity, brown, some fine sand	SM	VST	staining staining	-1.5
2	PT	0	MW07_1.5_1.7 (FD08)				Silty CLAY, low to medium plasticity, brown, some fine sand	SM	H	staining staining	-2
2.1		0	MW07_1.9_2.1				CLAY, mottled orange	D	H	staining staining	-2.1
2.3		0	MW07_2.1_2.3				Silty CLAY, medium plasticity, brown mottled grey, some fine sand	SM	H	staining staining	-2.3
2.5		0	MW07_2.5_2.7				Silty SAND, pale orange- brown mottled dark grey	D	D	staining staining, Occasional mottling.	-2.5
3	SFA						SAND, fine, pale orange- brown			staining staining	-3
3.0		0	MW07_3.0_6.2								-3.0
4	AH										-4
6		0	MW07_6.0_6.7		Grout		GRAVEL, fine to medium, subangular, dark grey (NATURAL - BEDROCK)			staining staining	-6
10							GRAVEL, fine to medium, subangular,	D		staining staining, Bands of	-10

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10.0							dark grey, and silt (NATURAL - BEDROCK)			rock excavating as silt, pale-grey.	-10.0
10.5											-10.5
11.0											-11.0
11.5											-11.5
12.0		0	MW07_12.0_24.7		Grout						-12.0
12.5											-12.5
13.0											-13.0
13.5											-13.5
14.0											-14.0
14.5					Bentonite						-14.5
15.0											-15.0
15.5											-15.5
16.0											-16.0
16.5											-16.5
17.0											-17.0
17.5											-17.5
18.0											-18.0
18.5					Sand						-18.5
19.0											-19.0
19.5											-19.5
20.0											-20.0
20.5											-20.5
21.0											-21.0
21.5											-21.5
Termination Depth at: 21.70 m. Target											

Notes			
GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.			
Drilling Abbreviations		Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL MW08

ENVIRONMENTAL-GROUNDWATER

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 01/06/2017 - 01/06/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 20.2 Diameter (mm)	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL - Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing PVC (Class 18)	Screen 0.5mm Slotted PVC (Class 18)	Surface Completion Gatic
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.0	HA	0	MW08_0.0_0.1				Clayey SILT, brown	D	MD	staining staining	
0.2		0	MW08_0.2_0.3				Gravelly SILT, brown, some clay, some fine sand	SM	MD	staining staining	
0.4		0	MW08_0.4_0.5 (FD09)				Gravelly CLAY, mottled orange and green, no	W	ST	staining staining	-0.5
0.9		0	MW08_0.9_1				CLAY, low plasticity, orange- brown mottled brown- grey, some cobbles	SM	ST	staining staining, Hand auger refusal at 1.0m.	-1
1.0 - 4.7	SFA										
4.7		0	MW08_4.7_5.2_1104		Grout		Silty SAND, pale yellow- brown (NATURAL - BEDROCK)	D	VD	staining staining	-2
5.2 - 7.7											
7.7		0	MW08_7.7_8.2				GRAVEL, fine to medium, subrounded, dark grey, with silt, some fine to medium sand	D		staining staining	-6.5
8.2 - 10.0											

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	Moisture Abbreviations D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Consistency Abbreviations Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard
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BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW08

Page 2 of 2

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10.5		0	MW08_10.7_11.2								-10.5
11											-11
11.5											-11.5
12											-12
12.5											-12.5
13					Grout						-13
13.5											-13.5
14		0	MW08_13.7_14.2								-14
14.5											-14.5
15											-15
15.5											-15.5
16					Bentonite						-16
16.5											-16.5
17		0	MW08_16.7_17.2								-17
17.5							SILT, brown (possible NATURAL - BEDROCK)	M		staining staining	-17.5
18											-18
18.5		0.1	MW08_18.2_18.7 (FD10)		Sand						-18.5
19							SILT, brown (possible NATURAL - BEDROCK)	W		staining staining	-19
19.5											-19.5
20											-20
20.5							Termination Depth at: 20.20 m. Target depth achieved.				-20.5
21											-21
21.5											-21.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations

AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler

Moisture Abbreviations

D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated

Consistency Abbreviations

Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense

Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW09

Page 1 of 2

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 02/06/2017 -	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 17.2 Diameter (mm)	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL - Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing PVC (Class 18)	Screen 0.5mm Slotted PVC (Class 18)	Surface Completion Gatic
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.0	HA	0	MW09_0.0_0.1_1110		Cement		Clayey SILT, dark brown, some roots	M	MD	staining staining	
0.1		0	MW09_0.2_0.3_1111				CLAY, mottled orange- brown and grey- brown, trace silt	M	S	staining staining	
0.4		0	MW09_0.4_0.9_1112				Sandy CLAY, grey- brown with mottled orange- brown, and fine gravel	M	L	staining staining, Pale grey mottling increasing with depth	-0.5
0.9		0	MW09_0.9_1.9_1113 (FD11 and FD12)				Sandy CLAY, grey- brown with mottled orange- brown, trace fine to medium gravel	M	L	staining staining, Increasing ironstone content and decreasing clay content	-1
1.8	PT	0	MW09_1.8_2								-1.5
2.8		0	MW09_2.8_3_1115				Sandy SILT, pale yellow- brown with pale green (NATURAL - BEDROCK)	D		staining staining	-2
3.8		0	MW09_3.8_4_1116								-2.5
4.7	AH	0	MW09_4.7_4.9_1117		Grout		Silty SAND, pale yellow- brown and pale green (NATURAL - BEDROCK)	D		staining staining	-3
5.7											-3.5
6.7							Sandy SILT, pale yellow- brown (NATURAL - BEDROCK)	D		staining staining	-4
7.7		0	MW09_7.7_8.2_1118								-4.5
8.2											-5
9.2					Bentonite						-5.5
10.2											-6
11.2											-6.5
12.2											-7
13.2											-7.5
14.2											-8
15.2											-8.5
16.2											-9
17.2											-9.5

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL MW09

Page 2 of 2

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
10.5		0	MW09_10.7_11.2_119 (FD13)		Bentonite		Sandy SILT, dark yellow- brown (NATURAL - BEDROCK)	M	F	staining staining	-10.5
11											-11
11.5											-11.5
12											-12
12.5											-12.5
13							Sandy SILT, dark yellow- brown, some fine gravel, fine to coarse sand (NATURAL - BEDROCK)	M	F	staining staining, Grading with depth. Increasing sand content with depth.	-13
13.5		0	MW09_13.7_14.2_1120		Sand						-13.5
14											-14
14.5											-14.5
15											-15
15.5							Sandy GRAVEL, subangular, dark green and dark brown	W	H	staining staining	-15.5
16											-16
16.5											-16.5
17		0	MW09_16.7_17.2								-17
17.5							Termination Depth at: 17.20 m. Target depth achieved.				-17.5
18											-18
18.5											-18.5
19											-19
19.5											-19.5
20											-20
20.5											-20.5
21											-21
21.5											-21.5

Notes			
GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.			
Drilling Abbreviations		Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler		D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL SB13

Page 1 of 1

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 30/05/2017 - 29/05/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 1.9 Diameter (mm) 60	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A		Casing		Screen		Surface Completion		Backfill			
Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.1		0	SB13_0.0_0.1 (FD03)				CL - Silty CLAY, dark brown, with rootlets	M	S	staining staining	-0.1
0.2							Clayey SILT, no plasticity, grey- brown	D	MD	staining staining	-0.2
0.3		0	SB13_0.3_0.4								-0.3
0.4							CLAY, grey- brown, trace silt	D	ST	staining staining	-0.4
0.5		0	SB13_0.5_0.6								-0.5
0.6											-0.6
0.7											-0.7
0.8							CLAY, grey- brown to brown, trace gravel	D	VST	staining staining, Paler with depth	-0.8
0.9		0	SB13_0.9_1								-0.9
1.0											-1.0
1.1											-1.1
1.2											-1.2
1.3											-1.3
1.4											-1.4
1.5											-1.5
1.6		0	SB13_1.6 (FD04)				Silty SAND, pale yellow- brown (NATURAL - BEDROCK)	D	H	staining staining	-1.6
1.7											-1.7
1.8											-1.8
1.9							Termination Depth at: 1.90 m. Refusal on bedrock.				-1.9

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

MONITORING WELL SB14

ENVIRONMENTAL-GROUNDWATER

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 29/05/2017 - 29/05/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 2.7 Diameter (mm) 60	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing	Screen	Surface Completion	Backfill
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.0	HA	0	SB14_0.0_0.1			ASPHALT				staining staining	-0.00
0.1						Gravelly SAND, brown- orange (FILL)		D	L	staining staining	-0.10
0.2						CH - CLAY, high plasticity, orange- brown and brown, trace sand, and gravel, fine to medium sand, fine gravel		M	S	staining staining, Becoming more brown with depth	-0.20
0.4		0.1	SB14_0.4_0.5 (FD02)								-0.40
0.6											-0.60
0.8							CH - CLAY, high plasticity, brown, trace sand, and gravel, fine to medium sand, fine gravel	M	F	staining staining	-0.80
1.0		0.1	SB14_0.9_1								-1.00
1.2											-1.20
1.4											-1.40
1.6	PT						CH - CLAY, high plasticity, brown, trace sand, and gravel, fine to medium sand, fine gravel	M	ST	staining staining	-1.60
1.8		0	SB14_1.6_1.8								-1.80
2.0							CH - CLAY, high plasticity, mottled grey-orange and pale red- brown, trace: and gravel, fine to medium sand, fine gravel	SM	ST	staining staining	-2.00
2.2							SAND, fine to medium, pale orange-brown (NATURAL - BEDROCK)	D	VST	staining staining	-2.20
2.4											-2.40
2.6		0	SB14_2.5_2.7								-2.60
2.8							Termination Depth at: 2.70 m. Refusal on bedrock.				-2.80

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard



BOREHOLE LOG

ENVIRONMENTAL-GROUNDWATER

MONITORING WELL SB15

Page 1 of 1

Client Fire & Rescue NSW Project Armidale FRNSW Site Investigation Project No. 212558304 Site Armidale FRNSW Location 2-16 Mann Street, Armidale, NSW Date Drilled 29/05/2017 - 29/05/2017	Drill Co. Terratest Driller CB Rig Type Drill Method Total Depth (m) 2.7 Diameter (mm) 60	Easting, Northing , Grid Ref GDA94_MGA_zone_56 Elevation Collar RL Logged By Jesse Simkus Checked By JH
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B.C.L No. N/A	Casing	Screen	Surface Completion Backfill
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Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Well Details	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials, separate phase liquids, imported fill, ash.	Elevation (m)
0.0	HA	0	SB15_0.0_0.1 (FD01)				CH - Sandy CLAY, high plasticity, dark brown, with rootlets	M	S	staining staining, FDOI	-0.00
0.2		0	SB15_0.2_0.3				CH - CLAY, high plasticity, brown with mottled orange, some fine to medium sand	M	F	staining staining	-0.20
0.4		0	SB15_0.4_0.5				Silty CLAY, low plasticity, pale grey-brown	SM	F	staining staining	-0.40
0.6							CL - CLAY, medium plasticity, dark brown- grey mottled orange, trace sand, and gravel	M	F	staining staining	-0.60
0.8											-0.80
1.0		0	SB15_0.9_1								-1.00
1.2											-1.20
1.4											-1.40
1.6	PT						CL - CLAY, medium plasticity, dark brown- grey mottled orange, with coarse gravel	M	F	staining staining	-1.60
1.8		0	SB15_1.8_1.9				CL - CLAY, medium plasticity, dark brown- grey mottled orange, with coarse gravel	M	ST	staining staining	-1.80
2.0											-2.00
2.2											-2.20
2.4							SAND, orange (NATURAL - BEDROCK)	D	H	staining staining	-2.40
2.6		0	SB15_2.5_2.7								-2.60
2.8							Termination Depth at: 2.70 m. Refusal on bedrock.				-2.80

Notes

GHD Soil Classifications The GHD Soil Classification is based on Australian Standards AS 1726-1993. This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, NDD-Non Destructive Drilling, PT-Push tube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	Granular Soils VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense, VD - Very Dense	Cohesive Soils VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Appendix F – NATA accredited laboratory reports and chain of custody documentation



CHAIN OF CUSTODY

ALS Laboratory
Please tick →

CLIENT: GHD

TURNDOWN REQUIREMENTS: Standard TAT (List due date)

FOR LABORATORY USE ONLY (Circle)

OFFICE: Sydney

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

Custody Seal intact? Non Standard or urgent TAT (List due date)

PROJECT: 21258314

ALS QUOTE NO: SY14317

CCC SEQUENCE NUMBER (Circle)

Free Ice / frozen Ice bricks present upon receipt?

ORDER NUMBER:

CONTACT PH: 0427 045 833 / 0408 713 343

DR: 1 2 3 4 5 6 7

Random Sample Temperature on Receipt:

SAMPLER: Jesse Simkus

SAMPLER MOBILE: 0464 542 354

REINQUISHED BY: [Signature]

RECEIVED BY: [Signature]

REINQUISHED BY: [Signature]

RECEIVED BY: [Signature]

COC emailed to ALS? (YES / NO)

EDD FORMAT (or default): ESDat

DATE/TIME: 9/6/17

DATE/TIME: 2pm

DATE/TIME:

DATE/TIME:

Email Reports to (will default to PM if no other addresses are listed): Jesse.Simkus@ghd.com

DATE/TIME:

DATE/TIME:

DATE/TIME:

DATE/TIME:

Comments/SPECIAL HANDLING/STORAGE OR DISPOSAL: Potential PFAS contamination - handle with care

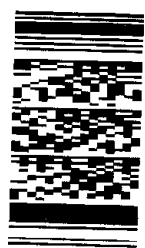
Please hold samples for 6 months.

Additional Information

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)	CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB: Some Codes must be listed to attract suite price! Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required))	Additional Information						
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	refer to	TOTAL CONTAINERS	PFAS	TOC	HOLD.	pH, silica, aluminium
①	SB15_0-0-0-1	24/5/17	S	P + G		2	X	X		
40	SB15_0-2-0-3								X	
41	SB15_0-4-0-5								X	
42	SB15_0-9-1-0								X	
②	SB15_18-2-0						X			
③	SB15_25-2-7						X			X
④	SB14_0-0-0-1						X	X		
⑤	SB14_0-4-0-5						X	X		X
43	SB14_0-9-1-0								X	
44	SB14_16-1-8								X	
⑥	SB14_25-2-7						X	X		
⑦	SB15_0-0-0-1						X	X		X

Water Container Codes: F = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, S = Sodium Hydroxide Preserved, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass Unpreserved, AP = Amber Glass Preserved, V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Borohydride Preserved, VS = VOA Vial Sodium Borohydride Preserved, AV = Airtight Preserved Vial SG = Sulphur Preserved Amber Glass, H = HDI Preserved Plastic, NS = NC Preserved Plastic, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottle, ST = Special Bottle, ASS = Plastic Used for Acid Sulphide Soils, R = Unpreserved Bag

Environmental Division
Sydney
Work Order Reference
ES1714150



Telephone: + 61 2 8784 8535



CHAIN OF CUSTODY

ALS Laboratory
please use 3

CLIENT: GH0

OFFICE: Sydney

PROJECT: 212656314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC optional to ALS? YES / NO

Email Reports to (will default to PKI if no other addresses are listed) jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed) FSS.A.P@GH0.COM

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: Standard TAT (list due date):

Standard TAT may be longer for some tests e.g. Non Standard or urgent TAT (list due date):

ALS QUOTE NO.: SY-143-17

CONTACT PH: 0421 045 935 / 0408 713 343

SAMPLER MOBILE: 0404 542 354

EDD FORMAT (or default): ESDat

RECEIVED BY: [Signature]

DATE/TIME: 21/5/17

FOR LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice blocks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: C

Other comment:

RECEIVED BY: [Signature]

DATE/TIME: 21/5/17

COC SEQUENCE NUMBER (Circle)
COC: 1 2 3 4 5 6 7
OF: 1 2 3 4 5 6 7
RECEIVED BY: [Signature]
DATE/TIME: 21/5/17

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	TOTAL CONTAINERS	ANALYSIS REQUIRED (including SUITES (NB: Suite Codes must be listed to attract scale price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required))	Additional Information
45	SB13_03-04	21/5/17	S	P+G	2	PFAS Full Suite TOC MOLD	
46	SB13_04-05					X	
47	SB13_09-10					X	
48	SB13_16-19					X	
49	MW06_00-01					X	
50	MW06_02-04					X	
51	MW06_07-09					X	
52	MW06_12-14					X	
53	MW06_20-22					X	
54	MW06_30-32					X	
55	MW06_40-42					X	
56	FDD01					X	

Water Container Codes: A - Unopened Plastic; B - Unopened Plastic; C - Filled Plastic; D - Filled Plastic; E - Filled Plastic; F - Filled Plastic; G - Filled Plastic; H - Filled Plastic; I - Filled Plastic; J - Filled Plastic; K - Filled Plastic; L - Filled Plastic; M - Filled Plastic; N - Filled Plastic; O - Filled Plastic; P - Filled Plastic; Q - Filled Plastic; R - Filled Plastic; S - Filled Plastic; T - Filled Plastic; U - Filled Plastic; V - Filled Plastic; W - Filled Plastic; X - Filled Plastic; Y - Filled Plastic; Z - Filled Plastic

3



CHAIN OF CUSTODY
ALS Laboratory
Please tick

CLIENT: GHD
OFFICE: Sydney
PROJECT: 212558314
ORDER NUMBER:
PROJECT MANAGER: Nicole Rosen / Ben Anderson
SAMPLER: Jesse Simkus
COC emailed to ALS? (YES / NO)
Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com
Email Invoice to (will default to PM if no other addresses are listed): FSS.AP@GHD.COM

TURNAROUND REQUIREMENTS
Standard TAT may be longer for some tests e.g. Ultra Trace Organics
ALS QUOTE NO.: SY-143-17
 Standard TAT (List due date)
 Non Standard or urgent TAT (List due date):

FOR LABORATORY USE ONLY (Circle)
COC SEQUENCE NUMBER (Circle)
of: 1 2 3 4 5 6 7
RECEIVED BY: (Signature) DATE/TIME: 7/16/17
RECEIVED BY: DATE/TIME:
RECEIVED BY: DATE/TIME:

Comments on likely contaminant levels, dilutions, or samples requiring specific GC analysis etc.

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	REFER TO	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed in attach suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required)	Additional Information
* FDO2		29/5/17	S	P + G		2	PFAS Full Suite TOC HOLD. pH, silica aluminium	Comments on likely contaminant levels, dilutions, or samples requiring specific GC analysis etc.
S2 FDO3				+ G		2	Please forward to Eurofins for PFAS Full Suite	
S3 FDO4					1			
S4 FDO5				+ G	2			
B FRO1			W	PFAS Bottle	1			
S5 MW06-4.7-9.7		30/5/17	S	P + G	2			
W MW06-13.2-14.2					1			
S6 MW05-0.0-0.1					1			
K MW05-0.2-0.3					1			
S7 MW05-0.5-0.6					1			
S8 MW05-0.9-1.0					1			
S9 MW05-1.7-1.8					1			

Water Container Codes: P = Unopened Plastic, N = Nitric Preserved Plastic, OPG = Nitric Preserved CRP, SH = Sodium Hydroxide Preserved, S = Sodium Hydroxide Preserved, AS = Amber Glass, Unopened, AO = Antiseptic Unopened Plastic, V = VOA Vol HCl Preserved, VB = VOA Vol Sulphur Preserved, VS = VOA Vol Sulphur Preserved, AV = VOA Vol Sulphur Preserved, Via SG = Sulfur Preserved Amber Glass, H = HCl Preserved Plastic, HS = HCl Preserved Speciation Bottle, SP = Sulfur Preserved Plastic, F = Formaldehyde Preserved Glass, Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottle, ST = Steven Bottle, ASS = Plastic Bag for Acid Silicic Acid, B = Unopened Bag



CHAIN OF CUSTODY

ALS Laboratory
Please tick →

CLIENT: GHD

TURNAROUND REQUIREMENTS: Standard TAT (List due date)

FOR LABORATORY USE ONLY (Circle)

OFFICE: Sydney

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

Non Standard or urgent TAT (List due date):

Custody Seal Intact: Yes No N/A

PROJECT: 212553314

ALS QUOTE NO.:

SY-143-17

COC SEQUENCE NUMBER (Circle)

Free for frozen ice sticks present upon receipt: Yes No N/A

ORDER NUMBER:

CONTACT PH: 0421 845 335 / 0408 713 343

COC: 1 2 3 4 5 6 7

Random Sample Temperature on Receipt: °C

PROJECT MANAGER: Nicole Hosen / Ben Anderson

SAMPLER MOBILE: 0404 542 354

RECEIVED BY: *[Signature]*

Other comment:

SAMPLER: Jesse Simkus

EDD FORMAT (or default): ESDat

RECEIVED BY: *[Signature]*

RECEIVED BY:

COC emailed to ALS? (YES / NO)

EMAIL REPORTS TO (will default to PM if no other addresses are listed): Jesse.Simkus@ghd.com

DATE/TIME: 26/11/14

DATE/TIME:

Email invoice to (will default to PM if no other addresses are listed): PSS.AP@GHD.COM

DATE/TIME: 26/11/14

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)	CONTAINER INFORMATION	ANALYSIS REQUIRED (including SUITES (NB: Suite Codes must be used to attract suite price) Where Metals are required specify Total (unfiltered) or Dispersed (filtered) filterable) (required)	Additional Information										
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes yellow)	(refer to)	TOTAL CONTAINERS	PFAS Full Suite	TOC	HOLD. pH, silica, aluminium	RECEIVED BY:	DATE/TIME:	RECEIVED BY:	DATE/TIME:	Comments on likely contaminant levels, dilutions, or samples requiring specific DC analysis etc
60	MW05_2.4-2.5	30/5/17	S	P + G		2	X	X	X					
61	MW05_2.9-3.1													
61	MW05_3.4-3.6													
62	MW05_4.8-5.0													
63	MW05_10.0-11.0													
64	MW05-15.0-16.0													
65	FDD6													
66	FDD7													
67	FDD2													
68	MW05_20.2-21.7	3/5/17	S	P + G		2	X	X	X					
67	MW07_00-01													
68	MW07_04-05													

Water Container Codes: P - Unpreserved Plastic; N - Nitric Preserved Plastic; ORC - Nitric Preserved ORC; SH - Sodium Hydroxide Preserved; S - Sodium Hydroxide Preserved Plastic; AG - Amber Glass Unpreserved; JF - Furanal Unpreserved Plastic; V - VOA via HCl Preserved; VB - VOA via Sodium Bisulfate Preserved; VS - VOA via Sulfuric Preserved; AV - Air/Argon Unpreserved via S2; Sulfur Preserved Amber Glass; H - HCl Preserved Plastic; HS - HCl Preserved Speciation bottle; SP - Sulfuric Preserved Plastic; F - Formaldehyde Preserved Glass; Z - Zinc Acetate Preserved Bottle; E - EDTA Preserved Bottle; ST - Sterile Bottle; ASS - Plastic Bag for Acid Sulfuric Seal; S - Unpreserved Seal

(7)



CHAIN OF CUSTODY
ALS Laboratory
please tick →

CLIENT: GHD

OFFICE: Sydney

PROJECT: 212558314

ORDER NUMBER:

PROJECT MANAGER: Nicola Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed): FSS-ALP@GHD.COM

TURNAROUND REQUIREMENTS: Standard TAT (list due date): Non Standard or urgent TAT (list due date):

ALS QUOTE NO.: SY-143-17

CONTRACT PH: 0421 045 835 / 0408 713 343

SAMPLER MOBILE: 0404 542 354

EDS FORMAT (or default): ESDai

RELINQUISHED BY: DATE/TIME: RECEIVED BY: DATE/TIME:

FOR LABORATORY USE ONLY (tick)

COC SEQUENCE NUMBER (tick)

OF: 1 2 3 4 5 6 7

Free Ice / Rosen Ice Swabs Present upon receipt: Yes No N/A

Random Sample Temperature on Receipt: °C

Other comment:

RECEIVED BY: DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)	DATE / TIME	MATRIX	CONTAINER INFORMATION		ANALYSIS REQUIRED INCLUDING SUITES (NB: Suit Codes must be listed in attached suite print) Where Methods are required specify total (unfiltered bottle required) or Disposed (field filtered bottle required)		FOR LABORATORY USE ONLY (tick)		Additional Information		
				TYPE & PRESERVATIVE (codes below)	(refer to)	TOTAL CONTAINERS	PEAS Full Suite	TOC	HOLD. pH, silica aluminium		Yes	No
69	MW07-09-1.0	31/5/17	S	P + G	2	X	X	X				
70	MW07-15-1.7					X	X	X				
71	MW07-19-2.1					X	X	X				
72	MW07-21-2.3					X	X	X				
73	MW07-25-2.7					X	X	X				
74	MW07-3.0-3.2					X	X	X				
75	MW07-6.0-6.7					X	X	X				
76	MW07-12.0-12.7					X	X	X				
77	FD05					X	X	X				
78	FR03					X	X	X				
79	MW08-0.0-0.1	1/6/17	S	P + G	2	X	X	X				
76	MW08-0.2-0.3					X	X	X				

Water Condition Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, ORC = Nitric Preserved ORC, S = Sodium Hydroxide Preserved Plastic, AG = Amber Glass (Inorganic), AP = Airtight Unpreserved Plastic, F = Formaldehyde Preserved Glass
 V = VOA Vial HCl Preserved, VB = VOA Vial Sodium Hydroxide Preserved, VS = VOA Vial Sulfuric Preserved, AV = Airtight Unpreserved Vial S3 = Sulfuric Preserved Amber Glass, H = HCl Preserved Plastic, HS = HCl Preserved Separation bottle, SP = Sulfuric Preserved Plastic, F = Formaldehyde Preserved Glass
 Z = Zinc Acetate Preserved Bottle, E = EDTA Preserved Bottles, ST = Silicone Bottle, ASS = Plastic Bag for Acid Sulfuric Soils, B = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory
please tick →

CLIENT: GHD

OFFICE: Sydney

PROJECT: 21255314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed) jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed) FSS.AP@GHD.COM

TURNAROUND REQUIREMENTS: Standard TAT (List due date) Non Standard or urgent TAT (List due date)

Standard TAT may be longer for some tests e.g. Ultra Trace Organics

ALS QUOTE NO.: SY-243-17

COC SEQUENCE NUMBER (Circle)

COC: 1	2	3	4	5	6	7
or: 1	2	3	4	5	6	7

RECEIVED BY: *JMS* DATE/TIME: 21/01/12

RECEIVED BY: *JMS* DATE/TIME: 21/01/12

FOR LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	NA
Free bag / frozen ice bricks present upon receipt?	Yes	No	NA
Random Sample Temperature on Receipt:	C		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes (only)	refer to	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract scale price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required)	Additional Information
71	MW08-04-0.5	1/6/12	S	P + G		2	PFAS Full Suite TOC HOLD. pH, silica aluminium	
72	MW08-09-1.0						X	
78	MW08-1.8-2.0						X	
79	MW08-4.7-5.2						X	
79	MW08-7.7-8.2						X	
80	MW08-10.7-11.2						X	
81	MW08-13.7-14.2						X	
82	MW08-16.7-17.2						X	
85	MW08-18.2-18.7						X	
83	FD09						X	
86	FD10						X	
83	FR04						X	

Water Container Codes: P = Unpreserved Plastic, K = Miller Preserved Plastic, GAC = Glass Preserved Plastic, ST = Sediment Hydrochloric Acid Preserved, S = Sediment Hydrochloric Acid Preserved, AG = Amber Glass Unpreserved, AP = Airtech Unpreserved Plastic

V = VOA/VA HCl Preserved, VB = VOA/Vol Sediment B substrate Preserved, VS = VOA/Vol Sediment B substrate Preserved, VSS = VOA/Vol Sediment B substrate Preserved, VSS = VOA/Vol Sediment B substrate Preserved, VSS = VOA/Vol Sediment B substrate Preserved, VSS = VOA/Vol Sediment B substrate Preserved

E = EDTA Preserved Bottle, S1 = Sterile EDTA, AS = Matrix Bag to Acid Sulphate Stage, B = Preserved Bag

Comments on likely contaminants levels, durations, or samples requiring specific OC analysis etc.



CHAIN OF CUSTODY

A.S. Laboratory
please tick →

CLIENT: GHD

OFFICE: Sydney

PROJECT: 23258314

ORDER NUMBER:

PROJECT MANAGER: Nicole Fossen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO): YES

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

TURNAROUND REQUIREMENTS: Standard TAT (List due date) Next Standard or urgent TAT (List due date)

ALS QUOTE NO.: SY-143-17

CONTACT PH: 0421 045 435 / 0408 713 343

SAMPLER MOBILE: 0404 542 354

EDD FORMAT (or default): ESSdat

RELINQUISHED BY: DATE/TIME

RECEIVED BY: DATE/TIME

FOR LABORATORY USE ONLY (Circle):

Standard Seal Intact?	Yes	No	N/A
Freeze / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:			
Other comment:			

RECEIVED BY: DATE/TIME

ALS USE	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	ratio to	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be ticked to collect suite price) where Metas are required specify Total number bottles returned or Dissolved / field filtered bottle (required)	Additional Information
84	MW09-0.0-0.1	2/6/17	S	P = G		2	PFAS Full Suite TOC HOLD. pH, silica aluminium	
85	MW09-0.2-0.3							
86	MW09-0.4-0.5							
87	MW09-0.9-1.0							
88	MW09-1.8-2.0							
89	MW09-2.9-3.0							
90	MW09-3.8-4.0							
91	MW09-4.7-5.2							
92	MW09-7.7-8.2							
93	MW09-10.7-11.2							
94	MW09-13.7-14.2							
95	MW09-16.7-17.2							

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved Plastic; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved Plastic; AM = Amalgam Impregnated Plastic; V = VOA Volatile Preserved; VB = VOA Volatile Bubbled Preserved; VS = VOA Volatile Preserved; AV = A/V Unpreserved; VA = VOA Volatile Preserved; SS = Silica Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Specimen bottle; SP = Silica Preserved Plastic; E = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Steno Bottle; ASS = Plastic Bag for Acid Sulphate Solts; B = Unpreserved Bag



CHAIN OF CUSTODY
A.S. Laboratory
Orange TX 77630

CLIENT: GHD
TURNAROUND REQUIREMENTS: Standard FAT (list due date) Non Standard or urgent (FAT list due date):
Standard FAT may be longer for some tests e.g. Lead Trace (3-5 weeks)

OFFICE: Sydney
PROJECT: 272558314
ALS QUOTE NO.: SY-143-17
ORDER NUMBER:
PROJECT MANAGER: Nicole Rossini / Ben Anderson
CONTACT PH: 0421 045 835 / 0408 713 343
SAMPLER: Jesse Sinkus
SAMPLER MOBILE: 0404 542 334
COC emailed to ALS? (YES / NO) YES NO
Email Reports to (will default to PH if no other addresses are listed): jesse.sinkus@ghd.com
Email Invoice to (will default to PH if no other addresses are listed): FSS.AP@GHD.COM

RELINQUISHED BY: DATE/TIME: RECEIVED BY: DATE/TIME:
RELINQUISHED BY: DATE/TIME: RECEIVED BY: DATE/TIME:

FOR LABORATORY USE ONLY (CFOA)
Custody Seal Intact? Yes No N/A
Fres Ice / frozen Ice blocks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	MATRIX: SOLID (S) WATER (W)	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	refer to	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (N.S. Suite Codes must be listed to attract scale price) where Matrix is required specify Total (unfilled bottle required) or Dissolved (fill filtered bottle required)	Additional Information
(S)		WDO1	2/6/17	S	P + 2x G		3	PFAS Full Suite TOC HOLD TRH/BTEXH/ M8/PAH5 TCLP PFAS	Comments on likely contaminant levels, dilutions or samples requiring specific OC analysis etc
(S)		WDO2							
(S)		WDO3							
(S)		WDO4							
(S)		WDO5							
(S)		WDO6							
(S)		WDO FDI1							
(S)		FD12							
(S)		FD13							
(S)		FD14							
(S)		FB01	29/5/17	W	P + 2x G PTAS BOTTLE		1		
(S)		FB02	2/6/17	W	"		1		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; OPC = Nitric Preserved OTC; SH = Sodium Hydroxide OTC Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved AP = Airtight Unpreserved Plastic
V = VOA Vial HD Preserved VB = VOA Vial Sodium Bisulfite Preserved VS = VOA Vial Sodium Preserved AV = Airtight Unpreserved Vial BG = Sodium Preserved Amber Glass; N = HDI Preserved Plastic; HS = HDI Preserved Specimen Bottle SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass
Z = Zinc Ascorbic Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; SS = Single Bag for Acid Sulphate 50%; B = Unpreserved Bag



CHAIN OF CUSTODY
ALS Laboratory
please use →

CLIENT: GHD

TURNAROUND REQUIREMENTS: Standard TAT (list due date)
(Standard TAT may be longer for some tests e.g. Micro Tox, Organics)

FOR LABORATORY USE ONLY (circle)

OFFICE: Sydney

Non Standard or urgent TAT (list due date)

Custody Seal Intact? Yes No N/A

PROJECT: 21255314

ALS QUOTE NO: SY-143-17

COC SEQUENCE NUMBER (circle) 9

Free Ice / Frozen Ice blocks present upon receipt? Yes No N/A

ORDER NUMBER:

CONTACT PH: 0421 045 835 / 0408 713 343

Other comment: C

Random Sample Temperature on Receipt: C

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER MOBILE: 0407 542 354

RECEIVED BY: *[Signature]*

RECEIVED BY: *[Signature]*

SAMPLER: Jesse Simkus

EDD FORMAT (or default): ES01

RECEIVED BY: *[Signature]*

RECEIVED BY: *[Signature]*

COC emailed to ALS? YES / NO

DATE/TIME

DATE/TIME

DATE/TIME

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

DATE/TIME

DATE/TIME

DATE/TIME

Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

DATE/TIME

DATE/TIME

DATE/TIME

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)	CONTAINER INFORMATION	ANALYSIS REQUIRED including SURES (NB: Some Codes must be used to attract suite price) (where Matrix is required specify Total (unfiltered bottle required) or Dissolved /field filtered bottle (required))	Additional Information								
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	REFER TO	TOTAL CONTAINERS	RECEIVED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
	FR05	2/6/17	W	PFAS BOTTLE		PFAS Full suite						
	WATER											

Matrix Container Codes: B = Unpreserved Plastic; N = Nitric Preserved Plastic; OHC = Nitric Preserved OHC; SU = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved; MG = Amber Glass Unpreserved; AP = Amber Glass Unpreserved Plastic; V = VOA Vial HD Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sodium Preserved; AV = Airtight Unpreserved; VA = Sodium Preserved Amber Glass; H = HD Preserved Plastic; HS = HD Preserved Specialist; SS = Sodium Preserved Plastic; F = Formaldenide Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved; BPT = ST - Sigma Reagent; AS = Plastic Bag for Asbestos; S = Unpreserved Bag

CERTIFICATE OF ANALYSIS

Work Order : **ES1714150**
Client : **GHD PTY LTD**
Contact : **MS NICOLE ROSEN**
Address : **LEVEL 15, 133 CASTLEREAGH STREET**
SYDNEY NSW, AUSTRALIA 2000
Telephone : **+61 02 9239 7100**
Project : **212558314**
Order number : **----**
C-O-C number : **----**
Sampler : **JESSE SIMKUS**
Site : **----**
Quote number : **SY/143/17**
No. of samples received : **97**
No. of samples analysed : **40**

Page : 1 of 37
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 07-Jun-2017 14:00
Date Analysis Commenced : 13-Jun-2017
Issue Date : 22-Jun-2017 11:07



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR.
Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.



Analytical Results

Sub-Matrix: CONCRETE (Matrix: SOIL)		Client sample ID			A01	----	----	----	----
Client sampling date / time		02-Jun-2017 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-097	-----	-----	-----	-----	
				Result	----	----	----	----	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	<1.0	----	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0002	----	----	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0199	----	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0011	----	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0002	----	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0043	----	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0008	----	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0039	----	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0002	----	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0003	----	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----	



Analytical Results

Sub-Matrix: CONCRETE (Matrix: SOIL)				Client sample ID	A01	----	----	----	----
Client sampling date / time				02-Jun-2017 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1714150-097	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	----	----	----	----
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	----	----	----	----
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	----	----	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	----	----	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	0.0023	----	----	----	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	0.0006	----	----	----	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	----	----	----	----
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	0.0338	----	----	----	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0201	----	----	----	----	----
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0275	----	----	----	----	----
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	107	----	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.0-0.1	SB14_0.4-0.5
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-001	ES1714150-002	ES1714150-003	ES1714150-004	ES1714150-005	
				Result	Result	Result	Result	Result	
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	----	----	8.0	----	6.9	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	11.6	17.7	7.8	7.0	15.4	
ED040S : Soluble Sulfate by ICPAES									
Silica	7631-86-9	1	mg/kg	----	----	835	----	9650	
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	----	----	14000	----	18400	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.53	0.10	0.04	0.52	0.64	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0028	0.0011	0.0004	<0.0002	0.0012	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0473	<0.0002	0.0012	<0.0002	0.0002	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0014	<0.0002	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0004	0.0004	<0.0002	<0.0002	0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0003	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0024	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0033	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0006	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0008	<0.0002	<0.0002	<0.0002	<0.0002	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.0-0.1	SB14_0.4-0.5
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-001	ES1714150-002	ES1714150-003	ES1714150-004	ES1714150-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	0.0024	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	0.0630	0.0019	0.0016	<0.0002	0.0018	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0501	0.0011	0.0016	<0.0002	0.0014	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0556	0.0019	0.0016	<0.0002	0.0018	
EP231S: PFAS Surrogate									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.0-0.1	SB14_0.4-0.5
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-001	ES1714150-002	ES1714150-003	ES1714150-004	ES1714150-005	ES1714150-005
				Result	Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%	106	107	110	110	110	108



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.5-2.7	SB13_0.0-0.1	SB13_0.4-0.5	SB13_1.6-1.9	MW06_2.0-2.2
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-006	ES1714150-007	ES1714150-008	ES1714150-009	ES1714150-010	
				Result	Result	Result	Result	Result	
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	----	6.6	----	----	----	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	7.4	17.8	19.6	4.5	6.6	
ED040S : Soluble Sulfate by ICPAES									
Silica	7631-86-9	1	mg/kg	----	3230	----	----	----	
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	----	11200	----	----	----	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.45	0.05	1.17	0.47	0.09	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.0008	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0014	0.0012	<0.0002	<0.0002	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.0160	0.0018	0.0002	<0.0002	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.0014	0.0003	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0006	0.0004	<0.0002	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0006	0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.5-2.7	SB13_0.0-0.1	SB13_0.4-0.5	SB13_1.6-1.9	MW06_2.0-2.2
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-006	ES1714150-007	ES1714150-008	ES1714150-009	ES1714150-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	0.0207	0.0050	0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	0.0174	0.0030	0.0002	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	0.0205	0.0047	0.0002	<0.0002	
EP231S: PFAS Surrogate									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB14_2.5-2.7	SB13_0.0-0.1	SB13_0.4-0.5	SB13_1.6-1.9	MW06_2.0-2.2
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-006	ES1714150-007	ES1714150-008	ES1714150-009	ES1714150-010	ES1714150-010
				Result	Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%	103	97.5	111	102	104	104



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_4.0-4.2	FD01	MW06_13.2-14.2	MW05_0.2-0.3	MW06_2.9-3.1
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-011	ES1714150-012	ES1714150-014	ES1714150-015	ES1714150-016	
				Result	Result	Result	Result	Result	
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	----	----	9.2	----	----	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	5.9	10.9	<1.0	14.8	11.4	
ED040S : Soluble Sulfate by ICPAES									
Silica	7631-86-9	1	mg/kg	----	----	11	----	----	
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	----	----	10700	----	----	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.04	----	0.05	0.02	0.13	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0022	<0.0002	0.0004	<0.0002	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.0571	<0.0002	0.0108	<0.0002	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0018	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0031	<0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.0041	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.0006	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.0009	<0.0002	<0.0002	<0.0002	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_4.0-4.2	FD01	MW06_13.2-14.2	MW05_0.2-0.3	MW06_2.9-3.1
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-011	ES1714150-012	ES1714150-014	ES1714150-015	ES1714150-016	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.0027	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	0.0749	<0.0002	0.0112	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	0.0593	<0.0002	0.0112	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	0.0661	<0.0002	0.0112	<0.0002	
EP231S: PFAS Surrogate									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW06_4.0-4.2	FD01	MW06_13.2-14.2	MW05_0.2-0.3	MW06_2.9-3.1
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00	30-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-011	ES1714150-012	ES1714150-014	ES1714150-015	ES1714150-016	ES1714150-016
				Result	Result	Result	Result	Result	Result
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%	106	98.7	104	96.9	100	100



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW05_20.2-21.7	MW07_2.5-2.7	MW07_6.0-6.7	MW07_12.0-12.7	MW08_0.9-1.0
Client sampling date / time				31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	01-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-018	ES1714150-019	ES1714150-020	ES1714150-021	ES1714150-023	
				Result	Result	Result	Result	Result	
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	9.2	----	----	9.0	----	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	2.4	7.6	1.1	<1.0	16.0	
ED040S : Soluble Sulfate by ICPAES									
Silica	7631-86-9	1	mg/kg	53	----	----	38	----	
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	10600	----	----	14500	----	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.04	0.03	0.03	0.03	0.05	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW05_20.2-21.7	MW07_2.5-2.7	MW07_6.0-6.7	MW07_12.0-12.7	MW08_0.9-1.0
Client sampling date / time				31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	01-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-018	ES1714150-019	ES1714150-020	ES1714150-021	ES1714150-023	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231S: PFAS Surrogate									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW05_20.2-21.7	MW07_2.5-2.7	MW07_6.0-6.7	MW07_12.0-12.7	MW08_0.9-1.0
Client sampling date / time				31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	31-May-2017 00:00	01-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-018	ES1714150-019	ES1714150-020	ES1714150-021	ES1714150-023	
				Result	Result	Result	Result	Result	
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%	98.0	97.3	94.9	100	101	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID			MW08_4.7-5.2	MW08_18.2-18.7	FD10	MW09_0.2-0.3	MW09_10.7-11.2	
Client sampling date / time		01-Jun-2017 00:00			01-Jun-2017 00:00		01-Jun-2017 00:00		02-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-024	ES1714150-025	ES1714150-026	ES1714150-028	ES1714150-029		
				Result	Result	Result	Result	Result		
EA002 : pH (Soils)										
pH Value	----	0.1	pH Unit	----	8.3	----	----	----		
EA055: Moisture Content										
Moisture Content (dried @ 103°C)	----	1	%	5.4	4.7	5.0	10.3	9.0		
ED040S : Soluble Sulfate by ICPAES										
Silica	7631-86-9	1	mg/kg	----	160	----	----	----		
EG005T: Total Metals by ICP-AES										
Aluminium	7429-90-5	50	mg/kg	----	13000	----	----	----		
EP003: Total Organic Carbon (TOC) in Soil										
Total Organic Carbon	----	0.02	%	0.18	0.03	----	0.06	0.33		
EP231A: Perfluoroalkyl Sulfonic Acids										
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
EP231B: Perfluoroalkyl Carboxylic Acids										
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001		
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW08_4.7-5.2	MW08_18.2-18.7	FD10	MW09_0.2-0.3	MW09_10.7-11.2
Client sampling date / time				01-Jun-2017 00:00	01-Jun-2017 00:00	01-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-024	ES1714150-025	ES1714150-026	ES1714150-028	ES1714150-029	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231S: PFAS Surrogate									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW08_4.7-5.2	MW08_18.2-18.7	FD10	MW09_0.2-0.3	MW09_10.7-11.2
Client sampling date / time				01-Jun-2017 00:00	01-Jun-2017 00:00	01-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-024	ES1714150-025	ES1714150-026	ES1714150-028	ES1714150-029	
				Result	Result	Result	Result	Result	
EP231S: PFAS Surrogate - Continued									
13C4-PFOS	----	0.0002	%	106	102	103	104	99.0	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW09_16.7-17.2	WD01	WD02	WD03	WD04
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-030	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	
				Result	Result	Result	Result	Result	
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit	7.9	----	----	----	----	
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1	%	10.9	17.3	12.6	1.1	3.6	
ED040S : Soluble Sulfate by ICPAES									
Silica	7631-86-9	1	mg/kg	52	----	----	----	----	
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	23800	----	----	----	----	
Arsenic	7440-38-2	5	mg/kg	----	<5	<5	6	<5	
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	<1	<1	
Chromium	7440-47-3	2	mg/kg	----	38	12	12	12	
Copper	7440-50-8	5	mg/kg	----	10	13	12	14	
Lead	7439-92-1	5	mg/kg	----	14	6	7	8	
Nickel	7440-02-0	2	mg/kg	----	8	8	8	10	
Zinc	7440-66-6	5	mg/kg	----	67	46	48	48	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	<0.1	<0.1	<0.1	
EN33: TCLP Leach									
Initial pH	----	0.1	pH Unit	----	9.9	8.4	9.5	8.4	
After HCl pH	----	0.1	pH Unit	----	2.0	1.9	2.0	1.9	
Extraction Fluid Number	----	1	-	----	1	1	1	1	
Final pH	----	0.1	pH Unit	----	4.9	4.8	5.0	4.9	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.13	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Acenaphthylene	208-96-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Acenaphthene	83-32-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Fluorene	86-73-7	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Phenanthrene	85-01-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Anthracene	120-12-7	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Fluoranthene	206-44-0	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Pyrene	129-00-0	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Benz(a)anthracene	56-55-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Chrysene	218-01-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW09_16.7-17.2	WD01	WD02	WD03	WD04
Client sampling date / time					02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-030	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	
				Result	Result	Result	Result	Result	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	----	0.6	0.6	0.6	0.6	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	----	1.2	1.2	1.2	1.2	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	----	<10	<10	<10	<10	
C10 - C14 Fraction	----	50	mg/kg	----	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	
C29 - C36 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg	----	<10	<10	<10	<10	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	----	<10	<10	<10	<10	
>C10 - C16 Fraction	----	50	mg/kg	----	<50	<50	<50	<50	
>C16 - C34 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	mg/kg	----	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	----	<50	<50	<50	<50	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	----	<50	<50	<50	<50	
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2	
Toluene	108-88-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Ethylbenzene	100-41-4	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
ortho-Xylene	95-47-6	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
^ Sum of BTEX	----	0.2	mg/kg	----	<0.2	<0.2	<0.2	<0.2	
^ Total Xylenes	1330-20-7	0.5	mg/kg	----	<0.5	<0.5	<0.5	<0.5	
Naphthalene	91-20-3	1	mg/kg	----	<1	<1	<1	<1	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW09_16.7-17.2	WD01	WD02	WD03	WD04
Client sampling date / time					02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-030	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	----	75.1	84.5	87.5	85.5	
2-Chlorophenol-D4	93951-73-6	0.5	%	----	80.0	76.6	80.5	81.5	
2,4,6-Tribromophenol	118-79-6	0.5	%	----	43.9	54.8	43.6	54.8	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	----	73.1	76.9	82.0	79.8	
Anthracene-d10	1719-06-8	0.5	%	----	83.8	84.2	88.2	85.6	
4-Terphenyl-d14	1718-51-0	0.5	%	----	86.6	87.8	93.8	89.9	
EP080S: TPH(V)/BTEX Surrogates									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	MW09_16.7-17.2	WD01	WD02	WD03	WD04
Client sampling date / time					02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-030	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	----	110	86.0	85.3	96.3	
Toluene-D8	2037-26-5	0.2	%	----	104	95.9	114	131	
4-Bromofluorobenzene	460-00-4	0.2	%	----	92.8	90.8	111	98.6	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	120	102	104	104	104	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID			WD05	WD06	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-035	ES1714150-036	-----	-----	-----	-----	-----	
				Result	Result	----	----	----	----	----	
EA055: Moisture Content											
Moisture Content (dried @ 103°C)	----	1	%	1.5	<1.0	----	----	----	----	----	
EG005T: Total Metals by ICP-AES											
Arsenic	7440-38-2	5	mg/kg	<5	<5	----	----	----	----	----	
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----	----	----	
Chromium	7440-47-3	2	mg/kg	19	19	----	----	----	----	----	
Copper	7440-50-8	5	mg/kg	10	10	----	----	----	----	----	
Lead	7439-92-1	5	mg/kg	<5	<5	----	----	----	----	----	
Nickel	7440-02-0	2	mg/kg	8	8	----	----	----	----	----	
Zinc	7440-66-6	5	mg/kg	52	54	----	----	----	----	----	
EG035T: Total Recoverable Mercury by FIMS											
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	----	----	----	----	----	
EN33: TCLP Leach											
Initial pH	----	0.1	pH Unit	9.2	9.5	----	----	----	----	----	
After HCl pH	----	0.1	pH Unit	2.0	2.0	----	----	----	----	----	
Extraction Fluid Number	----	1	-	1	1	----	----	----	----	----	
Final pH	----	0.1	pH Unit	5.0	5.2	----	----	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons											
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----	----	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	WD05	WD06	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-035	ES1714150-036	-----	-----	-----	
				Result	Result	----	----	----	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	----	----	----	
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----	
C10 - C14 Fraction	----	50	mg/kg	<50	<50	----	----	----	
C15 - C28 Fraction	----	100	mg/kg	<100	<100	----	----	----	
C29 - C36 Fraction	----	100	mg/kg	<100	<100	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	----	----	----	
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	----	----	----	
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	----	----	----	
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	----	----	----	
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	----	----	----	
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	----	----	----	
^ Total Xylenes	1330-20-7	0.5	mg/kg	<0.5	<0.5	----	----	----	
Naphthalene	91-20-3	1	mg/kg	<1	<1	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	WD05	WD06	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-035	ES1714150-036	-----	-----	-----	
				Result	Result	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	WD05	WD06	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-035	ES1714150-036	-----	-----	-----	
				Result	Result	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	<0.0002	----	----	----	
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%	81.1	85.6	----	----	----	
2-Chlorophenol-D4	93951-73-6	0.5	%	79.1	82.4	----	----	----	
2,4,6-Tribromophenol	118-79-6	0.5	%	42.5	53.6	----	----	----	
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%	78.7	83.4	----	----	----	
Anthracene-d10	1719-06-8	0.5	%	86.3	99.0	----	----	----	
4-Terphenyl-d14	1718-51-0	0.5	%	90.5	110	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%	96.1	94.6	----	----	----	
Toluene-D8	2037-26-5	0.2	%	121	124	----	----	----	
4-Bromofluorobenzene	460-00-4	0.2	%	88.1	117	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	111	106	----	----	----	



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WD01	WD02	WD03	WD04	WD05
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	ES1714150-035	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.01	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WD01	WD02	WD03	WD04	WD05
Client sampling date / time					02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00	02-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1714150-031	ES1714150-032	ES1714150-033	ES1714150-034	ES1714150-035	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	0.01	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.01	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	87.7	90.8	86.3	92.4	99.0	



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WD06	----	----	----	----
Client sampling date / time				02-Jun-2017 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-036	-----	-----	-----	-----	
				Result	----	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	----	----	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	----	----	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	----	----	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	----	----	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	----	----	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	----	----	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	----	----	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	----	----	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	----	----	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	----	----	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	----	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	----	----	----	----	



Analytical Results

Sub-Matrix: TCLP LEACHATE (Matrix: WATER)				Client sample ID	WD06	----	----	----	----
Client sampling date / time				02-Jun-2017 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-036	-----	-----	-----	-----	
				Result	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	----	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	----	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	----	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	----	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	----	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	----	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	----	----	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	----	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	89.5	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FR01	FR02	FR03	FR04	FB01
Client sampling date / time				29-May-2017 00:00	30-May-2017 00:00	31-May-2017 00:00	01-Jun-2017 00:00	29-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-013	ES1714150-017	ES1714150-022	ES1714150-027	ES1714150-037	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FR01	FR02	FR03	FR04	FB01
Client sampling date / time				29-May-2017 00:00	30-May-2017 00:00	31-May-2017 00:00	01-Jun-2017 00:00	29-May-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1714150-013	ES1714150-017	ES1714150-022	ES1714150-027	ES1714150-037	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	101	103	103	102	98.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		FB02	FR05	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1714150-038	ES1714150-039	-----	-----	-----	-----	-----
				Result	Result	----	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids										
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids										
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides										
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FB02	FR05	----	----	----
Client sampling date / time				02-Jun-2017 00:00	02-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1714150-038	ES1714150-039	-----	-----	-----	
				Result	Result	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	----	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	95.7	96.5	----	----	----	



Surrogate Control Limits

Sub-Matrix: CONCRETE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: TCLP LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

QUALITY CONTROL REPORT

Work Order	: ES1714150	Page	: 1 of 27
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 07-Jun-2017
Order number	: ----	Date Analysis Commenced	: 13-Jun-2017
C-O-C number	: ----	Issue Date	: 22-Jun-2017
Sampler	: JESSE SIMKUS		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 97		
No. of samples analysed	: 40		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Satishkumar Trivedi	Acid Sulfate Soils Supervisor	Brisbane Acid Sulphate Soils, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA002 : pH (Soils) (QC Lot: 942689)									
ES1714150-014	MW06_13.2-14.2	EA002: pH Value	----	0.1	pH Unit	9.2	9.3	1.08	0% - 20%
ES1713962-002	Anonymous	EA002: pH Value	----	0.1	pH Unit	6.1	6.1	0.00	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 941088)									
ES1714149-076	Anonymous	EA055: Moisture Content	----	1	%	16.5	16.4	0.00	0% - 50%
ES1714150-005	SB14_0.4-0.5	EA055: Moisture Content	----	1	%	15.4	16.4	6.40	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 941089)									
ES1714150-015	MW05_0.2-0.3	EA055: Moisture Content	----	1	%	14.8	14.4	3.10	0% - 50%
ES1714150-029	MW09_10.7-11.2	EA055: Moisture Content	----	1	%	9.0	8.6	4.86	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 941090)									
ES1714154-001	Anonymous	EA055: Moisture Content	----	1	%	42.0	43.1	2.59	0% - 20%
ES1714160-003	Anonymous	EA055: Moisture Content	----	1	%	19.7	19.9	0.987	0% - 50%
ED040S: Soluble Major Anions (QC Lot: 942690)									
ES1714150-014	MW06_13.2-14.2	ED040S: Silica	7631-86-9	1	mg/kg	11	12	0.00	0% - 50%
ES1713962-002	Anonymous	ED040S: Silica	7631-86-9	1	mg/kg	238	233	2.12	0% - 20%
EG005T: Total Metals by ICP-AES (QC Lot: 943202)									
ES1714111-007	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	18	18	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	18	18	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	11	10	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	21	21	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	26	24	8.98	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	99	89	11.4	0% - 50%
		EG005T: Aluminium	7429-90-5	50	mg/kg	4150	4040	2.75	0% - 20%
ES1714111-010	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG005T: Total Metals by ICP-AES (QC Lot: 943202) - continued									
ES1714111-010	Anonymous	EG005T: Chromium	7440-47-3	2	mg/kg	18	20	11.6	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	16	17	6.33	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	9	10	14.2	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	20	23	15.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	25	25	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	86	82	3.83	0% - 50%
		EG005T: Aluminium	7429-90-5	50	mg/kg	4790	5450	12.8	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 943203)									
ES1714111-010	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 951534)									
ES1714150-001	SB15_0.0-0.1	EP003: Total Organic Carbon	----	0.02	%	0.53	0.56	4.67	0% - 20%
ES1714150-011	MW06_4.0-4.2	EP003: Total Organic Carbon	----	0.02	%	0.04	0.04	0.00	No Limit
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 951535)									
ES1714150-025	MW08_18.2-18.7	EP003: Total Organic Carbon	----	0.02	%	0.03	0.03	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 940614)									
ES1714028-002	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		ES1714150-032	WD02	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5
EP075(SIM): Acenaphthylene	208-96-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthene	83-32-9			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Fluorene	86-73-7			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Phenanthrene	85-01-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 940614) - continued									
ES1714150-032	WD02	EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit		
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 940613)									
ES1714028-002	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1714150-032	WD02	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 940970)									
ES1714150-031	WD01	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1714243-044	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 940613)									
ES1714028-002	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1714150-032	WD02	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 940970)									
ES1714150-031	WD01	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1714243-044	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 940970)									
ES1714150-031	WD01	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit



Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 940970) - continued									
ES1714150-031	WD01	EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1714243-044	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 942515)									
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0028	0.0030	5.61	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	0.0005	0.0006	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0473	0.0504	6.24	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0014	0.0016	14.3	No Limit
ES1714150-011	MW06_4.0-4.2	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 942516)									
ES1714150-024	MW08_4.7-5.2	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
ES1714150-035	WD05	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 947811)									
EM1707602-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	0.0002	0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 947811) - continued										
EM1707602-003	Anonymous	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0016	0.0016	0.00	No Limit	
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0095	0.0098	3.38	0% - 20%	
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit	
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 942515)										
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit	
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	0.0004	0.0004	0.00	No Limit	
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0003	0.0004	0.00	No Limit	
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0024	0.0028	14.0	0% - 50%	
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0008	0.0009	0.00	No Limit	
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0033	0.0033	0.00	0% - 50%	
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	0.0006	0.0007	18.2	No Limit	
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	0.0008	0.0008	0.00	No Limit	
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit	
ES1714150-011	MW06_4.0-4.2	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit	
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 942516)	ES1714150-024	MW08_4.7-5.2	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
			EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1714150-035	WD05	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit	
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit	



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 942516) - continued									
ES1714150-035	WD05	EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 947811)									
EM1707602-003	Anonymous	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
				EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 942515)									
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1714150-011	MW06_4.0-4.2	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit



Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 942515) - continued									
ES1714150-011	MW06_4.0-4.2	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 942516)									
ES1714150-024	MW08_4.7-5.2	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1714150-035	WD05	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 947811)									
EM1707602-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 947811) - continued									
EM1707602-003	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 942515)									
ES1714150-001	SB15_0.0-0.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	0.0024	0.0022	13.0	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1714150-011	MW06_4.0-4.2	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 942516)									
ES1714150-024	MW08_4.7-5.2	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1714150-035	WD05	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 942516) - continued									
ES1714150-035	WD05	EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 947811)									
EM1707602-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
Sub-Matrix: WATER									
Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 942635)									
EB1711769-007	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.36	1.38	1.97	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.11	0.10	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	1.45	1.53	5.51	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1714354-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	71.4	74.1	3.70	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.95	0.88	7.68	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	1.16	0.99	15.4	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	7.48	6.78	9.81	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.99	0.92	7.77	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	0.20	0.18	11.3	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 946814)									
EB1712076-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	3.89	3.93	0.921	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.50	0.52	2.55	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.41	0.41	0.00	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	3.84	3.82	0.287	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.12	0.12	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EM1707549-003	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	3.30	3.64	9.81	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.08	0.10	16.9	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.07	0.08	13.3	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.57	0.64	11.9	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.20	0.23	13.5	0% - 50%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 946814) - continued									
EM1707549-003	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 942635)									
EB1711769-007	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.05	0.05	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.09	0.09	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.08	0.09	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1714354-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	2.52	2.41	4.34	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.45	0.44	0.00	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	1.32	1.29	2.38	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.63	0.60	3.74	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.09	0.10	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.04	0.03	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 946814)									
EB1712076-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.17	0.16	0.00	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.18	0.18	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.55	0.54	2.03	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.10	0.10	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EM1707549-003	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.14	0.17	19.9	0% - 50%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.23	0.27	14.8	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.07	0.08	16.8	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 946814) - continued									
EM1707549-003	Anonymous	EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 942635)									
EB1711769-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1714354-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.11	0.11	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 946814)									
EB1712076-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 946814) - continued									
EB1712076-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EM1707549-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 942635)									
EB1711769-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1714354-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	6.40	5.89	8.29	0% - 20%
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	1.83	1.76	3.62	0% - 20%
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 946814)									
EB1712076-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 946814) - continued									
EB1712076-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EM1707549-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 942635)									
EB1711769-007	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	3.30	3.40	2.98	0% - 20%
ES1714354-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	95.6	96.5	0.947	0% - 20%
EP231P: PFAS Sums (QC Lot: 946814)									
EB1712076-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	9.76	9.78	0.205	0% - 20%
EM1707549-003	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	4.69	5.24	11.1	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG005T: Total Metals by ICP-AES (QCLot: 943202)									
EG005T: Aluminium	7429-90-5	50	mg/kg	<50	6134 mg/kg	119	70	130	
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	94.1	86	126	
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	93.4	83	113	
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	92.4	76	128	
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	91.6	86	120	
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	92.1	80	114	
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	95.0	87	123	
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122	
EG035T: Total Recoverable Mercury by FIMS (QCLot: 943203)									
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	78.8	70	105	
EN33: TCLP Leach (QCLot: 942789)									
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----	
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----	
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----	
EN33: TCLP Leach (QCLot: 942790)									
EN33a: Initial pH	----	0.1	pH Unit	1.0	----	----	----	----	
EN33a: After HCl pH	----	0.1	pH Unit	1.0	----	----	----	----	
EN33a: Final pH	----	0.1	pH Unit	1.0	----	----	----	----	
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 951534)									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	104	70	130	
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 951535)									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	102	70	130	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 940614)									
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	116	77	125	
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	112	72	124	
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	112	73	127	
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	110	72	126	
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	116	75	127	
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	116	77	127	
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	113	73	127	
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	112	74	128	
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	115	69	123	
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	118	75	127	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 940614) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	108	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	102	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	112	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	101	61	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	99.7	62	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	98.1	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 940613)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	96.5	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	101	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	93.6	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 940970)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	124	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 940613)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	99.0	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	100	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	89.2	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 940970)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	126	68	128
EP080: BTEXN (QCLot: 940970)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	106	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	117	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	96.5	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	109	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	102	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	105	63	119
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942515)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.2	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	52	126
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	117	54	123
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	55	127
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	118	54	125
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942516)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	69.3	57	121
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	74.2	55	125
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	87.2	52	126



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942516) - continued									
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.4	54	123	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	55	127	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	54	125	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 947811)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	80.7	57	121	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.0	55	125	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	85.3	52	126	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	108	54	123	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.0	55	127	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	107	54	125	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942515)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	102	52	128	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	54	129	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.6	58	127	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	120	57	128	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	60	134	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	115	63	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	118	55	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	124	62	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	118	53	134	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	115	49	129	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	112	59	129	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942516)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	89.5	52	128	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.2	54	129	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	71.0	58	127	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	81.1	57	128	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	60	134	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	124	63	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	55	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	123	62	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	53	134	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.1	49	129	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	90.8	59	129	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 947811)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	88.0	52	128	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.6	54	129	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	67.8	58	127	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 947811) - continued									
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	105	57	128	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.8	60	134	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	63	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	117	55	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	79.3	62	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	86.6	53	134	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	49	129	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	100	59	129	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942515)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	112	52	132	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	118	65	126	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	111	64	126	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	63	124	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	99.5	58	125	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	117	61	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	121	55	130	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942516)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	90.8	52	132	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	98.6	65	126	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	89.2	64	126	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	115	63	124	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	87.9	58	125	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	97.9	61	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	116	55	130	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 947811)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	104	52	132	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	104	65	126	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	106	64	126	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	96.8	63	124	



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 947811) - continued									
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	58	125	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	113	61	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	92.8	55	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942515)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	123	54	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	105	61	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	113	62	130	
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	89.6	60	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942516)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	101	54	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	116	61	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	116	62	130	
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	99.9	60	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 947811)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	111	54	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	124	61	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	81.4	62	130	
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	95.7	60	130	

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942635)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	86.8	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	95.8	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	84.4	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	94.4	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	94.0	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	98.0	70	130	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 946814)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	95.6	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	88.4	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	101	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	92.2	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	108	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	90.0	70	130	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike	Spike Recovery (%)	Recovery Limits (%)	
					Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942635)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	101	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	74.8	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	85.0	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	88.0	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	98.4	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	106	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	98.8	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	95.0	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	95.8	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	85.9	70	124
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 946814)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	99.6	70	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	86.8	70	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	90.6	70	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	87.6	70	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	106	70	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	81.8	70	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	82.6	70	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	105	70	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	102	70	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	84.6	70	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	97.0	70	124
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942635)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	97.6	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	96.8	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	100	70	129
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	104	70	129
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	99.8	70	126
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	97.6	70	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	97.4	70	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 946814)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	118	70	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	104	70	130
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	98.0	70	129



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 946814) - continued									
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	91.2	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	92.9	70	126	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	83.2	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	93.0	70	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942635)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	79.0	70	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	95.6	70	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	105	70	130	
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	78.8	70	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 946814)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	102	70	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	105	70	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	100	70	130	
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	82.8	70	130	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
						Low	High
EG005T: Total Metals by ICP-AES (QCLot: 943202)							
ES1714111-010	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	96.9	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.9	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	100.0	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	96.1	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	94.2	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	97.5	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	97.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 943203)							
ES1714111-010	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	98.5	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 940614)							
ES1714028-002	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	96.2	70	130



Sub-Matrix: SOIL

				Matrix Spike (MS) Report				
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 940614) - continued								
ES1714028-002	Anonymous	EP075(SIM): Pyrene	129-00-0	10 mg/kg	95.0	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 940613)								
ES1714028-002	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	80.2	73	137	
		EP071: C15 - C28 Fraction	----	2319 mg/kg	94.8	53	131	
		EP071: C29 - C36 Fraction	----	1714 mg/kg	104	52	132	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 940970)								
ES1714150-031	WD01	EP080: C6 - C9 Fraction	----	32.5 mg/kg	107	70	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 940613)								
ES1714028-002	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	83.2	73	137	
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	101	53	131	
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	92.8	52	132	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 940970)								
ES1714150-031	WD01	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	116	70	130	
EP080: BTEXN (QCLot: 940970)								
ES1714150-031	WD01	EP080: Benzene	71-43-2	2.5 mg/kg	79.1	70	130	
		EP080: Toluene	108-88-3	2.5 mg/kg	102	70	130	
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	88.2	70	130	
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	88.9	70	130	
			106-42-3					
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	85.7	70	130	
	EP080: Naphthalene	91-20-3	2.5 mg/kg	99.3	70	130		
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942515)								
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	65.2	50	130	
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	62.4	50	130	
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	108	50	130	
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	96.4	50	130	
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	50	130	
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	86.8	50	130	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942516)								
ES1714150-024	MW08_4.7-5.2	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	60.8	50	130	
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	64.6	50	130	
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	72.0	50	130	
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	67.6	50	130	
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	99.0	50	130	
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	89.8	50	130	



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 947811)							
EM1707602-003	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	109	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	115	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	90.0	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	110	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	111	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942515)							
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	107	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	88.4	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	68.0	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	96.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	79.6	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	93.2	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	62.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	85.6	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	82.0	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	72.0	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	86.5	30	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942516)							
ES1714150-024	MW08_4.7-5.2	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	98.7	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	61.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	73.8	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	68.4	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	97.5	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	121	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	102	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	105	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	101	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	112	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	107	30	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 947811)							
EM1707602-003	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	92.6	30	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	109	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	113	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	118	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	107	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	83.6	50	130



Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 947811) - continued							
EM1707602-003	Anonymous	EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	78.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	94.4	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	112	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	102	30	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	104	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942515)							
ES1714150-001	SB15_0.0-0.1	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	82.0	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	96.5	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	82.7	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	75.2	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	72.9	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	104	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	79.2	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942516)							
ES1714150-024	MW08_4.7-5.2	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	83.1	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	104	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	109	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	83.6	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	109	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	100	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	90.1	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 947811)							
EM1707602-003	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	100	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	89.4	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	111	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	92.6	30	130



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 947811) - continued							
EM1707602-003	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	92.8	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	92.0	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	92.8	30	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942515)							
ES1714150-001	SB15_0.0-0.1	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	96.8	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	96.0	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	93.2	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	94.8	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942516)							
ES1714150-024	MW08_4.7-5.2	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	78.3	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	106	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	107	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	93.8	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 947811)							
EM1707602-003	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	121	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	91.6	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	87.2	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	86.4	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 942635)							
EB17111769-007	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	85.4	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	125	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	94.4	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	115	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	105	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	97.0	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 946814)							
EB1712076-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	112	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	96.8	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	93.6	50	130



Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
				Low	High		
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 946814) - continued							
EB1712076-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	96.8	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 942635)							
EB1711769-007	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	99.1	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	81.8	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	80.2	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	101	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	112	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	88.6	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	97.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	89.2	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	93.2	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	109	50	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	85.8	50	130		
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 946814)							
EB1712076-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	98.7	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	83.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	87.8	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	109	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	116	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	61.0	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	70.0	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	89.4	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	106	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	63.8	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	85.7	50	130
		EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942635)					
EB1711769-007	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	123	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	99.9	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	120	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	104	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	109	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	66.0	50	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 942635) - continued							
EB1711769-007	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	68.0	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 946814)							
EB1712076-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	106	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	66.2	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	50.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	78.7	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	90.0	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	73.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	85.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 942635)							
EB1711769-007	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	124	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	123	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	95.6	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	56.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 946814)							
EB1712076-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	112	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	119	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	103	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	84.6	50	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1714150	Page	: 1 of 17
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 07-Jun-2017
Site	: ----	Issue Date	: 22-Jun-2017
Sampler	: JESSE SIMKUS	No. of samples received	: 97
Order number	: ----	No. of samples analysed	: 40

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1714150--001	SB15_0.0-0.1	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM1707602--003	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EB1712076--001	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EB1712076--001	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue	
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved	MW08_18.2-18.7	14-Jun-2017	08-Jun-2017	6	----	----	----	
Soil Glass Jar - Unpreserved	MW09_16.7-17.2	14-Jun-2017	09-Jun-2017	5	----	----	----	
Soil Glass Jar - Unpreserved	SB15_2.5-2.7, SB13_0.0-0.1	SB14_0.4-0.5,	14-Jun-2017	05-Jun-2017	9	----	----	
Soil Glass Jar - Unpreserved	MW06_13.2-14.2		14-Jun-2017	06-Jun-2017	8	----	----	
Soil Glass Jar - Unpreserved	MW05_20.2-21.7,	MW07_12.0-12.7	14-Jun-2017	07-Jun-2017	7	----	----	
EA055: Moisture Content								
HDPE (no PTFE)	SB15_0.0-0.1, SB14_0.0-0.1, SB13_0.4-0.5, MW06_2.0-2.2,	SB15_1.8-2.0, SB14_2.5-2.7, SB13_1.6-1.9, MW06_4.0-4.2	----	----	----	13-Jun-2017	12-Jun-2017	1



Matrix: **SOIL**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved SB15_2.5-2.7, SB13_0.0-0.1, SB14_0.4-0.5, FD01	----	----	----	13-Jun-2017	12-Jun-2017	1

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Control Samples (LCS)					
Major Anions - Soluble	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)					
Major Anions - Soluble	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: ✘ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Soil Glass Jar - Unpreserved (EA002) MW08_18.2-18.7	01-Jun-2017	14-Jun-2017	08-Jun-2017	✘	14-Jun-2017	14-Jun-2017	✔
Soil Glass Jar - Unpreserved (EA002) MW09_16.7-17.2	02-Jun-2017	14-Jun-2017	09-Jun-2017	✘	14-Jun-2017	14-Jun-2017	✔
Soil Glass Jar - Unpreserved (EA002) SB15_2.5-2.7, SB13_0.0-0.1, SB14_0.4-0.5,	29-May-2017	14-Jun-2017	05-Jun-2017	✘	14-Jun-2017	14-Jun-2017	✔
Soil Glass Jar - Unpreserved (EA002) MW06_13.2-14.2	30-May-2017	14-Jun-2017	06-Jun-2017	✘	14-Jun-2017	14-Jun-2017	✔
Soil Glass Jar - Unpreserved (EA002) MW05_20.2-21.7,	31-May-2017	14-Jun-2017	07-Jun-2017	✘	14-Jun-2017	14-Jun-2017	✔



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
HDPE (no PTFE) (EA055) MW08_0.9-1.0,	MW08_4.7-5.2	01-Jun-2017	----	----	----	13-Jun-2017	15-Jun-2017	✓
HDPE (no PTFE) (EA055) MW09_0.2-0.3,	MW09_10.7-11.2	02-Jun-2017	----	----	----	13-Jun-2017	16-Jun-2017	✓
HDPE (no PTFE) (EA055) SB15_0.0-0.1, SB14_0.0-0.1, SB13_0.4-0.5, MW06_2.0-2.2,	SB15_1.8-2.0, SB14_2.5-2.7, SB13_1.6-1.9, MW06_4.0-4.2	29-May-2017	----	----	----	13-Jun-2017	12-Jun-2017	*
HDPE (no PTFE) (EA055) MW05_0.2-0.3,	MW06_2.9-3.1	30-May-2017	----	----	----	13-Jun-2017	13-Jun-2017	✓
HDPE (no PTFE) (EA055) MW07_2.5-2.7,	MW07_6.0-6.7	31-May-2017	----	----	----	13-Jun-2017	14-Jun-2017	✓
Snap Lock Bag (EA055) A01		02-Jun-2017	----	----	----	13-Jun-2017	16-Jun-2017	✓
Soil Glass Jar - Unpreserved (EA055) MW08_18.2-18.7,	FD10	01-Jun-2017	----	----	----	13-Jun-2017	15-Jun-2017	✓
Soil Glass Jar - Unpreserved (EA055) MW09_16.7-17.2, WD02, WD04, WD06	WD01, WD03, WD05,	02-Jun-2017	----	----	----	13-Jun-2017	16-Jun-2017	✓
Soil Glass Jar - Unpreserved (EA055) SB15_2.5-2.7, SB13_0.0-0.1,	SB14_0.4-0.5, FD01	29-May-2017	----	----	----	13-Jun-2017	12-Jun-2017	*
Soil Glass Jar - Unpreserved (EA055) MW06_13.2-14.2		30-May-2017	----	----	----	13-Jun-2017	13-Jun-2017	✓
Soil Glass Jar - Unpreserved (EA055) MW05_20.2-21.7,	MW07_12.0-12.7	31-May-2017	----	----	----	13-Jun-2017	14-Jun-2017	✓
ED040S : Soluble Sulfate by ICPAES								
Soil Glass Jar - Unpreserved (ED040S) MW08_18.2-18.7		01-Jun-2017	14-Jun-2017	29-Jun-2017	✓	14-Jun-2017	12-Jul-2017	✓
Soil Glass Jar - Unpreserved (ED040S) MW09_16.7-17.2		02-Jun-2017	14-Jun-2017	30-Jun-2017	✓	14-Jun-2017	12-Jul-2017	✓
Soil Glass Jar - Unpreserved (ED040S) SB15_2.5-2.7, SB13_0.0-0.1	SB14_0.4-0.5,	29-May-2017	14-Jun-2017	26-Jun-2017	✓	14-Jun-2017	12-Jul-2017	✓
Soil Glass Jar - Unpreserved (ED040S) MW06_13.2-14.2		30-May-2017	14-Jun-2017	27-Jun-2017	✓	14-Jun-2017	12-Jul-2017	✓
Soil Glass Jar - Unpreserved (ED040S) MW05_20.2-21.7,	MW07_12.0-12.7	31-May-2017	14-Jun-2017	28-Jun-2017	✓	14-Jun-2017	12-Jul-2017	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) MW08_18.2-18.7	01-Jun-2017	14-Jun-2017	28-Nov-2017	✓	15-Jun-2017	28-Nov-2017	✓
Soil Glass Jar - Unpreserved (EG005T) MW09_16.7-17.2, WD01, WD02, WD03, WD04, WD05, WD06	02-Jun-2017	14-Jun-2017	29-Nov-2017	✓	15-Jun-2017	29-Nov-2017	✓
Soil Glass Jar - Unpreserved (EG005T) SB15_2.5-2.7, SB13_0.0-0.1	29-May-2017	14-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Nov-2017	✓
Soil Glass Jar - Unpreserved (EG005T) MW06_13.2-14.2	30-May-2017	14-Jun-2017	26-Nov-2017	✓	15-Jun-2017	26-Nov-2017	✓
Soil Glass Jar - Unpreserved (EG005T) MW05_20.2-21.7, MW07_12.0-12.7	31-May-2017	14-Jun-2017	27-Nov-2017	✓	15-Jun-2017	27-Nov-2017	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) WD01, WD02, WD03, WD04, WD05, WD06	02-Jun-2017	14-Jun-2017	30-Jun-2017	✓	15-Jun-2017	30-Jun-2017	✓
EN33: TCLP Leach							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN33a) WD01, WD02, WD03, WD04, WD05, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	----	----	----



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP003: Total Organic Carbon (TOC) in Soil								
Pulp Bag (EP003) MW08_0.9-1.0, MW08_18.2-18.7	MW08_4.7-5.2,	01-Jun-2017	19-Jun-2017	29-Jun-2017	✓	19-Jun-2017	29-Jun-2017	✓
Pulp Bag (EP003) MW09_0.2-0.3, MW09_16.7-17.2	MW09_10.7-11.2,	02-Jun-2017	19-Jun-2017	30-Jun-2017	✓	19-Jun-2017	30-Jun-2017	✓
Pulp Bag (EP003) SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2	SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2,	29-May-2017	19-Jun-2017	26-Jun-2017	✓	19-Jun-2017	26-Jun-2017	✓
Pulp Bag (EP003) MW06_13.2-14.2, MW06_2.9-3.1	MW05_0.2-0.3,	30-May-2017	19-Jun-2017	27-Jun-2017	✓	19-Jun-2017	27-Jun-2017	✓
Pulp Bag (EP003) MW05_20.2-21.7, MW07_6.0-6.7,	MW07_2.5-2.7, MW07_12.0-12.7	31-May-2017	19-Jun-2017	28-Jun-2017	✓	19-Jun-2017	28-Jun-2017	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Soil Glass Jar - Unpreserved (EP075(SIM)) WD01, WD03, WD05,	WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	14-Jun-2017	24-Jul-2017	✓
EP080/071: Total Petroleum Hydrocarbons								
Soil Glass Jar - Unpreserved (EP071) WD01, WD03, WD05,	WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	14-Jun-2017	24-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP080) WD01, WD03, WD05,	WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	16-Jun-2017	16-Jun-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Soil Glass Jar - Unpreserved (EP071) WD01, WD03, WD05,	WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	14-Jun-2017	24-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP080) WD01, WD03, WD05,	WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	16-Jun-2017	16-Jun-2017	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Soil Glass Jar - Unpreserved (EP080)								
WD01, WD03, WD05, WD02, WD04, WD06	02-Jun-2017	14-Jun-2017	16-Jun-2017	✓	16-Jun-2017	16-Jun-2017	✓	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X)								
MW08_0.9-1.0	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X)								
MW08_4.7-5.2, FD10, MW08_18.2-18.7,	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X)								
MW09_0.2-0.3, MW09_16.7-17.2, WD02, WD04, WD06, MW09_10.7-11.2, WD01, WD03, WD05,	02-Jun-2017	15-Jun-2017	29-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X)								
SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2, SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2, FD01	29-May-2017	15-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X)								
MW06_13.2-14.2, MW06_2.9-3.1, MW05_0.2-0.3,	30-May-2017	15-Jun-2017	26-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X)								
MW05_20.2-21.7, MW07_6.0-6.7, MW07_2.5-2.7,	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	
Snap Lock Bag (EP231X)								
A01	02-Jun-2017	16-Jun-2017	29-Nov-2017	✓	16-Jun-2017	26-Jul-2017	✓	
Soil Glass Jar - Unpreserved (EP231X)								
MW07_12.0-12.7	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) MW08_0.9-1.0	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓	
HDPE (no PTFE) (EP231X) MW08_4.7-5.2, FD10	MW08_18.2-18.7,	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW09_0.2-0.3, MW09_16.7-17.2, WD02, WD04, WD06	MW09_10.7-11.2, WD01, WD03, WD05,	02-Jun-2017	15-Jun-2017	29-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2,	SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2, FD01	29-May-2017	15-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW06_13.2-14.2, MW06_2.9-3.1	MW05_0.2-0.3,	30-May-2017	15-Jun-2017	26-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW05_20.2-21.7, MW07_6.0-6.7	MW07_2.5-2.7,	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
Snap Lock Bag (EP231X) A01		02-Jun-2017	16-Jun-2017	29-Nov-2017	✓	16-Jun-2017	26-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X) MW07_12.0-12.7		31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) MW08_0.9-1.0	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW08_4.7-5.2, FD10	MW08_18.2-18.7, 01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW09_0.2-0.3, MW09_16.7-17.2, WD02, WD04, WD06	MW09_10.7-11.2, WD01, WD03, WD05, 02-Jun-2017	15-Jun-2017	29-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2,	SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2, FD01 29-May-2017	15-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW06_13.2-14.2, MW06_2.9-3.1	MW05_0.2-0.3, 30-May-2017	15-Jun-2017	26-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW05_20.2-21.7, MW07_6.0-6.7	MW07_2.5-2.7, 31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
Snap Lock Bag (EP231X) A01	02-Jun-2017	16-Jun-2017	29-Nov-2017	✓	16-Jun-2017	26-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X) MW07_12.0-12.7	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) MW08_0.9-1.0	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW08_4.7-5.2, FD10	MW08_18.2-18.7, 01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW09_0.2-0.3, MW09_16.7-17.2, WD02, WD04, WD06	MW09_10.7-11.2, WD01, WD03, WD05, 02-Jun-2017	15-Jun-2017	29-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2,	SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2, FD01 29-May-2017	15-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW06_13.2-14.2, MW06_2.9-3.1	MW05_0.2-0.3, 30-May-2017	15-Jun-2017	26-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW05_20.2-21.7, MW07_6.0-6.7	MW07_2.5-2.7, 31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
Snap Lock Bag (EP231X) A01	02-Jun-2017	16-Jun-2017	29-Nov-2017	✓	16-Jun-2017	26-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X) MW07_12.0-12.7	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) MW08_0.9-1.0	01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW08_4.7-5.2, FD10	MW08_18.2-18.7, 01-Jun-2017	15-Jun-2017	28-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW09_0.2-0.3, MW09_16.7-17.2, WD02, WD04, WD06	MW09_10.7-11.2, WD01, WD03, WD05, 02-Jun-2017	15-Jun-2017	29-Nov-2017	✓	16-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB14_0.4-0.5, SB13_0.0-0.1, SB13_1.6-1.9, MW06_4.0-4.2,	SB15_1.8-2.0, SB14_0.0-0.1, SB14_2.5-2.7, SB13_0.4-0.5, MW06_2.0-2.2, FD01 29-May-2017	15-Jun-2017	25-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW06_13.2-14.2, MW06_2.9-3.1	MW05_0.2-0.3, 30-May-2017	15-Jun-2017	26-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
HDPE (no PTFE) (EP231X) MW05_20.2-21.7, MW07_6.0-6.7	MW07_2.5-2.7, 31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓
Snap Lock Bag (EP231X) A01	02-Jun-2017	16-Jun-2017	29-Nov-2017	✓	16-Jun-2017	26-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP231X) MW07_12.0-12.7	31-May-2017	15-Jun-2017	27-Nov-2017	✓	15-Jun-2017	25-Jul-2017	✓

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) FR04	01-Jun-2017	----	----	----	15-Jun-2017	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) FB02, FR05	02-Jun-2017	----	----	----	15-Jun-2017	29-Nov-2017	✓
HDPE (no PTFE) (EP231X) WD01, WD03, WD05, WD02, WD04, WD06	14-Jun-2017	----	----	----	19-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) FR01, FB01	29-May-2017	----	----	----	15-Jun-2017	25-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR02	30-May-2017	----	----	----	15-Jun-2017	26-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR03	31-May-2017	----	----	----	15-Jun-2017	27-Nov-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) FR04	01-Jun-2017	----	----	----	15-Jun-2017	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) FB02, FR05	02-Jun-2017	----	----	----	15-Jun-2017	29-Nov-2017	✓
HDPE (no PTFE) (EP231X) WD01, WD03, WD05, WD02, WD04, WD06	14-Jun-2017	----	----	----	19-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) FR01, FB01	29-May-2017	----	----	----	15-Jun-2017	25-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR02	30-May-2017	----	----	----	15-Jun-2017	26-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR03	31-May-2017	----	----	----	15-Jun-2017	27-Nov-2017	✓
EP231C: Perfluoroalkyl Sulfonamides							
HDPE (no PTFE) (EP231X) FR04	01-Jun-2017	----	----	----	15-Jun-2017	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) FB02, FR05	02-Jun-2017	----	----	----	15-Jun-2017	29-Nov-2017	✓
HDPE (no PTFE) (EP231X) WD01, WD03, WD05, WD02, WD04, WD06	14-Jun-2017	----	----	----	19-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) FR01, FB01	29-May-2017	----	----	----	15-Jun-2017	25-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR02	30-May-2017	----	----	----	15-Jun-2017	26-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR03	31-May-2017	----	----	----	15-Jun-2017	27-Nov-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) FR04	01-Jun-2017	----	----	----	15-Jun-2017	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) FB02, FR05	02-Jun-2017	----	----	----	15-Jun-2017	29-Nov-2017	✓
HDPE (no PTFE) (EP231X) WD01, WD03, WD05, WD02, WD04, WD06	14-Jun-2017	----	----	----	19-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) FR01, FB01	29-May-2017	----	----	----	15-Jun-2017	25-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR02	30-May-2017	----	----	----	15-Jun-2017	26-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR03	31-May-2017	----	----	----	15-Jun-2017	27-Nov-2017	✓
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) FR04	01-Jun-2017	----	----	----	15-Jun-2017	28-Nov-2017	✓
HDPE (no PTFE) (EP231X) FB02, FR05	02-Jun-2017	----	----	----	15-Jun-2017	29-Nov-2017	✓
HDPE (no PTFE) (EP231X) WD01, WD03, WD05, WD02, WD04, WD06	14-Jun-2017	----	----	----	19-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) FR01, FB01	29-May-2017	----	----	----	15-Jun-2017	25-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR02	30-May-2017	----	----	----	15-Jun-2017	26-Nov-2017	✓
HDPE (no PTFE) (EP231X) FR03	31-May-2017	----	----	----	15-Jun-2017	27-Nov-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✘ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Major Anions - Soluble	ED040S	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Moisture Content	EA055	6	60	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	5	42	11.90	10.00	✔	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	3	24	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Major Anions - Soluble	ED040S	0	14	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	42	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	24	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Major Anions - Soluble	ED040S	0	14	0.00	5.00	✘	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	42	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TCLP for Non & Semivolatile Analytes	EN33a	2	21	9.52	9.09	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	24	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	42	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	31	12.90	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4B3 (mod.) or 4B4 (mod.) and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Major Anions - Soluble	ED040S	SOIL	In house: Soluble Anions are determined off a 1:5 soil / water extract by ICPAES.
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	In house QWI-EN/33 referenced to USEPA SW846-1311: The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Sample Extraction for PFAS	EP231-PR	SOIL	In house
Dry and Pulverise (up to 100g)	GEO30	SOIL	#
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na ₂ SO ₄ and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CLIENT: GHD
 OFFICE: Sydney
 PROJECT: 212558314
 ORDER NUMBER:
 PROJECT MANAGER: Nicole Rosen / Ben Anderson

TURNAROUND REQUIREMENTS:
 Standard TAT (List due date):
 Non Standard or urgent TAT (List due date):
 (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)
 ALS QUOTE NO.: SY-143-17

RELINQUISHED BY: Stephanie Wark
 DATE/TIME: 19/6/17 11:00

RECEIVED BY: [Signature]
 DATE/TIME: 20/6/17 14:10

FOR LABORATORY USE ONLY (Circle)
 Customer Seal Intact? YES NO N/A
 Free Ice / Frozen Ice blocks present upon receipt? YES NO N/A
 Random Sample Temperature on Receipt: 15.7
 Other comment:

SAMPLER: Jesse Simkus
 CONTACT PH: 0421 045 835 / 0408 713 343
 SAMPLER MOBILE: 0404 542 354
 COC emailed to ALS? (YES / NO) EDD FORMAT (or default): ESDat
 Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com
 Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM
 COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: Please send Duroc to Eurghus.

ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)
 Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (filtered bottle required)

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL CONTAINERS	PFAS	TDS	Alkalinity	TOC	ASLP-PFAS	TSS	Additional Information
1	MW01	13/6/17	W	P		2	X	X					
2	MW02		W	P		2	X	X					
3	SW01		W	P		2	X					X	
4	SS01		S	P		2	X				X		
5	SS02		S	P		2	X				X		
-	<u>Duroc</u>		W	P		2	X						
6	Rinsate - Thowel	13/6/17	W	P		1	X						
7	SS03	14/6/17	S	P		2	X				X		
8	SS04		S	P		2	X				X		
9	SW13		W	P		2	X		X				
10	SW02		W	P		2	X						
11	MW05		W	P		2	X	X					

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisphosphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Special bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solts; B = Unpreserved Bag

Environmental Division
 Sydney
 Work Order Reference
ES1715278
 Telephone: - 61-2-9784 8555

*Please send to Eurghus

Barcode: [Barcode]

Comments: [Handwritten notes]



CHAIN OF CUSTODY

ALS Laboratory:
please tick ->

CLIENT: GHD

OFFICE: Sydney

PROJECT: 212558314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

COMMENT/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS:

Standard TAT (List due date): Standard TAT (List due date):

Non Standard or urgent TAT (List due date):

ALS QUOTE NO.: SY-143-17

CONTACT PH: 0421 045 835 / 0408 713 343

SAMPLER MOBILE: 0404 542 354

EDD FORMAT (or default): ESdat

RELINQUISHED BY: Stephanie Warrin

DATE/TIME: 19/6/17 11:00

RECEIVED BY: Scott Kelly

DATE/TIME: 20/6/17 14:10

FOR LABORATORY USE ONLY (Circle)

Quantity Seal Intact? Yes No N/A

Labels / frozen ice (ticks present upon receipt)? Yes No N/A

Random Sample Temperature on Receipt? Yes No N/A

Other comment:

RECEIVED BY: *SW*

DATE/TIME:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	TOTAL CONTAINERS (refer to	ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)							Additional Information		
						PFAS	TDS	Alkalinity	TOC	ASLP-PFAS	TSS				
12	DUP02	14/6/17	W	P	1	X									
13	SS09		S		2	X			X						
14	SW14		B		2	X		X							
15	SS05		S		2	X			X						
16	SW15		B		2	X		X							
17	SS06		S		2	X			X						
18	SS01		S		2	X			X						
19	SS08		S		2	X			X						
20	SW03		B		2	X							X		
21	SW04		B		2	X							X		
22	DUP03		S		1	X									
23	WU04		S		2	X			X						

Water Containing Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisphosphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Speciation bottles; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag



CHAIN OF CUSTODY

ALS Laboratory
please tick →

CLIENT: GHD

OFFICE: Sydney

PROJECT: 212558314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALST (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

COMMENT/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS : Standard TAT (list due date); Non Standard or urgent TAT (list due date);

Ultra Trace Organics

ALS QUOTE NO.: SY-143-17

CONTACT PH: 0421 045 835 / 0408 713 343

SAMPLER MOBILE: 0404 542 384

EDD FORMAT (or default): ESSdai

RELINQUISHED BY: Stephanie Warr

DATE/TIME: 19/6/17 11:00

RECEIVED BY: Steve

DATE/TIME: 20/6/17 14:10

FOR LABORATORY USE ONLY (Circle)

Control Seal Intact? Yes No N/A

Free Ice / frozen ice blocks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: Yes No N/A

Other comment: 187c

RELINQUISHED BY: DATE/TIME:

RECEIVED BY: DATE/TIME:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) / WATER (W)	CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB: Suite Codes must be listed to attract suite prices) where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
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LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (codes below)	TOTAL CONTAINERS	PFAS	TDS	Alkalinity	TOC	ASLR-PFAS	TSS	Comments on likely contaminant levels, dilutions, or samples requiring specific COC analysis etc.
24	Trip Blank 01	14/6/17	S	P	1	X						
25	Trip Blank 02	↓	W		1	X						
26	Rinsate - pump 1	↓	W		1	X						
27	MW07	15/6/17	W		2	X	X	X				
28	MW08	↓	W		2	X	X	X				
29	MW03	↓	W		2	X	X					
30	MW09	↓	W		2	X	X	X				
31	SW05	↓	W		2	X					X	
32	SSI0	↓	S		2	X			X	X		
33	Rinsate - pump 2	15/6/17	W		2	X						
34	SW09	16/6/17	W		2	X		X			X	
35	SW16	16/6/17	W		2	X		X			X	

Water Conditioning Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved Plastic; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



CHAIN OF CUSTODY

ALS Laboratory:
please tick →

1. This Chain of Custody Form is to be used to document the custody of samples from the time they are collected until they are analysed. It is to be completed by the person collecting the samples and the person receiving the samples at the laboratory. It is to be signed by the person receiving the samples at the laboratory and the person analysing the samples. It is to be kept with the samples until they are analysed and then returned to the person who collected the samples.

CLIENT: GHD

OFFICE: Sydney

PROJECT: 212558314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@ghd.com

COMMENT/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: Standard TAT (List due date): Non Standard or urgent TAT (List due date):

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

ALS QUOTE NO.: SY-143-17

RELINQUISHED BY: Stephanie Wirth

DATE/TIME: 19/6/17

RECEIVED BY: [Signature]

DATE/TIME: 20/6/17 14:10

FOR LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Physical / frozen for dry ice preserved upon receipt? Yes No N/A

Random Sample Temperature on Receipt: Yes No N/A

Other comment: 15-7

COC SEQUENCE NUMBER (Circle)

1 2 3 4 5 6 7

COG: 1 2 3 4 5 6 7

OR: 1 2 3 4 5 6 7

RECEIVED BY:

DATE/TIME:

Additional Information

Comments on likely contaminant levels, dilutions, or samples requiring specific OC analysis etc.

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	refer to	TOTAL CONTAINERS	PFAS	TDS	Alkalinity	TOC	ASLP-PFAS	TSS
36	SW06	16/6/17	W		P	2	X					X
37	SW10		W			2	X		X			X
38	SW07		W			2	X					X
39	SW11		W			2	X		X			X
40	SW08		W			2	X					X
41	SW12		W			2	X		X			X
42	SS18		S			2	X			X		
43	SS11		S			2	X		X	X		
44	SS12		S			2	X		X	X		
45	SS13		S			2	X		X	X		
46	SS14		S			2	X		X	X		
47	SS15		S			2	X		X	X		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved Plastic; S = Sodium Hydroxide Preserved Plastic; AS = Amber Glass Unpreserved Plastic; Airfreight Unpreserved Plastic

V = VOA Vial HCl Preserved; VA = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.



CHAIN OF CUSTODY
ALS Laboratory
Please tick →

ALS Laboratory
Please tick →

CLIENT: GHD

OFFICE: Sydney

PROJECT: 212558314

ORDER NUMBER:

PROJECT MANAGER: Nicole Rosen / Ben Anderson

SAMPLER: Jesse Simkus

COC emailed to ALS? (YES / NO)

Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Email invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

TURNAROUND REQUIREMENTS: Standard TAT (List due date); Non Standard or urgent TAT (List due date):

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

ALS QUOTE NO.: SY-143-17

CONTACT PH: 0421 045 835 / 0408 713 343

SAMPLER MOBILE: 0404 542 354

EDD FORMAT (or default): ESSdt

RELINQUISHED BY: *Stephanie Martin*

DATE/TIME: 19/6/17

RECEIVED BY: *Stephanie Martin*

DATE/TIME: 20/6/17

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? YES NO N/A

Freeze / frozen ice blocks present upon receipt? YES NO N/A

Random Sample Temperature on Receipt: C F

Other comment: *157*

RELINQUISHED BY: *Stephanie Martin*

DATE/TIME: 20/6/17

RECEIVED BY: *Stephanie Martin*

DATE/TIME: 20/6/17

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	refer to	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB, Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).	Additional Information
48	SS20	16/6/17	S	P		2	PFAS	
49	SS19		S			2	TDS	
50	SS16		S			2	Alkalinity	
51	SS22		S			2	TOC	
52	SS17		S			2	ASLP-PFAS	
53	SS21		S			2	TSS	
54	SS23		S			2		
55	SS24		S			2		
56	DUB04		S			2		
57	RmSade-travel/02		S			1		

Comments on likely contaminant levels, dilutions, or samples requiring specific OC analysis etc.

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order	: ES1715278	Page	: 1 of 44
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 08 6222 8222	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 20-Jun-2017 14:10
Order number	: ----	Date Analysis Commenced	: 22-Jun-2017
C-O-C number	: ----	Issue Date	: 30-Jun-2017 15:43
Sampler	: JESSE SIMKUS		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 58		
No. of samples analysed	: 58		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP231X: High LCS & MS recovery for analyte "N-Ethyl perfluorooctane sulfonamide (EtFOSA)" deemed acceptable as all associated analyte results are less than LOR.
- Poor spike recovery for Sulfate due to matrix interferences.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS01	SS02	SS03	SS04	SS09
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-004	ES1715278-005	ES1715278-007	ES1715278-008	ES1715278-013	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.14	<0.02	0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.24	2.24	0.13	0.69	0.09	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.03	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.07	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.06	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.03	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.03	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.03	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.03	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS01	SS02	SS03	SS04	SS09
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-004	ES1715278-005	ES1715278-007	ES1715278-008	ES1715278-013	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.06	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.28	2.69	0.13	0.71	0.09	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.24	2.38	0.13	0.71	0.09	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.25	2.63	0.13	0.71	0.09	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	106	102	101	105	104	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS05	SS06	SS07	SS08	SS10
Client sampling date / time					14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	15-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-015	ES1715278-017	ES1715278-018	ES1715278-019	ES1715278-032	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.04	0.05	0.13	0.05	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.17	0.62	0.59	1.10	0.33	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	0.06	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	0.05	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	0.04	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.01	<0.01	0.03	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS05	SS06	SS07	SS08	SS10
Client sampling date / time					14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	15-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-015	ES1715278-017	ES1715278-018	ES1715278-019	ES1715278-032	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.17	0.67	0.64	1.41	0.38	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.17	0.66	0.64	1.23	0.38	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.17	0.67	0.64	1.41	0.38	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	102	104	102	102	102	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS18	SS11	SS12	SS13	SS14
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-042	ES1715278-043	ES1715278-044	ES1715278-045	ES1715278-046	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.06	0.13	0.04	<0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.88	1.82	1.01	0.05	0.19	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.02	0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.02	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS18	SS11	SS12	SS13	SS14
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-042	ES1715278-043	ES1715278-044	ES1715278-045	ES1715278-046	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.95	1.99	1.07	0.05	0.19	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.94	1.95	1.05	0.05	0.19	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.95	1.99	1.07	0.05	0.19	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	102	100	104	102	108	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS15	SS20	SS19	SS16	SS22
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-047	ES1715278-048	ES1715278-049	ES1715278-050	ES1715278-051	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.03	0.03	<0.01	0.02	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS15	SS20	SS19	SS16	SS22
Client sampling date / time					16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-047	ES1715278-048	ES1715278-049	ES1715278-050	ES1715278-051	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.04	0.03	0.03	<0.01	0.02	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	0.03	0.03	<0.01	0.02	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	0.03	0.03	<0.01	0.02	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	101	103	101	101	99.4	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS17	SS21	SS23	SS24	----
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	----	
Compound	CAS Number	LOR	Unit	ES1715278-052	ES1715278-053	ES1715278-054	ES1715278-055	-----	
				Result	Result	Result	Result	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.07	<0.02	<0.02	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.13	0.15	<0.01	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SS17	SS21	SS23	SS24	----
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	----	
Compound	CAS Number	LOR	Unit	ES1715278-052	ES1715278-053	ES1715278-054	ES1715278-055	-----	
				Result	Result	Result	Result	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.04	0.20	0.15	<0.01	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	0.20	0.15	<0.01	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	0.20	0.15	<0.01	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	102	103	100	99.3	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS01	SS02	SS03	SS04	SS09
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-004	ES1715278-005	ES1715278-007	ES1715278-008	ES1715278-013	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	23.0	25.7	22.8	28.4	25.4	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	7.2	6.0	7.0	6.9	6.8	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.84	0.51	0.70	0.41	0.96	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0011	<0.0002	0.0003	0.0003	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0071	0.0732	0.0064	0.0238	0.0054	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0004	0.0021	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0009	<0.0002	0.0002	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0002	0.0008	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0004	0.0010	<0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0004	0.0016	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0014	0.0012	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS01	SS02	SS03	SS04	SS09
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		ES1715278-004	ES1715278-005	ES1715278-007	ES1715278-008	ES1715278-013
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.0042	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.0048	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	0.0099	0.0943	0.0064	0.0243	0.0057	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0071	0.0743	0.0064	0.0241	0.0057	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0077	0.0833	0.0064	0.0243	0.0057	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	94.1	90.2	93.7	84.0	85.5	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS05	SS06	SS07	SS08	DUP03
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-015	ES1715278-017	ES1715278-018	ES1715278-019	ES1715278-022	ES1715278-022
				Result	Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	43.3	22.0	42.0	33.5	46.3	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	6.5	6.6	6.4	7.0	----	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	1.09	0.45	2.78	1.24	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.0003	0.0005	<0.0002	<0.0002
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	0.0006	0.0006	0.0016	0.0027	0.0007	0.0007
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0003	0.0005	<0.0002	<0.0002
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0216	0.0174	0.0409	0.0670	0.0214	0.0214
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0002	<0.0002	<0.0002	0.0004	0.0002	0.0002
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0026	<0.0002	<0.0002
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0002	0.0005	0.0014	<0.0002	<0.0002
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0019	<0.0002	<0.0002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0005	0.0003	0.0015	0.0003	0.0003
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0016	<0.0002	<0.0002
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS05	SS06	SS07	SS08	DUP03
Client sampling date / time					14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		ES1715278-015	ES1715278-017	ES1715278-018	ES1715278-019	ES1715278-022
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	0.0006	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		0.0224	0.0187	0.0439	0.0810	0.0226
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		0.0222	0.0180	0.0425	0.0697	0.0221
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		0.0222	0.0187	0.0433	0.0777	0.0224
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		95.0	91.4	102	82.0	85.7



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TRIP BLANK 01	SS10	SS18	SS11	SS12
Client sampling date / time				14-Jun-2017 00:00	15-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-024	ES1715278-032	ES1715278-042	ES1715278-043	ES1715278-044	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	<1.0	30.8	43.9	34.6	22.1	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	----	7.0	6.7	7.1	6.4	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	----	0.57	3.77	1.42	0.90	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0008	0.0010	0.0025	0.0008	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.0003	0.0007	0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.0167	0.0495	0.112	0.0599	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.0004	0.0007	0.0008	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0003	0.0004	0.0008	0.0003	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.0004	0.0006	0.0003	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0002	0.0006	0.0010	0.0004	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0005	0.0003	0.0003	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	TRIP BLANK 01	SS10	SS18	SS11	SS12
Client sampling date / time					14-Jun-2017 00:00	15-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		ES1715278-024	ES1715278-032	ES1715278-042	ES1715278-043	ES1715278-044
					Result	Result	Result	Result	Result
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg		<0.0002	0.0180	0.0534	0.119	0.0630
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg		<0.0002	0.0175	0.0505	0.114	0.0607
Sum of PFAS (WA DER List)	----	0.0002	mg/kg		<0.0002	0.0180	0.0519	0.117	0.0617
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%		90.8	89.1	91.0	104	96.3



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS13	SS14	SS15	SS20	SS19
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-045	ES1715278-046	ES1715278-047	ES1715278-048	ES1715278-049	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	20.6	28.6	24.6	15.8	15.9	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	6.9	8.6	9.4	8.3	8.8	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.46	0.44	0.15	0.33	0.30	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0028	0.0093	0.0015	0.0007	0.0021	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS13	SS14	SS15	SS20	SS19
Client sampling date / time					16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-045	ES1715278-046	ES1715278-047	ES1715278-048	ES1715278-049	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	0.0028	0.0106	0.0015	0.0007	0.0021	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	0.0028	0.0093	0.0015	0.0007	0.0021	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	0.0028	0.0102	0.0015	0.0007	0.0021	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	91.0	85.2	86.2	96.4	97.3	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS16	SS22	SS17	SS21	SS23
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-050	ES1715278-051	ES1715278-052	ES1715278-053	ES1715278-054	
				Result	Result	Result	Result	Result	
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	21.5	41.6	29.0	45.8	18.8	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	8.5	7.4	8.1	7.2	6.9	
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.10	4.24	1.39	2.93	0.52	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0017	<0.0002	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.0035	0.0044	0.0223	0.0076	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.0003	0.0005	0.0011	<0.0002	
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.0005	0.0009	<0.0002	
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.0003	<0.0002	0.0010	<0.0002	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS16	SS22	SS17	SS21	SS23
Client sampling date / time					16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-050	ES1715278-051	ES1715278-052	ES1715278-053	ES1715278-054	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	0.0041	0.0054	0.0284	0.0076	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	0.0035	0.0044	0.0240	0.0076	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	0.0038	0.0049	0.0256	0.0076	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	98.2	91.0	88.3	91.7	109	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Client sample ID			SS24	----	----	----	----
Client sampling date / time		16-Jun-2017 00:00			----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1715278-055	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1	%	11.6	----	----	----	----	----
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	6.9	----	----	----	----	----
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%	0.11	----	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	----	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	----	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	----	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	----	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SS24	----	----	----	----
Client sampling date / time				16-Jun-2017 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES1715278-055	-----	-----	-----	-----	
				Result	----	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	----	----	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	----	----	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	----	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	----	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	----	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	----	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	----	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	----	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	----	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.0002	mg/kg	<0.0002	----	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.0002	mg/kg	<0.0002	----	----	----	----	
Sum of PFAS (WA DER List)	----	0.0002	mg/kg	<0.0002	----	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.0002	%	104	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW01	MW02	SW01	RINSATE - TROWEL	SW13
Client sampling date / time				13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-001	ES1715278-002	ES1715278-003	ES1715278-006	ES1715278-009	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	----	----	----	----	6.87	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	----	213	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	1260	783	----	----	----	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	----	----	----	----	138	
EA025: Total Suspended Solids dried at 104 ± 2 °C									
Suspended Solids (SS)	----	5	mg/L	----	----	81	----	78	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	----	----	----	----	61	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	----	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	----	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	----	74	
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	----	74	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	----	14	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	----	----	----	6	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	----	----	----	13	
Magnesium	7439-95-4	1	mg/L	----	----	----	----	7	
Sodium	7440-23-5	1	mg/L	----	----	----	----	16	
Potassium	7440-09-7	1	mg/L	----	----	----	----	4	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	----	----	----	<0.1	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	----	1.94	
Total Cations	----	0.01	meq/L	----	----	----	----	2.02	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.46	0.04	0.28	<0.02	0.61	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW01	MW02	SW01	RINSATE - TROWEL	SW13
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-001	ES1715278-002	ES1715278-003	ES1715278-006	ES1715278-009	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.37	0.04	0.34	<0.02	0.68	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.59	0.18	2.15	<0.02	3.55	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	<0.02	0.14	<0.02	0.35	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.48	0.53	5.79	0.04	4.67	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.55	<0.02	0.84	<0.02	0.21	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.59	0.05	0.85	<0.02	1.14	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.14	<0.02	0.37	<0.02	0.32	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.05	0.02	0.32	<0.01	0.36	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.08	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.04	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW01	MW02	SW01	RINSATE - TROWEL	SW13
Client sampling date / time					13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	13-Jun-2017 00:00	14-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715278-001	ES1715278-002	ES1715278-003	ES1715278-006	ES1715278-009	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.07	0.83	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.10	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	3.27	0.93	12.1	0.04	11.9	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.07	0.71	7.94	0.04	8.22	
Sum of PFAS (WA DER List)	----	0.01	µg/L	2.86	0.89	11.5	0.04	10.9	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	89.3	90.0	90.0	97.0	95.1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW02	MW05	DUP02	SW14	SW15
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-010	ES1715278-011	ES1715278-012	ES1715278-014	ES1715278-016	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	----	----	----	6.98	6.92	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	117	97	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	----	900	----	----	----	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	----	----	----	76	63	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	10	----	----	88	105	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	----	----	----	25	23	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	33	35	
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	33	35	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	2	5	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	----	----	12	7	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	----	----	5	6	
Magnesium	7439-95-4	1	mg/L	----	----	----	3	2	
Sodium	7440-23-5	1	mg/L	----	----	----	12	10	
Potassium	7440-09-7	1	mg/L	----	----	----	4	3	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	----	----	<0.1	<0.1	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	1.04	1.00	
Total Cations	----	0.01	meq/L	----	----	----	1.12	0.98	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.04	<0.02	<0.02	0.04	0.04	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW02	MW05	DUP02	SW14	SW15
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-010	ES1715278-011	ES1715278-012	ES1715278-014	ES1715278-016	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.03	<0.02	<0.02	0.03	0.03	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.22	<0.02	<0.02	0.21	0.18	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.50	0.03	0.02	0.25	0.20	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.06	<0.02	<0.02	0.02	0.03	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	<0.01	<0.01	0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW02	MW05	DUP02	SW14	SW15
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-010	ES1715278-011	ES1715278-012	ES1715278-014	ES1715278-016	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.87	0.03	0.02	0.56	0.48	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.72	0.03	0.02	0.46	0.38	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.84	0.03	0.02	0.53	0.45	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	93.7	92.0	91.1	92.3	94.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW03	SW04	MW04	TRIP BLANK 02	RINSATE_PUMP1
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-020	ES1715278-021	ES1715278-023	ES1715278-025	ES1715278-026	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	----	----	568	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	72	36	----	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.64	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.60	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.27	2.93	<0.02	<0.02	<0.02	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.22	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.45	6.78	<0.01	<0.01	<0.01	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	1.17	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.06	1.47	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.55	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.42	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.04	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW03	SW04	MW04	TRIP BLANK 02	RINSATE_PUMP1
Client sampling date / time				14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	14-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-020	ES1715278-021	ES1715278-023	ES1715278-025	ES1715278-026	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.35	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	0.90	15.2	<0.01	<0.01	<0.01	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.72	9.71	<0.01	<0.01	<0.01	
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.86	14.3	<0.01	<0.01	<0.01	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	94.3	90.0	89.8	93.4	95.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW07	MW08	MW03	MW09	SW05
Client sampling date / time				15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-027	ES1715278-028	ES1715278-029	ES1715278-030	ES1715278-031	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.03	7.62	----	7.12	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	2940	2080	----	1080	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	2300	1470	878	720	----	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	1910	1350	----	702	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	26	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	1360	797	----	443	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	239	371	----	223	----	
Total Alkalinity as CaCO3	----	1	mg/L	239	371	----	223	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	851	143	----	219	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	409	398	----	62	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	359	194	----	105	----	
Magnesium	7439-95-4	1	mg/L	114	76	----	44	----	
Sodium	7440-23-5	1	mg/L	182	112	----	59	----	
Potassium	7440-09-7	1	mg/L	6	3	----	2	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.2	----	<0.1	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	34.0	21.6	----	10.8	----	
Total Cations	----	0.01	meq/L	35.4	20.9	----	11.5	----	
Ionic Balance	----	0.01	%	1.92	1.72	----	3.21	----	
EP231A: Perfluoroalkyl Sulfonic Acids									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW07	MW08	MW03	MW09	SW05
Client sampling date / time				15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-027	ES1715278-028	ES1715278-029	ES1715278-030	ES1715278-031	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.14	0.12	0.72	<0.02	0.19	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.12	0.08	0.71	<0.02	0.18	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.32	0.16	0.86	<0.02	0.90	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.03	<0.02	0.06	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.10	0.02	0.92	<0.01	1.90	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.21	<0.02	0.15	<0.02	0.21	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.33	0.10	0.48	<0.02	0.33	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.06	<0.02	0.09	<0.02	0.11	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	<0.01	0.04	<0.01	0.09	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MW07	MW08	MW03	MW09	SW05
Client sampling date / time				15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	15-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-027	ES1715278-028	ES1715278-029	ES1715278-030	ES1715278-031	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.08	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	1.31	0.48	4.08	<0.01	3.97	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.42	0.18	1.78	<0.01	2.80	
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.19	0.40	3.34	<0.01	3.73	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	88.2	90.0	88.0	86.2	89.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RINSATE_PUMP2	SW09	SW16	SW06	SW10
Client sampling date / time				15-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-033	ES1715278-034	ES1715278-035	ES1715278-036	ES1715278-037	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	----	6.85	6.58	----	6.82	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	----	117	110	----	109	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	----	76	72	----	71	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	----	25	34	41	13	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	----	34	30	----	30	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	<1	----	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	<1	----	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	44	42	----	41	
Total Alkalinity as CaCO3	----	1	mg/L	----	44	42	----	41	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	3	4	----	3	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	6	5	----	5	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	7	7	----	7	
Magnesium	7439-95-4	1	mg/L	----	4	3	----	3	
Sodium	7440-23-5	1	mg/L	----	9	8	----	9	
Potassium	7440-09-7	1	mg/L	----	3	3	----	3	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	<0.1	<0.1	----	<0.1	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	1.11	1.06	----	1.02	
Total Cations	----	0.01	meq/L	----	1.15	1.02	----	1.06	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.14	0.11	0.11	0.12	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.13	0.10	0.10	0.10	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RINSATE_PUMP2	SW09	SW16	SW06	SW10
Client sampling date / time				15-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-033	ES1715278-034	ES1715278-035	ES1715278-036	ES1715278-037	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.70	0.52	0.50	0.55	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.05	0.04	0.05	0.05	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	1.88	1.94	2.00	1.85	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.12	0.11	0.12	0.11	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.21	0.18	0.18	0.18	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.08	0.06	0.07	0.08	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.08	0.07	0.07	0.07	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RINSATE_PUMP2	SW09	SW16	SW06	SW10
Client sampling date / time				15-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-033	ES1715278-034	ES1715278-035	ES1715278-036	ES1715278-037	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	3.39	3.13	3.20	3.11	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	2.58	2.46	2.50	2.40	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	3.21	2.99	3.05	2.96	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	95.0	94.2	93.7	92.9	93.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW07	SW11	SW08	SW12	DUP04
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-038	ES1715278-039	ES1715278-040	ES1715278-041	ES1715278-056	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	----	7.41	----	7.69	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	----	299	----	306	----	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	----	194	----	199	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	46	6	7	<5	----	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	----	108	----	114	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	----	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	----	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	104	----	105	----	
Total Alkalinity as CaCO3	----	1	mg/L	----	104	----	105	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	13	----	12	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	21	----	21	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	22	----	21	----	
Magnesium	7439-95-4	1	mg/L	----	13	----	15	----	
Sodium	7440-23-5	1	mg/L	----	20	----	18	----	
Potassium	7440-09-7	1	mg/L	----	4	----	4	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	----	0.1	----	0.1	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	2.94	----	2.94	----	
Total Cations	----	0.01	meq/L	----	3.14	----	3.17	----	
Ionic Balance	----	0.01	%	----	3.27	----	3.73	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.05	<0.02	<0.02	<0.02	0.05	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	<0.02	<0.02	<0.02	0.04	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW07	SW11	SW08	SW12	DUP04
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-038	ES1715278-039	ES1715278-040	ES1715278-041	ES1715278-056	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.24	<0.02	0.02	<0.02	0.24	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.02	<0.02	<0.02	<0.02	0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.68	0.02	0.02	0.02	0.72	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.08	<0.02	<0.02	<0.02	0.08	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.03	<0.02	<0.02	<0.02	0.03	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.03	<0.01	<0.01	<0.01	0.03	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW07	SW11	SW08	SW12	DUP04
Client sampling date / time				16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	16-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	ES1715278-038	ES1715278-039	ES1715278-040	ES1715278-041	ES1715278-056	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	1.17	0.02	0.04	0.02	1.21	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.92	0.02	0.04	0.02	0.96	
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.11	0.02	0.04	0.02	1.15	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	90.4	93.2	92.4	88.1	92.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			RINSATE_TROWEL02	GW966477	----	----	----	
Client sampling date / time		16-Jun-2017 00:00			15-Jun-2017 00:00			----	----	----
Compound	CAS Number	LOR	Unit	ES1715278-057	ES1715278-058	-----	-----	-----		
				Result	Result	----	----	----		
EA015: Total Dissolved Solids dried at 180 ± 5 °C										
Total Dissolved Solids @180°C	----	10	mg/L	----	760	----	----	----		
EP231A: Perfluoroalkyl Sulfonic Acids										
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.02	----	----	----		
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.02	----	----	----		
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.08	----	----	----		
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.20	----	----	----		
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----		
EP231B: Perfluoroalkyl Carboxylic Acids										
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----		
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.02	----	----	----		
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----		
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----		
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----		
EP231C: Perfluoroalkyl Sulfonamides										
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----		
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----		



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RINSATE_TROWEL02	GW966477	----	----	----
Client sampling date / time				16-Jun-2017 00:00	15-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1715278-057	ES1715278-058	-----	-----	-----	
				Result	Result	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	0.34	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.28	----	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.32	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	95.5	89.9	----	----	----	



Surrogate Control Limits

Sub-Matrix: DI WATER LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	70	130

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

QUALITY CONTROL REPORT

Work Order	: ES1715278	Page	: 1 of 27
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 08 6222 8222	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 20-Jun-2017
Order number	: ----	Date Analysis Commenced	: 22-Jun-2017
C-O-C number	: ----	Issue Date	: 30-Jun-2017
Sampler	: JESSE SIMKUS		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 58		
No. of samples analysed	: 58		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 963484)									
EB1712734-054	Anonymous	EA055: Moisture Content	----	1	%	10.2	10.5	2.13	0% - 50%
EB1712734-065	Anonymous	EA055: Moisture Content	----	1	%	17.9	16.4	8.28	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 963485)									
ES1715278-024	TRIP BLANK 01	EA055: Moisture Content	----	1	%	<1.0	<1.0	0.00	No Limit
ES1715278-051	SS22	EA055: Moisture Content	----	1	%	41.6	46.8	11.9	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 966857)									
ES1714973-005	Anonymous	EA055: Moisture Content	----	1	%	19.7	17.6	11.5	0% - 50%
ES1715457-002	Anonymous	EA055: Moisture Content	----	1	%	16.7	19.6	16.0	0% - 50%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 969239)									
ES1715278-004	SS01	EP003: Total Organic Carbon	----	0.02	%	0.84	0.84	0.00	0% - 20%
ES1715278-042	SS18	EP003: Total Organic Carbon	----	0.02	%	3.77	3.85	2.05	0% - 20%
EP003: Total Organic Carbon (TOC) in Soil (QC Lot: 969240)									
ES1715278-052	SS17	EP003: Total Organic Carbon	----	0.02	%	1.39	1.40	0.00	0% - 20%
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 960951)									
ES1715278-004	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	0.0071	0.0080	11.6	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	0.0004	0.0003	0.00	No Limit
ES1715278-024	TRIP BLANK 01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 960951) - continued									
ES1715278-024	TRIP BLANK 01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 960953)									
ES1715278-050	SS16	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 960951)									
ES1715278-004	SS01	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	0.0004	0.0004	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	0.0004	0.0003	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	0.0014	0.0015	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
		ES1715278-024	TRIP BLANK 01	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorononanoic acid (PFNA)	375-95-1			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8			0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7			0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4			0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 960953)									
ES1715278-050	SS16	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 960953) - continued									
ES1715278-050	SS16	EP231X: Perfluorododecanoic acid (PFDODA)	307-55-1	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTDA)	72629-94-8	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	<0.001	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 960951)									
ES1715278-004	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1715278-024	TRIP BLANK 01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 960953)									
ES1715278-050	SS16	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	<0.0002	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 960953) - continued									
ES1715278-050	SS16	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 960951)									
ES1715278-004	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
ES1715278-024	TRIP BLANK 01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 960953)									
ES1715278-050	SS16	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	<0.0005	0.00	No Limit

Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 965198)									
ES1715278-039	SW11	EA005-P: pH Value	----	0.01	pH Unit	7.41	7.67	3.45	0% - 20%
ES1715278-027	MW07	EA005-P: pH Value	----	0.01	pH Unit	7.03	7.07	0.567	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 965199)									
ES1715278-039	SW11	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	299	290	3.02	0% - 20%
ES1715278-027	MW07	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	2940	2940	0.00	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 959647)									
ES1715278-001	MW01	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1260	1210	3.81	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 959658)									
ES1715278-003	SW01	EA025H: Suspended Solids (SS)	----	5	mg/L	81	79	2.18	0% - 50%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 961564)									
ES1714981-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	10	12	18.6	No Limit
ES1715278-038	SW07	EA025H: Suspended Solids (SS)	----	5	mg/L	46	48	2.65	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 959603)									
ES1715264-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	25	26	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	25	26	0.00	0% - 20%
ES1715278-034	SW09	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	44	43	2.36	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	44	43	2.36	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 964741)									
ES1715278-009	SW13	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	14	16	18.5	0% - 50%
ES1715485-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 964740)									
ES1715278-009	SW13	ED045G: Chloride	16887-00-6	1	mg/L	6	6	0.00	No Limit
ES1715485-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	<1	<1	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 964766)									
ES1715105-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	14	16	15.4	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	11	10	15.1	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	53	54	2.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	4	4	0.00	No Limit
ES1715278-037	SW10	ED093F: Calcium	7440-70-2	1	mg/L	7	7	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	3	3	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	9	9	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 965197)									
ES1715233-011	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.2	0.2	0.00	No Limit
ES1715278-027	MW07	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.3	0.3	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 960999)									
ES1715278-001	MW01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.48	0.51	7.30	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.46	0.53	14.0	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.37	0.32	14.5	0% - 50%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.59	0.69	14.7	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.05	22.7	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1715278-020	SW03	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.45	0.43	2.73	0% - 20%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 960999) - continued									
ES1715278-020	SW03	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.04	0.03	26.3	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.27	0.26	0.00	0% - 50%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 961012)									
EP1706591-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.12	0.12	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.06	0.05	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1715278-035	SW16	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.94	1.93	0.00	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	0.11	0.11	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.10	0.11	14.6	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.52	0.55	5.05	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.04	0.05	0.00	No Limit
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit		
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 968239)									
ES1715278-004	SS01	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.24	0.23	0.00	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1715278-042	SS18	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.88	0.96	8.44	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit		
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 968241)									
ES1715278-052	SS17	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 960999)									



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 960999) - continued									
ES1715278-001	MW01	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.05	0.06	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.55	0.64	15.4	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.59	0.66	9.77	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.14	0.16	14.6	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1715278-020	SW03	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.06	0.06	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 961012)									
EP1706591-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.20	0.18	5.80	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.11	0.11	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.04	0.04	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	2.1	2.0	0.00	0% - 20%
ES1715278-035	SW16	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.07	0.07	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.11	0.11	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.18	0.17	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.06	0.07	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 961012) - continued									
ES1715278-035	SW16	EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 968239)									
ES1715278-004	SS01	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1715278-042	SS18	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.01	0.02	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 968241)									
ES1715278-052	SS17	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 960999)									
ES1715278-001	MW01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-020	SW03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 961012)									
EP1706591-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-035	SW16	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 961012) - continued									
ES1715278-035	SW16	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 968239)									
ES1715278-004	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-042	SS18	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 968241)									
ES1715278-052	SS17	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 968241) - continued									
ES1715278-052	SS17	EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 960999)									
ES1715278-001	MW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-020	SW03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 961012)									
EP1706591-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-035	SW16	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 961012) - continued									
ES1715278-035	SW16	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 968239)									
ES1715278-004	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715278-042	SS18	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 968241)									
ES1715278-052	SS17	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 960999)									
ES1715278-001	MW01	EP231X: Sum of PFAS	----	0.01	µg/L	3.27	3.62	10.2	0% - 20%
ES1715278-020	SW03	EP231X: Sum of PFAS	----	0.01	µg/L	0.90	0.86	4.54	0% - 20%
EP231P: PFAS Sums (QC Lot: 961012)									
EP1706591-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	2.73	2.60	4.88	0% - 20%
ES1715278-035	SW16	EP231X: Sum of PFAS	----	0.01	µg/L	3.13	3.17	1.27	0% - 20%
EP231P: PFAS Sums (QC Lot: 968239)									
ES1715278-004	SS01	EP231X: Sum of PFAS	----	0.01	µg/L	0.28	0.27	3.64	0% - 20%

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 Work Order : ES1715278
 Client : GHD PTY LTD
 Project : 212558314



Sub-Matrix: **WATER**

				<i>Laboratory Duplicate (DUP) Report</i>					
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EP231P: PFAS Sums (QC Lot: 968239) - continued									
ES1715278-042	SS18	EP231X: Sum of PFAS	----	0.01	µg/L	0.95	1.04	9.04	0% - 20%
EP231P: PFAS Sums (QC Lot: 968241)									
ES1715278-052	SS17	EP231X: Sum of PFAS	----	0.01	µg/L	0.04	0.04	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 969239)									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	101	70	130	
EP003: Total Organic Carbon (TOC) in Soil (QCLot: 969240)									
EP003: Total Organic Carbon	----	0.02	%	<0.02	100 %	99.3	70	130	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960951)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.0	57	121	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	55	125	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.8	52	126	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	91.2	54	123	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	103	55	127	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.2	54	125	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960953)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.0002	mg/kg	<0.0002	0.00125 mg/kg	83.1	57	121	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.2	55	125	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	63.4	52	126	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	89.3	54	123	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	118	55	127	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.1	54	125	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960951)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	110	52	128	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	88.8	54	129	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	76.6	58	127	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	57	128	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	99.3	60	134	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	119	63	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	96.9	55	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	67.0	62	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	75.4	53	134	
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	69.4	49	129	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	59	129	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960953)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.001	mg/kg	<0.001	0.00625 mg/kg	83.4	52	128	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.0002	mg/kg	<0.0002	0.00125 mg/kg	84.4	54	129	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.0002	mg/kg	<0.0002	0.00125 mg/kg	73.0	58	127	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	102	57	128	



Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike	Spike Recovery (%)	Recovery Limits (%)	
					Concentration	LCS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960953) - continued								
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	101	60	134
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	94.3	63	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.0002	mg/kg	<0.0002	0.00125 mg/kg	111	55	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	71.6	62	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.0002	mg/kg	<0.0002	0.00125 mg/kg	72.4	53	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.0002	mg/kg	<0.0002	0.00125 mg/kg	60.7	49	129
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.0	59	129
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960951)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	71.3	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	97.8	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	101	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	85.1	63	124
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	91.6	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	76.2	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	116	55	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960953)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	79.0	52	132
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.0005	mg/kg	<0.0005	0.00312 mg/kg	119	65	126
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.9	64	126
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.0005	mg/kg	<0.0005	0.00312 mg/kg	102	63	124
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.0005	mg/kg	<0.0005	0.00312 mg/kg	95.5	58	125
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.0002	mg/kg	<0.0002	0.00125 mg/kg	121	61	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.0002	mg/kg	<0.0002	0.00125 mg/kg	110	55	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960951)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	88.8	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	115	61	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	88.0	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	104	60	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960953)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	89.4	54	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.0005	mg/kg	<0.0005	0.00125 mg/kg	116	61	130



Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960953) - continued								
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.0005	mg/kg	<0.0005	0.00125 mg/kg	124	62	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.0005	mg/kg	<0.0005	0.00125 mg/kg	102	60	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EA010P: Conductivity by PC Titrator (QCLot: 965199)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	104	95	113
EA015H: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 959647)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	93.6	87	109
				<10	293 mg/L	107	66	126
EA025H: Total Suspended Solids dried at 104 ± 2°C (QCLot: 959658)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	117	83	129
				<5	1000 mg/L	96.5	82	110
EA025H: Total Suspended Solids dried at 104 ± 2°C (QCLot: 961564)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	101	83	129
				<5	1000 mg/L	98.2	82	110
ED037P: Alkalinity by PC Titrator (QCLot: 959603)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	100	81	111
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 964741)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	89.8	82	122
ED045G: Chloride by Discrete Analyser (QCLot: 964740)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	104	81	127
				<1	1000 mg/L	104	81	127
ED093F: Dissolved Major Cations (QCLot: 964766)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.0	80	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	100	90	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	99.3	82	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	85.5	85	113
EK040P: Fluoride by PC Titrator (QCLot: 965197)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	112	82	116
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960999)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	109	70	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	112	70	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	110	70	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	104	70	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	115	70	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	98.0	70	130



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 961012)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	92.0	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	105	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	95.8	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	85.4	70	130	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 968239)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	93.4	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	90.0	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	95.6	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	94.0	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	99.0	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	116	70	130	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 968241)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	103	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	106	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	107	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	122	70	130	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960999)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	100	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	89.0	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	104	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	106	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	110	70	130	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	112	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	101	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	115	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	116	70	130	
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	124	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	116	70	124	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 961012)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	102	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	94.0	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	94.0	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	103	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	108	70	130	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 961012) - continued									
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	114	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	112	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	113	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	115	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	119	70	124	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 968239)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	98.7	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	82.8	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	85.6	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	85.6	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	93.2	70	130	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	117	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	104	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	110	70	130	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	104	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	112	70	124	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 968241)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	112	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	103	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	109	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	104	70	130	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	117	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	103	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	118	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	104	70	130	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	110	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	106	70	124	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960999)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	118	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	102	70	129	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	97.1	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	115	70	126	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960999) - continued									
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	87.4	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	91.2	70	130	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 961012)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	118	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	113	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	# 143	70	129	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	102	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	# 127	70	126	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	86.4	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	94.8	70	130	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968239)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	105	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	102	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	89.3	70	129	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	92.1	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	80.1	70	126	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	79.6	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	97.4	70	130	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968241)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	105	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	124	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	129	70	129	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	113	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	108	70	126	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	96.6	70	130	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968241) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	96.0	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960999)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	108	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	112	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	99.0	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	97.8	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 961012)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	108	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	119	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	124	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	120	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 968239)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	86.2	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	92.2	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	114	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	93.6	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 968241)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	106	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	112	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	106	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	79.4	70	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960951)							
ES1715278-004	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	62.4	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	112	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	62.9	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	105	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	68.0	50	130



Sub-Matrix: SOIL

				Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Recovery Limits (%)			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960953)									
ES1715278-050	SS16	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.00125 mg/kg	54.5	50	130		
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.00125 mg/kg	111	50	130		
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.00125 mg/kg	56.6	50	130		
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.00125 mg/kg	102	50	130		
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.00125 mg/kg	117	50	130		
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.00125 mg/kg	97.8	50	130		
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960951)									
ES1715278-004	SS01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	107	30	130		
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	100.0	50	130		
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	86.7	50	130		
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	116	50	130		
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	111	50	130		
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	109	50	130		
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	80.0	50	130		
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	71.4	50	130		
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	71.5	50	130		
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	81.4	30	130		
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	67.0	30	130		
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960953)									
ES1715278-050	SS16	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.00625 mg/kg	91.9	30	130		
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.00125 mg/kg	100	50	130		
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.00125 mg/kg	73.4	50	130		
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.00125 mg/kg	116	50	130		
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.00125 mg/kg	114	50	130		
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.00125 mg/kg	109	50	130		
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.00125 mg/kg	107	50	130		
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.00125 mg/kg	65.8	50	130		
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.00125 mg/kg	51.4	50	130		
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.00125 mg/kg	69.6	30	130		
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.00312 mg/kg	72.4	30	130		
		EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960951)							
		ES1715278-004	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	58.6	50	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8			0.00312 mg/kg	74.2	30	130		
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2			0.00312 mg/kg	82.8	30	130		
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7			0.00312 mg/kg	63.9	30	130		



Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960951) - continued							
ES1715278-004	SS01	EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	63.6	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	56.8	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	99.1	30	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960953)							
ES1715278-050	SS16	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.00125 mg/kg	56.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.00312 mg/kg	55.8	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.00312 mg/kg	66.6	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.00312 mg/kg	56.3	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.00312 mg/kg	62.1	30	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.00125 mg/kg	53.3	30	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.00125 mg/kg	108	30	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960951)							
ES1715278-004	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	100	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	110	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	103	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	106	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960953)							
ES1715278-050	SS16	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.00125 mg/kg	94.3	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.00125 mg/kg	112	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.00125 mg/kg	104	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.00125 mg/kg	93.4	50	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 964741)							
ES1715278-009	SW13	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	83.6	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 964740)							
ES1715278-009	SW13	ED045G: Chloride	16887-00-6	250 mg/L	118	70	130
EK040P: Fluoride by PC Titrator (QCLot: 965197)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK040P: Fluoride by PC Titrator (QCLot: 965197) - continued							
ES1715233-011	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	118	70	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 960999)							
ES1715278-001	MW01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	103	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	123	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	118	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	118	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	103	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	103	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 961012)							
EP1706591-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	98.2	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	124	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	113	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	111	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	107	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	91.0	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 968239)							
ES1715278-004	SS01	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	109	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	106	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	113	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	105	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	109	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	127	50	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 968241)							
ES1715278-052	SS17	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	119	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	119	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	120	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	124	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	105	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	116	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960999)							
ES1715278-001	MW01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	70.1	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	74.6	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	83.4	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	124	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	113	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	90.8	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	88.2	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	119	50	130



Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
				Low	High		
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 960999) - continued							
ES1715278-001	MW01	EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	74.0	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	112	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	74.8	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 961012)							
EP1706591-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	80.0	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	75.2	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	94.8	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	120	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	112	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	96.6	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	91.2	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	123	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	128	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	106	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	73.0	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 968239)							
ES1715278-004	SS01	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	109	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	106	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	102	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	113	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	109	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	108	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	110	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	116	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	108	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	127	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	105	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 968241)							
ES1715278-052	SS17	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	103	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	109	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	117	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	130	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	121	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	102	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	93.6	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	119	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	112	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	109	50	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 968241) - continued							
ES1715278-052	SS17	EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	109	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 960999)							
ES1715278-001	MW01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	101	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	122	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	102	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	99.8	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	78.8	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	65.2	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	68.6	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 961012)							
EP1706591-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	101	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	111	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	# 140	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	92.3	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	121	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	64.6	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	66.4	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968239)							
ES1715278-004	SS01	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	105	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	111	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	128	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	125	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	105	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	101	50	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968239) - continued							
ES1715278-004	SS01	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	113	50	130
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 968241)							
ES1715278-052	SS17	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	91.4	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	114	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	109	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	79.6	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	113	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	102	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	98.0	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 960999)							
ES1715278-001	MW01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	99.0	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	82.8	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	98.2	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	108	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 961012)							
EP1706591-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	96.2	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	118	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	93.8	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	76.6	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 968239)							
ES1715278-004	SS01	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	95.8	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	107	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	95.6	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	62.4	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 968241)							
ES1715278-052	SS17	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	129	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	116	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	83.8	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	61.0	50	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1715278	Page	: 1 of 20
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN ANDERSON	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 20-Jun-2017
Site	: ----	Issue Date	: 30-Jun-2017
Sampler	: JESSE SIMKUS	No. of samples received	: 58
Order number	: ----	No. of samples analysed	: 58

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **Laboratory Control outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1715278--004	SS01	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP231C: Perfluoroalkyl Sulfonamides	QC-961012-002	----	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	143 %	70-129%	Recovery greater than upper control limit
EP231C: Perfluoroalkyl Sulfonamides	QC-961012-002	----	N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	127 %	70-126%	Recovery greater than upper control limit
Matrix Spike (MS) Recoveries							
EP231C: Perfluoroalkyl Sulfonamides	EP1706591--001	Anonymous	N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	140 %	50-130%	Recovery greater than upper data quality objective

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
SW13, SW15	SW14,	----	----	----	26-Jun-2017	14-Jun-2017	12
Clear Plastic Bottle - Natural							
MW07, MW09	MW08,	----	----	----	26-Jun-2017	15-Jun-2017	11
Clear Plastic Bottle - Natural							
SW09, SW10, SW12	SW16, SW11,	----	----	----	26-Jun-2017	16-Jun-2017	10
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural							
MW01,	MW02	----	----	----	22-Jun-2017	20-Jun-2017	2
Clear Plastic Bottle - Natural							
MW05,	MW04	----	----	----	22-Jun-2017	21-Jun-2017	1
EA025: Total Suspended Solids dried at 104 ± 2°C							



Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA025: Total Suspended Solids dried at 104 ± 2°C - Analysis Holding Time Compliance						
Clear Plastic Bottle - Natural SW01	----	----	----	22-Jun-2017	20-Jun-2017	2
Clear Plastic Bottle - Natural SW13, SW14, SW03, SW02, SW15, SW04	----	----	----	22-Jun-2017	21-Jun-2017	1
EA065: Total Hardness as CaCO3						
Clear Plastic Bottle - Natural SW13, SW15 SW14,	----	----	----	26-Jun-2017	21-Jun-2017	5
Clear Plastic Bottle - Natural MW07, MW09 MW08,	----	----	----	26-Jun-2017	22-Jun-2017	4
Clear Plastic Bottle - Natural SW09, SW10, SW12 SW16, SW11,	----	----	----	26-Jun-2017	23-Jun-2017	3
ED093F: Dissolved Major Cations						
Clear Plastic Bottle - Natural SW13, SW15 SW14,	----	----	----	26-Jun-2017	21-Jun-2017	5
Clear Plastic Bottle - Natural MW07, MW09 MW08,	----	----	----	26-Jun-2017	22-Jun-2017	4
Clear Plastic Bottle - Natural SW09, SW10, SW12 SW16, SW11,	----	----	----	26-Jun-2017	23-Jun-2017	3

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
HDPE Soil Jar (EA055) SS01, SS02	13-Jun-2017	----	----	----	27-Jun-2017	27-Jun-2017	✓
HDPE Soil Jar (EA055) SS03, SS04, SS09, SS05, SS06, SS07, SS08, DUP03, TRIP BLANK 01	14-Jun-2017	----	----	----	24-Jun-2017	28-Jun-2017	✓
HDPE Soil Jar (EA055) SS10	15-Jun-2017	----	----	----	24-Jun-2017	29-Jun-2017	✓
HDPE Soil Jar (EA055) SS18, SS11, SS12, SS13, SS14, SS15, SS20, SS19, SS16, SS22, SS17, SS21, SS23, SS24	16-Jun-2017	----	----	----	24-Jun-2017	30-Jun-2017	✓
EN60: Bottle Leaching Procedure							
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-D1a) SS01, SS02	13-Jun-2017	26-Jun-2017	27-Jun-2017	✓	----	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-D1a) SS03, SS04, SS09, SS05, SS06, SS07, SS08	14-Jun-2017	26-Jun-2017	28-Jun-2017	✓	----	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-D1a) SS10	15-Jun-2017	26-Jun-2017	29-Jun-2017	✓	----	----	----
Non-Volatile Leach: 14 day HT(e.g. SV organics) (EN60-D1a) SS18, SS11, SS12, SS13, SS14, SS15, SS20, SS19, SS16, SS22, SS17, SS21, SS23, SS24	16-Jun-2017	26-Jun-2017	30-Jun-2017	✓	----	----	----



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP003: Total Organic Carbon (TOC) in Soil							
Soil Glass Jar - Unpreserved (EP003) SS01, SS02	13-Jun-2017	28-Jun-2017	11-Jul-2017	✓	28-Jun-2017	11-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP003) SS03, SS09, SS06, SS08 SS04, SS05, SS07,	14-Jun-2017	28-Jun-2017	12-Jul-2017	✓	28-Jun-2017	12-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP003) SS10	15-Jun-2017	28-Jun-2017	13-Jul-2017	✓	28-Jun-2017	13-Jul-2017	✓
Soil Glass Jar - Unpreserved (EP003) SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS11, SS13, SS15, SS19, SS22, SS21, SS24	16-Jun-2017	28-Jun-2017	14-Jul-2017	✓	28-Jun-2017	14-Jul-2017	✓
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE Soil Jar (EP231X) SS01, SS02	13-Jun-2017	25-Jun-2017	10-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓
HDPE Soil Jar (EP231X) SS03, SS09, SS06, SS08, TRIP BLANK 01 SS04, SS05, SS07, DUP03,	14-Jun-2017	25-Jun-2017	11-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓
HDPE Soil Jar (EP231X) SS10	15-Jun-2017	25-Jun-2017	12-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓
HDPE Soil Jar (EP231X) SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS11, SS13, SS15, SS19, SS22, SS21, SS24	16-Jun-2017	25-Jun-2017	13-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE Soil Jar (EP231X) SS01, SS02	13-Jun-2017	25-Jun-2017	10-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS03, SS04, SS09, SS05, SS06, SS07, SS08, DUP03, TRIP BLANK 01	14-Jun-2017	25-Jun-2017	11-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS10	15-Jun-2017	25-Jun-2017	12-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS18, SS11, SS12, SS13, SS14, SS15, SS20, SS19, SS16, SS22, SS17, SS21, SS23, SS24	16-Jun-2017	25-Jun-2017	13-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE Soil Jar (EP231X) SS01, SS02	13-Jun-2017	25-Jun-2017	10-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS03, SS04, SS09, SS05, SS06, SS07, SS08, DUP03, TRIP BLANK 01	14-Jun-2017	25-Jun-2017	11-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS10	15-Jun-2017	25-Jun-2017	12-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS18, SS11, SS12, SS13, SS14, SS15, SS20, SS19, SS16, SS22, SS17, SS21, SS23, SS24	16-Jun-2017	25-Jun-2017	13-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE Soil Jar (EP231X) SS01, SS02	13-Jun-2017	25-Jun-2017	10-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS03, SS09, SS06, SS08, TRIP BLANK 01 SS04, SS05, SS07, DUP03,	14-Jun-2017	25-Jun-2017	11-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS10	15-Jun-2017	25-Jun-2017	12-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS11, SS13, SS15, SS19, SS22, SS21, SS24	16-Jun-2017	25-Jun-2017	13-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
EP231P: PFAS Sums								
HDPE Soil Jar (EP231X) SS01, SS02	13-Jun-2017	25-Jun-2017	10-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS03, SS09, SS06, SS08, TRIP BLANK 01 SS04, SS05, SS07, DUP03,	14-Jun-2017	25-Jun-2017	11-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS10	15-Jun-2017	25-Jun-2017	12-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	
HDPE Soil Jar (EP231X) SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS11, SS13, SS15, SS19, SS22, SS21, SS24	16-Jun-2017	25-Jun-2017	13-Dec-2017	✓	25-Jun-2017	04-Aug-2017	✓	

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

Evaluation: ✘ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	14-Jun-2017	✘
Clear Plastic Bottle - Natural (EA005-P) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	15-Jun-2017	✘
Clear Plastic Bottle - Natural (EA005-P) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	16-Jun-2017	✘
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	12-Jul-2017	✔
Clear Plastic Bottle - Natural (EA010-P) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	13-Jul-2017	✔
Clear Plastic Bottle - Natural (EA010-P) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	14-Jul-2017	✔
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H) MW01,	MW02	13-Jun-2017	----	----	----	22-Jun-2017	20-Jun-2017	✘
Clear Plastic Bottle - Natural (EA015H) MW05,	MW04	14-Jun-2017	----	----	----	22-Jun-2017	21-Jun-2017	✘
Clear Plastic Bottle - Natural (EA015H) MW07, MW03, GW966477	MW08, MW09,	15-Jun-2017	----	----	----	22-Jun-2017	22-Jun-2017	✔



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H) SW01	13-Jun-2017	----	----	----	22-Jun-2017	20-Jun-2017	*
Clear Plastic Bottle - Natural (EA025H) SW13, SW14, SW03, SW02, SW15, SW04	14-Jun-2017	----	----	----	22-Jun-2017	21-Jun-2017	*
Clear Plastic Bottle - Natural (EA025H) SW05	15-Jun-2017	----	----	----	22-Jun-2017	22-Jun-2017	✓
Clear Plastic Bottle - Natural (EA025H) SW09, SW06, SW07, SW08, SW16, SW10, SW11, SW12	16-Jun-2017	----	----	----	23-Jun-2017	23-Jun-2017	✓
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Natural (ED093F) SW13, SW15, SW14,	14-Jun-2017	----	----	----	26-Jun-2017	21-Jun-2017	*
Clear Plastic Bottle - Natural (ED093F) MW07, MW09, MW08,	15-Jun-2017	----	----	----	26-Jun-2017	22-Jun-2017	*
Clear Plastic Bottle - Natural (ED093F) SW09, SW10, SW12, SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	23-Jun-2017	*
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) SW13, SW15, SW14,	14-Jun-2017	----	----	----	22-Jun-2017	28-Jun-2017	✓
Clear Plastic Bottle - Natural (ED037-P) MW07, MW09, MW08,	15-Jun-2017	----	----	----	22-Jun-2017	29-Jun-2017	✓
Clear Plastic Bottle - Natural (ED037-P) SW09, SW10, SW12, SW16, SW11,	16-Jun-2017	----	----	----	22-Jun-2017	30-Jun-2017	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	12-Jul-2017	✔
Clear Plastic Bottle - Natural (ED041G) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	13-Jul-2017	✔
Clear Plastic Bottle - Natural (ED041G) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	14-Jul-2017	✔
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	12-Jul-2017	✔
Clear Plastic Bottle - Natural (ED045G) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	13-Jul-2017	✔
Clear Plastic Bottle - Natural (ED045G) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	14-Jul-2017	✔
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Natural (ED093F) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	21-Jun-2017	✖
Clear Plastic Bottle - Natural (ED093F) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	22-Jun-2017	✖
Clear Plastic Bottle - Natural (ED093F) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	23-Jun-2017	✖



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P) SW13, SW15	SW14,	14-Jun-2017	----	----	----	26-Jun-2017	12-Jul-2017	✓
Clear Plastic Bottle - Natural (EK040P) MW07, MW09	MW08,	15-Jun-2017	----	----	----	26-Jun-2017	13-Jul-2017	✓
Clear Plastic Bottle - Natural (EK040P) SW09, SW10, SW12	SW16, SW11,	16-Jun-2017	----	----	----	26-Jun-2017	14-Jul-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231A: Perfluoroalkyl Sulfonic Acids							
HDPE (no PTFE) (EP231X) MW01, SW01, MW02, RINSATE - TROWEL	13-Jun-2017	----	----	----	26-Jun-2017	10-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW13, MW05, SW14, SW03, MW04, RINSATE_PUMP1 SW02, DUP02, SW15, SW04, TRIP BLANK 02,	14-Jun-2017	----	----	----	26-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) MW07, MW03, SW05, GW966477 MW08, MW09, RINSATE_PUMP2,	15-Jun-2017	----	----	----	26-Jun-2017	12-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW09, SW06, SW07, SW08, DUP04, SW16, SW10, SW11, SW12, RINSATE_TROWEL02	16-Jun-2017	----	----	----	26-Jun-2017	13-Dec-2017	✓
HDPE (no PTFE) (EP231X) SS01, SS03, SS09, SS06, SS08, SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS02, SS04, SS05, SS07, SS10, SS11, SS13, SS15, SS19, SS22, SS21, SS24	26-Jun-2017	----	----	----	28-Jun-2017	23-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231B: Perfluoroalkyl Carboxylic Acids							
HDPE (no PTFE) (EP231X) MW01, SW01, MW02, RINSATE - TROWEL	13-Jun-2017	----	----	----	26-Jun-2017	10-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW13, MW05, SW14, SW03, MW04, RINSATE_PUMP1 SW02, DUP02, SW15, SW04, TRIP BLANK 02,	14-Jun-2017	----	----	----	26-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) MW07, MW03, SW05, GW966477 MW08, MW09, RINSATE_PUMP2,	15-Jun-2017	----	----	----	26-Jun-2017	12-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW09, SW06, SW07, SW08, DUP04, SW16, SW10, SW11, SW12, RINSATE_TROWEL02	16-Jun-2017	----	----	----	26-Jun-2017	13-Dec-2017	✓
HDPE (no PTFE) (EP231X) SS01, SS03, SS09, SS06, SS08, SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS02, SS04, SS05, SS07, SS10, SS11, SS13, SS15, SS19, SS22, SS21, SS24	26-Jun-2017	----	----	----	28-Jun-2017	23-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) MW01, SW01,	MW02, RINSATE - TROWEL	13-Jun-2017	----	----	----	26-Jun-2017	10-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW13, MW05, SW14, SW03, MW04, RINSATE_PUMP1	SW02, DUP02, SW15, SW04, TRIP BLANK 02,	14-Jun-2017	----	----	----	26-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) MW07, MW03, SW05, GW966477	MW08, MW09, RINSATE_PUMP2,	15-Jun-2017	----	----	----	26-Jun-2017	12-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW09, SW06, SW07, SW08, DUP04,	SW16, SW10, SW11, SW12, RINSATE_TROWEL02	16-Jun-2017	----	----	----	26-Jun-2017	13-Dec-2017	✓
HDPE (no PTFE) (EP231X) SS01, SS03, SS09, SS06, SS08, SS18, SS12, SS14, SS20, SS16, SS17, SS23,	SS02, SS04, SS05, SS07, SS10, SS11, SS13, SS15, SS19, SS22, SS21, SS24	26-Jun-2017	----	----	----	28-Jun-2017	23-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231D: (n:2) Fluorotelomer Sulfonic Acids							
HDPE (no PTFE) (EP231X) MW01, SW01, MW02, RINSATE - TROWEL	13-Jun-2017	----	----	----	26-Jun-2017	10-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW13, MW05, SW14, SW03, MW04, RINSATE_PUMP1 SW02, DUP02, SW15, SW04, TRIP BLANK 02,	14-Jun-2017	----	----	----	26-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) MW07, MW03, SW05, GW966477 MW08, MW09, RINSATE_PUMP2,	15-Jun-2017	----	----	----	26-Jun-2017	12-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW09, SW06, SW07, SW08, DUP04, SW16, SW10, SW11, SW12, RINSATE_TROWEL02	16-Jun-2017	----	----	----	26-Jun-2017	13-Dec-2017	✓
HDPE (no PTFE) (EP231X) SS01, SS03, SS09, SS06, SS08, SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS02, SS04, SS05, SS07, SS10, SS11, SS13, SS15, SS19, SS22, SS21, SS24	26-Jun-2017	----	----	----	28-Jun-2017	23-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP231P: PFAS Sums							
HDPE (no PTFE) (EP231X) MW01, SW01, MW02, RINSATE - TROWEL	13-Jun-2017	----	----	----	26-Jun-2017	10-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW13, MW05, SW14, SW03, MW04, RINSATE_PUMP1 SW02, DUP02, SW15, SW04, TRIP BLANK 02,	14-Jun-2017	----	----	----	26-Jun-2017	11-Dec-2017	✓
HDPE (no PTFE) (EP231X) MW07, MW03, SW05, GW966477 MW08, MW09, RINSATE_PUMP2,	15-Jun-2017	----	----	----	26-Jun-2017	12-Dec-2017	✓
HDPE (no PTFE) (EP231X) SW09, SW06, SW07, SW08, DUP04, SW16, SW10, SW11, SW12, RINSATE_TROWEL02	16-Jun-2017	----	----	----	26-Jun-2017	13-Dec-2017	✓
HDPE (no PTFE) (EP231X) SS01, SS03, SS09, SS06, SS08, SS18, SS12, SS14, SS20, SS16, SS17, SS23, SS02, SS04, SS05, SS07, SS10, SS11, SS13, SS15, SS19, SS22, SS21, SS24	26-Jun-2017	----	----	----	28-Jun-2017	23-Dec-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Moisture Content	EA055	6	59	10.17	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	3	26	11.54	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	3	24	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP003	2	24	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	7	64	10.94	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	3	26	11.54	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	9	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	64	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	26	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	9	22.22	10.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	64	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	26	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	4	64	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Organic Carbon	EP003	SOIL	In house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In-House. A portion of soil is extracted with MTBE. The extract is taken to dryness, made up in mobile phase. Analysis is by LC/MSMS, ESI Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM (2013) Schedule B(3)
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ ²⁻ by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ ²⁻ concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003



Analytical Methods	Method	Matrix	Method Descriptions
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

Preparation Methods	Method	Matrix	Method Descriptions
Deionised Water Leach	EN60-D1a	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates
Sample Extraction for PFAS	EP231-PR	SOIL	In house
Dry and Pulverise (up to 100g)	GEO30	SOIL	#

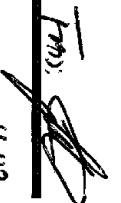
Fadi Soro

Brenda Hong

Monday, 26 June 2017 10:18 AM

Fadi Soro; Samples Sydney

FW: ASLP COC for Lab report

FMS: 
26/6/17
Hw

From: Brenda Hong
Sent: Monday, 26 June 2017 10:18 AM
To: Fadi Soro; Samples Sydney
Subject: FW: ASLP COC for Lab report

Hi Fadi, please rebatch as below using DI WATER. Thanks!

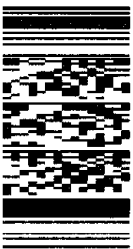
Regards

Brenda Hong
Client Services Co-ordinator, Environmental



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Environmental Division
Sydney
Work Order Reference
ES1715597

EnviroMail™ 113 - Amoeba Confirmation PCR
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EnviroMail™ 113 - Amoeba Confirmation PCR
EnviroMail™ 112 - Algal Capabilities
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From: Nicole Rosen [mailto:Nicole.Rosen@ghd.com]
Sent: Monday, 26 June 2017 9:27 AM
To: ALSEnviro Sydney <ALSEnviro.Sydney@ALSGlobal.com>
Cc: Chloe Leong <Chloe.Leong@ALSGlobal.com>
Subject: ASLP COC for Lab report

Hi,
Can I please schedule in the following samples for ASLP full PFAS suite from Lab report ES1714150

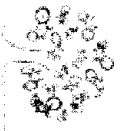
ES1714150001	SB15_0.0-0.1	1
ES1714150002	SB15_1.8-2.0	2
ES1714150003	SB15_2.5-2.7	3
ES1714150005	SB14_0.4-0.5	4
ES1714150007	SB13_0.0-0.1	5
ES1714150009	SB13_1.6-1.9	6
ES1714150015	MW05_0.2-0.3	7
ES1714150097	A01	

5 PFAS - 298

not enough sample volume - Bands 2, 3, 4, 5, 6, 7

Thanks,
Nicole Rosen
Senior Environmental Consultant - Contamination Assessment and Remediation

GHD
T: +61 2 9239 7683 | F: 61 2 9239 7199 | V: 217683 | M: 0421 045 835 | E: nicole.rosen@ghd.com
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CERTIFICATE OF ANALYSIS

Work Order : **ES1715597**
Client : **GHD PTY LTD**
Contact : **MS NICOLE ROSEN**
Address : **LEVEL 15, 133 CASTLEREAGH STREET**
SYDNEY NSW, AUSTRALIA 2000
Telephone : **+61 02 9239 7100**
Project : **212558314**
Order number : **----**
C-O-C number : **----**
Sampler : **JESSE SIMKUS**
Site : **----**
Quote number : **SY/143/17**
No. of samples received : **7**
No. of samples analysed : **7**

Page : 1 of 9
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 26-Jun-2017 11:00
Date Analysis Commenced : 28-Jun-2017
Issue Date : 04-Jul-2017 18:57



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.4-0.5	SB13_0.0-0.1
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715597-001	ES1715597-002	ES1715597-003	ES1715597-004	ES1715597-005	
				Result	Result	Result	Result	Result	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.09	0.02	0.03	0.03	0.03	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	1.53	0.86	0.01	0.01	0.20	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.02	<0.02	<0.02	<0.02	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.12	<0.01	<0.01	<0.01	<0.01	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.04	<0.02	<0.02	<0.02	<0.02	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.10	<0.02	<0.02	<0.02	<0.02	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.4-0.5	SB13_0.0-0.1
Client sampling date / time				29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715597-001	ES1715597-002	ES1715597-003	ES1715597-004	ES1715597-005	
				Result	Result	Result	Result	Result	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	1.88	0.90	0.04	0.04	0.23	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	1.62	0.88	0.04	0.04	0.23	
Sum of PFAS (WA DER List)	----	0.01	µg/L	1.74	0.90	0.04	0.04	0.23	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	98.1	96.1	100	102	100	



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID		SB13_1.6-1.9	MW05_0.2-0.3	----	----	----
Client sampling date / time				29-May-2017 00:00	30-May-2017 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1715597-006	ES1715597-007	-----	-----	-----	-----	-----
				Result	Result	----	----	----	----	----
EP231A: Perfluoroalkyl Sulfonic Acids										
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.02	----	----	----	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.28	----	----	----	----	----
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
EP231B: Perfluoroalkyl Carboxylic Acids										
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	----	----	----	----	----
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	----	----	----	----	----
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	----	----	----	----	----
EP231C: Perfluoroalkyl Sulfonamides										
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	----	----	----	----	----
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	----	----	----	----	----
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	----	----	----	----	----



Analytical Results

Sub-Matrix: DI WATER LEACHATE (Matrix: WATER)				Client sample ID	SB13_1.6-1.9	MW05_0.2-0.3	----	----	----
Client sampling date / time				29-May-2017 00:00	30-May-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1715597-006	ES1715597-007	-----	-----	-----	
				Result	Result	----	----	----	
EP231C: Perfluoroalkyl Sulfonamides - Continued									
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	----	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	----	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	----	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	----	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	----	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	----	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	----	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<0.01	0.30	----	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	0.30	----	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	0.30	----	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	102	96.9	----	----	----	



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	SB15_0.0-0.1	SB15_1.8-2.0	SB15_2.5-2.7	SB14_0.4-0.5	SB13_0.0-0.1
Client sampling date / time			29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00	29-May-2017 00:00
Compound	CAS Number	LOR	Unit	ES1715597-001	ES1715597-002	ES1715597-003	ES1715597-004	ES1715597-005
				Result	Result	Result	Result	Result
EN60: Bottle Leaching Procedure								
Final pH	----	0.1	pH Unit	9.1	9.0	9.2	8.5	8.6



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	SB13_1.6-1.9	MW05_0.2-0.3	----	----	----
Client sampling date / time				29-May-2017 00:00	30-May-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES1715597-006	ES1715597-007	-----	-----	-----	
				Result	Result	----	----	----	
EN60: Bottle Leaching Procedure									
Final pH	----	0.1	pH Unit	9.4	10.0	----	----	----	



Surrogate Control Limits

Sub-Matrix: DI WATER LEACHATE		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	130

QUALITY CONTROL REPORT

Work Order	: ES1715597	Page	: 1 of 7
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Contact	: Customer Services ES
Address	: LEVEL 15, 133 CASTLEREAGH STREET SYDNEY NSW, AUSTRALIA 2000	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9239 7100	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 26-Jun-2017
Order number	: ----	Date Analysis Commenced	: 28-Jun-2017
C-O-C number	: ----	Issue Date	: 04-Jul-2017
Sampler	: JESSE SIMKUS		
Site	: ----		
Quote number	: SY/143/17		
No. of samples received	: 7		
No. of samples analysed	: 7		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 973149)									
EM1708410-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	144	135	5.95	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	2.64	2.54	3.97	0% - 20%
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	2.81	3.00	6.68	0% - 20%
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	33.5	28.0	17.9	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	1.98	1.87	5.81	0% - 20%
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1715597-007	MW05_0.2-0.3	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.28	0.29	0.00	0% - 20%
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	0.02	0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 973149)									
EM1708410-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	2.35	2.30	2.37	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	1.60	1.54	3.50	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	7.62	7.45	2.16	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	1.31	1.32	0.00	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.08	0.08	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.03	0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	1.4	1.2	13.7	0% - 50%
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		ES1715597-007	MW05_0.2-0.3	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 973149) - continued									
ES1715597-007	MW05_0.2-0.3	EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit		
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 973149)									
EM1708410-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.73	0.70	4.35	0% - 20%
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715597-007	MW05_0.2-0.3	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 973149)									
EM1708410-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 973149) - continued									
EM1708410-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1715597-007	MW05_0.2-0.3	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 973149)									
EM1708410-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	200	185	7.81	0% - 20%
ES1715597-007	MW05_0.2-0.3	EP231X: Sum of PFAS	----	0.01	µg/L	0.30	0.31	3.28	0% - 20%



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 973149)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	109	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	115	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	112	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	112	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	108	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	95.0	70	130	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 973149)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	81.6	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	94.0	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	97.0	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	95.2	70	130	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	90.6	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	91.2	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	89.8	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	110	70	130	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	91.2	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	108	70	124	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 973149)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	110	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	118	70	129	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	0.05	µg/L	<0.05	1.25 µg/L	119	70	129	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	108	70	126	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	86.4	70	130	
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	78.4	70	130	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 973149)									
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	93.4	70	130	
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	95.0	70	130	
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	90.0	70	130	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
				Result	Spike	Spike Recovery (%)	Recovery Limits (%)	
					Concentration	LCS	Low	High
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 973149) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	91.0	70	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) Low High	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 973149)							
EM1708410-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	95.0	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	65.8	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 973149)							
EM1708410-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	75.8	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	78.4	50	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	109	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	# Not Determined	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	90.4	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	107	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	82.0	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	127	50	130
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.5 µg/L	79.0	50	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	78.7	50	130		
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 973149)							
EM1708410-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	71.2	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	110	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	121	50	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 973149) - continued							
EM1708410-001	Anonymous	EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	2448-09-7	1.25 µg/L	118	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	99.8	50	130
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	71.4	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	73.6	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 973149)							
EM1708410-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	85.4	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	93.8	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	127	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	88.2	50	130



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1715597	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE ROSEN	Telephone	: +61-2-8784 8555
Project	: 212558314	Date Samples Received	: 26-Jun-2017
Site	: ----	Issue Date	: 04-Jul-2017
Sampler	: JESSE SIMKUS	No. of samples received	: 7
Order number	: ----	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	EM1708410--001	Anonymous	Perfluorobutane sulfonic acid (PFBS)	375-73-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM1708410--001	Anonymous	Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM1708410--001	Anonymous	Perfluorohexane sulfonic acid (PFHxS)	355-46-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231A: Perfluoroalkyl Sulfonic Acids	EM1708410--001	Anonymous	Perfluorooctane sulfonic acid (PFOS)	1763-23-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231B: Perfluoroalkyl Carboxylic Acids	EM1708410--001	Anonymous	Perfluorohexanoic acid (PFHxA)	307-24-4	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP231B: Perfluoroalkyl Carboxylic Acids	EM1708410--001	Anonymous	Perfluorooctanoic acid (PFOA)	335-67-1	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EN60: Bottle Leaching Procedure							
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-D1a)							
SB15_0.0-0.1, SB15_1.8-2.0,	29-May-2017	28-Jun-2017	25-Nov-2017	✓	----	----	----
SB15_2.5-2.7, SB14_0.4-0.5,							
SB13_0.0-0.1, SB13_1.6-1.9							
Non-Volatile Leach: 180 day HT (e.g. metals ex.Hg) (EN60-D1a)							
MW05_0.2-0.3	30-May-2017	28-Jun-2017	26-Nov-2017	✓	----	----	----

Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.



Matrix: WATER Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB13_0.0-0.1, MW05_0.2-0.3	SB15_1.8-2.0, SB14_0.4-0.5, SB13_1.6-1.9	28-Jun-2017	----	----	----	03-Jul-2017	25-Dec-2017	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB13_0.0-0.1, MW05_0.2-0.3	SB15_1.8-2.0, SB14_0.4-0.5, SB13_1.6-1.9	28-Jun-2017	----	----	----	03-Jul-2017	25-Dec-2017	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB13_0.0-0.1, MW05_0.2-0.3	SB15_1.8-2.0, SB14_0.4-0.5, SB13_1.6-1.9	28-Jun-2017	----	----	----	03-Jul-2017	25-Dec-2017	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB13_0.0-0.1, MW05_0.2-0.3	SB15_1.8-2.0, SB14_0.4-0.5, SB13_1.6-1.9	28-Jun-2017	----	----	----	03-Jul-2017	25-Dec-2017	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) SB15_0.0-0.1, SB15_2.5-2.7, SB13_0.0-0.1, MW05_0.2-0.3	SB15_1.8-2.0, SB14_0.4-0.5, SB13_1.6-1.9	28-Jun-2017	----	----	----	03-Jul-2017	25-Dec-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	SOIL	In house: Direct injection analysis of fresh waters after dilution (1:1) with methanol. Analysis by LC-Electrospray-MS-MS, Negative Mode using MRM. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers.

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Deionised Water Leach	EN60-D1a	SOIL	In house QWI-EN/60 referenced to AS4439.3 Preparation of Leachates



CHAIN OF CUSTODY

ALS Laboratory please tick →

549869

mat

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: 15 C

CLIENT: GHD

PROJECT: Sydney

ORDER NUMBER: 212558314

PROJECT MANAGER: Nicole Rosin / Ben Anderson

SAMPLER: Jesse Simkus

Are samples emailed to ALS? (YES / NO)

Mail Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com

Mail Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM

TURNAROUND REQUIREMENTS

(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

Standard TAT (List due date):

Non Standard or urgent TAT (List due date):

ALS QUOTE NO.:

SY-143-17

COC SEQUENCE NUMBER (Circle)

COC 1 2 3 4 5 6 7
or 1 2 3 4 5 6 7

RECEIVED BY:

FMSI

DATE/TIME

7/16/17 2pm

RELINQUISHED BY:

DATE/TIME

RECEIVED BY: Moser

DATE/TIME

13/6/17 1:15 PM

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE

LAB ID

SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)

DATE / TIME

MATRIX

TYPE & PRESERVATIVE codes below

refer to

TOTAL CONTAINERS

ANALYSIS REQUIRED including SUITES (NB Suite Codes must be listed to attract suite price) Where Metals are required: Specif / Total (unfiltered bottle required) or Dissolved (field filtered bottle required)

PFAS Full Suite TOC HOLD. PH, silica aluminium

Comments on likely contaminant levels, dilutions of samples requiring specific QC analysis etc

Table with columns: LAB ID, SAMPLE ID, DATE / TIME, MATRIX, TYPE & PRESERVATIVE, TOTAL CONTAINERS, PFAS Full Suite, TOC, HOLD., PH, silica, aluminium. Includes handwritten entries for samples FDO2, FDO3, FDO4, FDO5, FRO1, MW06-07-0.7, MW06-13.2-14.2, MW05-00-01, MW05-02-03, MW05-05-0.6, MW05-07-1.0, MW05-1.7-1.8.

Water Container Codes: P = Unpreserved Plastic, N = Nitric Preserved Plastic, OPC = Nitric Preserved Plastic, S = Sodium Hydroxide Cd Preserved Plastic, AG = Amber Glass, Inpreserved Plastic, AP = Airtight Unpreserved Plastic, VOA Vial HCl Preserved, VOA Vial Sodium Bisphate Preserved, VS = VOA Vial Sulphur Preserved, A = Airtight Unpreserved Via SG, Sulphur Preserved Amber Glass, HCl preserved Plastic, HS = HC preserved Speciation bottle, SP = Sulphur Preserved Plastic, F = Formaldehyde Preserved Glass

Z = Zinc Acetate Preserved Bottle, F = EDTA Preserved Bottle, SF = Sterile Bottle, AS5 = Plastic Bag for Lead Sulphate Sol, B = Unpreserved Bag

EST 7/1

41500

3

Sample Receipt Advice

Company name: **GHD Pty Ltd NSW**
Contact name: **Jesse Simkus**
Project name: **SOIL ANALYSIS**
Project ID: **212558314**
COC number: **Not provided**
Turn around time: **5 Day**
Date/Time received: **Jun 13, 2017 1:15 PM**
Eurofins | mgt reference: **549869**

Sample information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table.
 - Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 15 degrees Celsius.
 - All samples have been received as described on the above COC.
 - COC has been completed correctly.
 - Attempt to chill was evident.
 - Appropriately preserved sample containers have been used.
 - All samples were received in good condition.
 - Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
 - Appropriate sample containers have been used.
 - Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Jesse Simkus - Jesse.Simkus@ghd.com.

GHD Pty Ltd NSW
 Level 15, 133 Castlereagh Street
 Sydney
 NSW 2000



NATA Accredited
 Accreditation Number 1261
 Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards.

Attention: **Jesse Simkus**

Report **549869-S**
 Project name SOIL ANALYSIS
 Project ID 212558314
 Received Date Jun 13, 2017

Client Sample ID			FD02
Sample Matrix			Soil
Eurofins mgt Sample No.			S17-Jn10711
Date Sampled			May 29, 2017
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)	5	ug/kg	< 5
Perfluoropentanoic acid (PFPeA)	5	ug/kg	< 5
Perfluorohexanoic acid (PFHxA)	5	ug/kg	< 5
Perfluoroheptanoic acid (PFHpA)	5	ug/kg	< 5
Perfluorooctanoic acid (PFOA)	5	ug/kg	< 5
Perfluorononanoic acid (PFNA)	5	ug/kg	< 5
Perfluorodecanoic acid (PFDA)	5	ug/kg	< 5
Perfluoroundecanoic acid (PFUnA)	5	ug/kg	< 5
Perfluorododecanoic acid (PFDoA)	5	ug/kg	< 5
Perfluorotridecanoic acid (PFTTrDA)	5	ug/kg	< 5
Perfluorotetradecanoic acid (PFTeDA)	5	ug/kg	< 5
13C4-PFBA (surr.)	1	%	151
13C5-PFPeA (surr.)	1	%	132
13C5-PFHxA (surr.)	1	%	130
13C4-PFHpA (surr.)	1	%	120
13C8-PFOA (surr.)	1	%	121
13C5-PFNA (surr.)	1	%	113
13C6-PFDA (surr.)	1	%	162
13C2-PFUnDA (surr.)	1	%	133
13C2-PFDoDA (surr.)	1	%	179
13C2-PFTeDA (surr.)	1	%	145
Perfluoroalkane sulfonamides (PFASAs)			
Perfluorooctane sulfonamide (FOSA)	5	ug/kg	< 5
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	5	ug/kg	< 5
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	5	ug/kg	< 5
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	5	ug/kg	< 5
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	5	ug/kg	< 5
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	10	ug/kg	< 10
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	10	ug/kg	< 10
13C8-FOSA (surr.)	1	%	118
D3-N-MeFOSA (surr.)	1	%	106
D5-N-EtFOSA (surr.)	1	%	133
D7-N-MeFOSE (surr.)	1	%	77

Client Sample ID			FD02
Sample Matrix			Soil
Eurofins mgt Sample No.			S17-Jn10711
Date Sampled			May 29, 2017
Test/Reference	LOR	Unit	
Perfluoroalkane sulfonamides (PFASAs)			
D9-N-EtFOSE (surr.)	1	%	97
D5-N-EtFOSAA (surr.)	1	%	190
D3-N-MeFOSAA (surr.)	1	%	221
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAAs)			
Perfluorobutanesulfonic acid (PFBS)	5	ug/kg	< 5
Perfluoropentanesulfonic acid (PFPeS)	5	ug/kg	< 5
Perfluorohexanesulfonic acid (PFHxS)	5	ug/kg	< 5
Perfluoroheptanesulfonic acid (PFHpS)	5	ug/kg	< 5
Perfluorooctanesulfonic acid (PFOS) ^{N11}	5	ug/kg	< 5
Perfluorodecanesulfonic acid (PFDS)	5	ug/kg	< 5
13C3-PFBS (surr.)	1	%	118
18O2-PFHxS (surr.)	1	%	114
13C8-PFOS (surr.)	1	%	84
n:2 Fluorotelomer sulfonic acids			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	5	ug/kg	< 5
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	10	ug/kg	< 10
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	5	ug/kg	< 5
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	5	ug/kg	< 5
13C2-4:2 FTS (surr.)	1	%	123
13C2-6:2 FTS (surr.)	1	%	134
13C2-8:2 FTS (surr.)	1	%	INT
% Moisture			
	1	%	19

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluorinated Alkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 20, 2017	180 Day
Perfluoroalkane sulfonamides (PFASAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 20, 2017	180 Day
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 20, 2017	180 Day
n:2 Fluorotelomer sulfonic acids - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 20, 2017	180 Day
% Moisture - Method: LTM-GEN-7080 Moisture	Brisbane	Jun 13, 2017	14 Day

Company Name: GHD Pty Ltd NSW	Order No.:	Received: Jun 13, 2017 1:15 PM
Address: Level 15, 133 Castlereagh Street Sydney NSW 2000	Report #: 549869	Due: Jun 20, 2017
	Phone: 02 9239 7100	Priority: 5 Day
	Fax: 02 9239 7199	Contact Name: Jesse Simkus
Project Name: SOIL ANALYSIS		
Project ID: 212558314		

Eurofins | mgt Analytical Services Manager : Nibha Vaidya

Sample Detail						Moisture Set	Per- and Polyfluorinated Alkyl Substances (PFASs)
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217							
Brisbane Laboratory - NATA Site # 20794						X	X
Perth Laboratory - NATA Site # 18217							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	FD02	May 29, 2017		Soil	S17-Jn10711	X	X
Test Counts						1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)	ug/kg	< 5		5	Pass	
Perfluoropentanoic acid (PFPeA)	ug/kg	< 5		5	Pass	
Perfluorohexanoic acid (PFHxA)	ug/kg	< 5		5	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/kg	< 5		5	Pass	
Perfluorooctanoic acid (PFOA)	ug/kg	< 5		5	Pass	
Perfluorononanoic acid (PFNA)	ug/kg	< 5		5	Pass	
Perfluorodecanoic acid (PFDA)	ug/kg	< 5		5	Pass	
Perfluoroundecanoic acid (PFUnA)	ug/kg	< 5		5	Pass	
Perfluorododecanoic acid (PFDoA)	ug/kg	< 5		5	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/kg	< 5		5	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/kg	< 5		5	Pass	
Method Blank						
Perfluoroalkane sulfonamides (PFASAs)						
Perfluorooctane sulfonamide (FOSA)	ug/kg	< 5		5	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/kg	< 5		5	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/kg	< 5		5	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/kg	< 5		5	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/kg	< 5		5	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/kg	< 10		10	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/kg	< 10		10	Pass	
Method Blank						
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFASs)						
Perfluorobutanesulfonic acid (PFBS)	ug/kg	< 5		5	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/kg	< 5		5	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/kg	< 5		5	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/kg	< 5		5	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/kg	< 5		5	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/kg	< 5		5	Pass	
Method Blank						
n:2 Fluorotelomer sulfonic acids						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	ug/kg	< 5		5	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	ug/kg	< 10		10	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	ug/kg	< 5		5	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	ug/kg	< 5		5	Pass	
LCS - % Recovery						
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)	%	115		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	108		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	122		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	120		50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	117		50-150	Pass	
Perfluorononanoic acid (PFNA)	%	122		50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	120		50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	%	113		50-150	Pass	
Perfluorododecanoic acid (PFDoA)	%	117		50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	124		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	111		50-150	Pass	
LCS - % Recovery						
Perfluoroalkane sulfonamides (PFASAs)						

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
Perfluorooctane sulfonamide (FOSA)	%	117			50-150	Pass		
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	109			50-150	Pass		
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	114			50-150	Pass		
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	92			50-150	Pass		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	113			50-150	Pass		
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	125			50-150	Pass		
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	123			50-150	Pass		
LCS - % Recovery								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAs)								
Perfluorobutanesulfonic acid (PFBS)	%	102			50-150	Pass		
Perfluoropentanesulfonic acid (PFPeS)	%	109			50-150	Pass		
Perfluorohexanesulfonic acid (PFHxS)	%	116			50-150	Pass		
Perfluoroheptanesulfonic acid (PFHpS)	%	99			50-150	Pass		
Perfluorooctanesulfonic acid (PFOS)	%	111			50-150	Pass		
Perfluorodecanesulfonic acid (PFDS)	%	93			50-150	Pass		
LCS - % Recovery								
n:2 Fluorotelomer sulfonic acids								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	%	113			50-150	Pass		
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	%	114			50-150	Pass		
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	%	112			50-150	Pass		
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	%	128			50-150	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)								
				Result 1				
Perfluorobutanoic acid (PFBA)	M17-Jn11159	NCP	%	122		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M17-Jn11159	NCP	%	111		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M17-Jn11159	NCP	%	115		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M17-Jn11159	NCP	%	116		50-150	Pass	
Perfluorooctanoic acid (PFOA)	M17-Jn11159	NCP	%	109		50-150	Pass	
Perfluorononanoic acid (PFNA)	M17-Jn11159	NCP	%	114		50-150	Pass	
Perfluorodecanoic acid (PFDA)	M17-Jn11159	NCP	%	110		50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	M17-Jn11159	NCP	%	103		50-150	Pass	
Perfluorododecanoic acid (PFDoA)	M17-Jn11159	NCP	%	118		50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	M17-Jn11159	NCP	%	111		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M17-Jn11159	NCP	%	112		50-150	Pass	
Spike - % Recovery								
Perfluoroalkane sulfonamides (PFASAs)								
				Result 1				
Perfluorooctane sulfonamide (FOSA)	M17-Jn11159	NCP	%	108		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M17-Jn11159	NCP	%	113		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M17-Jn11159	NCP	%	114		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M17-Jn11159	NCP	%	97		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M17-Jn11159	NCP	%	124		50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M17-Jn11159	NCP	%	98		50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M17-Jn11159	NCP	%	115		50-150	Pass	
Spike - % Recovery								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAs)								
				Result 1				

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorobutanesulfonic acid (PFBS)	M17-Jn11159	NCP	%	97			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M17-Jn11159	NCP	%	119			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M17-Jn11159	NCP	%	112			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M17-Jn11159	NCP	%	129			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M17-Jn11159	NCP	%	118			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M17-Jn11159	NCP	%	121			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	M17-Jn11159	NCP	%	104			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	M17-Jn11159	NCP	%	100			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	M17-Jn11159	NCP	%	108			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	M17-Jn11159	NCP	%	130			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorododecanoic acid (PFDoA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
Perfluoroalkane sulfonamides (PFASAs)				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	B17-Jn11030	NCP	ug/kg	< 10	< 10	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	B17-Jn11030	NCP	ug/kg	< 10	< 10	<1	30%	Pass	

Duplicate								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	B17-Jn11030	NCP	ug/kg	< 10	< 10	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	B17-Jn11030	NCP	ug/kg	< 5	< 5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	M17-My13471	NCP	%	19	21	7.0	30%	Pass

Comments

Some surrogate recoveries were recorded in excess of the QC limit designated in QSM 5.1 of 50-150%. Since no positive results were reported for any PFAS compounds for any of the Samples in this case no data was affected.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds. Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).

Authorised By

Nibha Vaidya	Analytical Services Manager
Bryan Wilson	Senior Analyst-Metal (QLD)
Jonathon Angell	Senior Analyst-Inorganic (QLD)
Jonathon Angell	Senior Analyst-Organic (QLD)



Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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MAT


551367



CHAIN OF CUSTODY

ALS Laboratory
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CLIENT: GHD	TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY (U.S. ONLY) RECEIVED BY: _____ DATE/TIME: _____
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: 212558314	ALS QUOTE NO.: SY-143-17	COC SEQUENCE NUMBER (Circle) COC: ① 2 3 4 5 6 7 OP: 1 2 3 4 ⑤ 6 7
ORDER NUMBER:	PROJECT MANAGER: Nicole Rosen / Ben Anderson	CONTACT PH: 0421 045 835 / 0408 713 343
SAMPLER: Jesse Simkus	SAMPLER MOBILE: 0404 542 354	RELINQUISHED BY: <i>Stephanie Marth</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESdat	RECEIVED BY: <i>Stephanie Marth</i>
Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com		DATE/TIME: 19/6/17 11:00
Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM		DATE/TIME: 20/6/17 1410
COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: <i>please send Dupo to Eurofins.</i>		

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	PFAS	TDS	Alkalinity	TOC	ASLP-PAS	TSS	Additional information
1	MW01	13/6/17	W	P		2	X	X					Environmental Division Sydney Work Order Reference ES1715278  Telephone - 61-2-8784 8555 *Please send to Eurofins
2	MW02		W	P		2	X	X					
3	SW01		W	P		2	X					X	
4	SS01		S	P		2	X			X	X		
5	SS02		S	P		2	X			X	X		
-	<u>Dupo</u>		W	P		2	X						
6	Rinsate - Trowel	13/6/17	W	P		1	X						
7	SS03	14/6/17	S	P		2	X			X	X		
8	SS04		S	P		2	X			X	X		
9	SW13		W	P		2	X		X				
10	SW02		W	P		2	X						
11	MW05		W	P		2	X	X					
TOTAL													

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Beaker for Acid Sulphate Soil; B = Unpreserved Beaker.

Handwritten notes:
 Dupo / Split WO
 X / Analysis: Eurofins / Dupo
 X / Release: By / Date: Brisbane / 14/6/17
 Relinquished By / Date: *(Signature) 19/6/17*
 Location / Courier: *(Signature) 19/6/17*



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ALS Laboratory
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):	COC SEQUENCE NUMBER (Circle) coc: 1 2 3 4 5 6 7 of: 1 2 3 4 5 6 7
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Chemical) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: 212558314	ALS QUOTE NO.: SY-143-17	
ORDER NUMBER:		
PROJECT MANAGER: Nicole Rosen / Ben Anderson	CONTACT PH: 0421 045 835 / 0408 713 343	
SAMPLER: Jesse Simkus	SAMPLER MOBILE: 0404 542 354	RELINQUISHED BY: Stephanie Marth
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESdat	RECEIVED BY: SoSteph
Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com		DATE/TIME: 19/6/17 11:00
Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM		DATE/TIME: 20/6/17 14:10

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below (refer to)	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information			
						PFAS	TDS	Alkalinity	TOC	ASLP-PFAS	TSS					
12	DUP02	14/6/17	W	P	1	X										
13	SS09	↓	S	↓	2	X				X	X					
14	SW14		B		2	X			X			X				
15	SS05		S		2	X				X	X					
16	SW15		W		2	X			X				X			
17	SS06		S		2	X				X	X					
18	SS07		S		2	X				X	X					
19	SS08		S		2	X				X	X					
20	SW03		W		2	X							X			
21	SW04		W		2	X							X			
22	DUP03		S		1	X										
23	MW04	↓	W	↓	2	X	X									
TOTAL																

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Boils; B = Unpreserved Bag.



CHAIN OF CUSTODY

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CLIENT: GHD	TURNAROUND REQUIREMENTS: <input checked="" type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: 212558314	ALS QUOTE NO.: SY-143-17	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:		
PROJECT MANAGER: Nicole Rosen / Ben Anderson	CONTACT PH: 0421 045 835 / 0408 713 343	
SAMPLER: Jesse Simkus	SAMPLER MOBILE: 0404 542 354	RELINQUISHED BY: <i>Stephanie Martha</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESdat	RECEIVED BY: <i>Susanne</i>
Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com		DATE/TIME: <i>19/6/17 11:00</i>
Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM		DATE/TIME: <i>20/6/17 1410</i>

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).						Additional Information	
						PFAS	TDS	Alkalinity	TOC	ASLR-PFAS	TSS		
24	Trip Blank 01	14/6/17	S	P	1	X							
25	Trip Blank 02		W		1	X							
26	Rinsate pump 1		W		1	X							
27	MW07	15/6/17	W		2	X	X	X					
28	MW08		W		2	X	X	X					
29	MW03		W		2	X	X						
30	MW09		W		2	X	X	X					
31	SW05		W		2	X						X	
32	SS10		S		2	X			X	X			
33	Rinsate pump 2	15/6/17	W		1	X							
34	SW09	16/6/17	W		2	X		X				X	
35	SW16	16/6/17	W		2	X		X				X	
TOTAL													

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.



CHAIN OF CUSTODY

ALS Laboratory
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):	FOR LABORATORY USE ONLY
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: 212558314	ALS QUOTE NO.: SY-143-17	COC SEQUENCE NUMBER (Circle)
ORDER NUMBER:		COC: 1 2 3 4 5 6 7
PROJECT MANAGER: Nicole Rosen / Ben Anderson	CONTACT PH: 0421 045 835 / 0408 713 343	OF: 1 2 3 4 5 6 7
SAMPLER: Jesse Simkus	SAMPLER MOBILE: 0404 542 354	RELINQUISHED BY: Stephanie marth
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESdat	RECEIVED BY: <i>50/5/17</i>
Email Reports to (will default to PM if no other addresses are listed): jesse.simkus@ghd.com		DATE/TIME: 19/6/17 15:00
Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM		RECEIVED BY: <i>20/6/17</i>
		DATE/TIME: 20/6/17 14:10

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below	(refer to)	TOTAL CONTAINERS	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).					Additional Information	
							PFAS	TDS	Alkalinity	TOC	ASL P-PFAS		TSS
36	SW06	16/6/17	W	P		2	X						
37	SW10		W			2	X		X				
38	SW07		W			2	X						
39	SW11		W			2	X		X				
40	SW08		W			2	X						
41	SW12		W			2	X		X				
42	SS18		S			2	X			X	X		
43	SS11		S			2	X			X	X		
44	SS12		S			2	X			X	X		
45	SS13		S			2	X			X	X		
46	SS14		S			2	X			X	X		
47	SS15		S			2	X			X	X		
TOTAL													

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 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bottle for Acid Sulphate Solts; B = Unpreserved Bag.



CHAIN OF CUSTODY

ALS Laboratory
please tick →

CLIENT: GHD	TURNAROUND REQUIREMENTS : <input checked="" type="checkbox"/> Standard TAT (List due date):	FOR LABS TO USE ONLY (8/1/17) Client Name: _____ Project Name: _____ Sample ID: _____ Date: _____
OFFICE: Sydney	(Standard TAT may be longer for some tests e.g. <input type="checkbox"/> Non Standard or urgent TAT (List due date):	
PROJECT: 212558314	ALS QUOTE NO.: SY-143-17	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7 OF: 1 2 3 4 5 6 7
ORDER NUMBER:	PROJECT MANAGER: Nicole Rosen / Ben Anderson	CONTACT PH: 0421 045 835 / 0408 713 343
SAMPLER: Jesse Simkus	SAMPLER MOBILE: 0404 542 354	RELINQUISHED BY: <i>Stephanie Martin</i>
COC emailed to ALS? (YES / NO)	EDD FORMAT (or default): ESdat	RECEIVED BY: <i>Sebastian</i>
Email Reports to (will default to PM if no other addresses are listed): Jesse.simkus@ghd.com	DATE/TIME: 19/6/17 11:00	DATE/TIME: 20/6/17 14:10
Email Invoice to (will default to PM if no other addresses are listed): FSS-AP@GHD.COM		

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

LAB ID	SAMPLE DETAILS		MATRIX	CONTAINER INFORMATION		ANALYSIS REQUIRED Including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).							Additional Information	
	SAMPLE ID	DATE / TIME		TYPE & PRESERVATIVE <i>codes below</i>	(refer to)	TOTAL CONTAINERS	PFAS	TDS	Alkalinity	TOC	ASLP-PFAS	TSS		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
48	SS20	16/6/17	S	P		2	X				X	X		
49	SS19	↓	S	↓		2	X				X	X		
50	SS16		S		2	X			X	X				
51	SS22		S		2	X			X	X				
52	SS17		S		2	X			X	X				
53	SS21		S		2	X			X	X				
54	SS23		S		2	X			X	X				
55	SS24		S		2	X			X	X				
56	DUP04		W		2	X								
57	Rin Sale trowel 02		W		1	X								
TOTAL														

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 V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulfate Soils; B = Unpreserved Bag.

Sample Receipt Advice

Company name: **GHD Pty Ltd NSW**
Contact name: **Nicole Rosen**
Project ID: **212558314**
COC number: **Not provided**
Turn around time: **5 Day**
Date/Time received: **Jun 23, 2017 11:30 AM**
Eurofins | mgt reference: **551367**

Sample information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table.
 - Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 14.8 degrees Celsius.
 - All samples have been received as described on the above COC.
 - COC has been completed correctly.
 - Attempt to chill was evident.
 - Appropriately preserved sample containers have been used.
 - All samples were received in good condition.
 - Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
 - Appropriate sample containers have been used.
 - Sample containers for volatile analysis received with zero headspace.
 - Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Nibha Vaidya on Phone : +61 (2) 9900 8400 or by e.mail: NibhaVaidya@eurofins.com

Results will be delivered electronically via e.mail to Nicole Rosen - nicole.rosen@ghd.com.

GHD Pty Ltd NSW
 Level 15, 133 Castlereagh Street
 Sydney
 NSW 2000



NATA Accredited
 Accreditation Number 1261
 Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards.

Attention: **Jesse Simkus**

Report **551367-W**
 Project name
 Project ID 212558314
 Received Date Jun 23, 2017

Client Sample ID			DUP01
Sample Matrix			Water
Eurofins mgt Sample No.			S17-Jn23251
Date Sampled			Jun 13, 2017
Test/Reference	LOR	Unit	
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA)	0.05	ug/L	0.12
Perfluoropentanoic acid (PFPeA)	0.01	ug/L	0.41
Perfluorohexanoic acid (PFHxA)	0.01	ug/L	^{N09} 0.38
Perfluoroheptanoic acid (PFHpA)	0.01	ug/L	^{N09} 0.05
Perfluorooctanoic acid (PFOA)	0.01	ug/L	^{N09} 0.03
Perfluorononanoic acid (PFNA)	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA)	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnA)	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoA)	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTTrDA)	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA)	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	78
13C5-PFPeA (surr.)	1	%	77
13C5-PFHxA (surr.)	1	%	84
13C4-PFHpA (surr.)	1	%	80
13C8-PFOA (surr.)	1	%	84
13C5-PFNA (surr.)	1	%	79
13C6-PFDA (surr.)	1	%	60
13C2-PFUnDA (surr.)	1	%	54
13C2-PFDoDA (surr.)	1	%	48
13C2-PFTeDA (surr.)	1	%	33
Perfluoroalkane sulfonamides (PFASAs)			
Perfluorooctane sulfonamide (FOSA)	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	50
D3-N-MeFOSA (surr.)	1	%	30
D5-N-EtFOSA (surr.)	1	%	26
D7-N-MeFOSE (surr.)	1	%	27

Client Sample ID			DUP01
Sample Matrix			Water
Eurofins mgt Sample No.			S17-Jn23251
Date Sampled			Jun 13, 2017
Test/Reference	LOR	Unit	
Perfluoroalkane sulfonamides (PFASAs)			
D9-N-EtFOSE (surr.)	1	%	26
D5-N-EtFOSAA (surr.)	1	%	50
D3-N-MeFOSAA (surr.)	1	%	55
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAAs)			
Perfluorobutanesulfonic acid (PFBS)	0.01	ug/L	0.20
Perfluoropentanesulfonic acid (PFPeS)	0.01	ug/L	^{N09} 0.13
Perfluorohexanesulfonic acid (PFHxS)	0.01	ug/L	^{N09} 0.21
Perfluoroheptanesulfonic acid (PFHpS)	0.01	ug/L	^{N09} 0.02
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.23
Perfluorodecanesulfonic acid (PFDS)	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	87
18O2-PFHxS (surr.)	1	%	88
13C8-PFOS (surr.)	1	%	71
n:2 Fluorotelomer sulfonic acids			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	0.05	ug/L	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	0.01	ug/L	< 0.01
13C2-4:2 FTS (surr.)	1	%	74
13C2-6:2 FTS (surr.)	1	%	72
13C2-8:2 FTS (surr.)	1	%	55

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluorinated Alkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 30, 2017	14 Day
Perfluoroalkane sulfonamides (PFASAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 30, 2017	14 Day
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 30, 2017	14 Day
n:2 Fluorotelomer sulfonic acids - Method: LTM-ORG-2100 Per- and Polyfluorinated Alkyl Substances by LC-MS/MS	Brisbane	Jun 30, 2017	14 Day

Company Name: GHD Pty Ltd NSW Address: Level 15, 133 Castlereagh Street Sydney NSW 2000 Project Name: Project ID: 212558314	Order No.: Report #: 551367 Phone: 02 9239 7100 Fax: 02 9239 7199	Received: Jun 23, 2017 11:30 AM Due: Jun 30, 2017 Priority: 5 Day Contact Name: Jesse Simkus
Eurofins mgt Analytical Services Manager : Nibha Vaidya		

Sample Detail						Per- and Polyfluorinated Alkyl Substances (PFASs)
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217						
Brisbane Laboratory - NATA Site # 20794						X
Perth Laboratory - NATA Site # 18217						
External Laboratory						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	DUP01	Jun 13, 2017		Water	S17-Jn23251	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. All biota results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 50-150%-Phenols & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05		0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01		0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01		0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01		0.01	Pass	
Perfluorooctanoic acid (PFOA)	ug/L	< 0.01		0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01		0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01		0.01	Pass	
Perfluoroundecanoic acid (PFUnA)	ug/L	< 0.01		0.01	Pass	
Perfluorododecanoic acid (PFDoA)	ug/L	< 0.01		0.01	Pass	
Perfluorotridecanoic acid (PFTTrDA)	ug/L	< 0.01		0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01		0.01	Pass	
Method Blank						
Perfluoroalkane sulfonamides (PFASAs)						
Perfluorooctane sulfonamide (FOSA)	ug/L	< 0.05		0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05		0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05		0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05		0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05		0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05		0.05	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05		0.05	Pass	
Method Blank						
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFASs)						
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01		0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01		0.01	Pass	
Perfluorohexanesulfonic acid (PFHxS)	ug/L	< 0.01		0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01		0.01	Pass	
Perfluorooctanesulfonic acid (PFOS)	ug/L	< 0.01		0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01		0.01	Pass	
Method Blank						
n:2 Fluorotelomer sulfonic acids						
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	ug/L	< 0.01		0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	ug/L	< 0.05		0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	ug/L	< 0.01		0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	ug/L	< 0.01		0.01	Pass	
LCS - % Recovery						
Perfluoroalkyl carboxylic acids (PFCAs)						
Perfluorobutanoic acid (PFBA)	%	88		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	82		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	88		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	90		50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	90		50-150	Pass	
Perfluorononanoic acid (PFNA)	%	91		50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	91		50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	%	83		50-150	Pass	
Perfluorododecanoic acid (PFDoA)	%	88		50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	%	52		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	89		50-150	Pass	
LCS - % Recovery						
Perfluoroalkane sulfonamides (PFASAs)						

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
Perfluorooctane sulfonamide (FOSA)	%	81			50-150	Pass		
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	88			50-150	Pass		
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	84			50-150	Pass		
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	73			50-150	Pass		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	88			50-150	Pass		
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	92			50-150	Pass		
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	81			50-150	Pass		
LCS - % Recovery								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSA's)								
Perfluorobutanesulfonic acid (PFBS)	%	84			50-150	Pass		
Perfluoropentanesulfonic acid (PFPeS)	%	94			50-150	Pass		
Perfluorohexanesulfonic acid (PFHxS)	%	80			50-150	Pass		
Perfluoroheptanesulfonic acid (PFHpS)	%	88			50-150	Pass		
Perfluorooctanesulfonic acid (PFOS)	%	79			50-150	Pass		
Perfluorodecanesulfonic acid (PFDS)	%	111			50-150	Pass		
LCS - % Recovery								
n:2 Fluorotelomer sulfonic acids								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	%	78			50-150	Pass		
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	%	81			50-150	Pass		
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	%	75			50-150	Pass		
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	%	104			50-150	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)								
Perfluorobutanoic acid (PFBA)	M17-Jn23195	NCP	%	100		50-150	Pass	
Perfluoropentanoic acid (PFPeA)	M17-Jn23195	NCP	%	107		50-150	Pass	
Perfluorohexanoic acid (PFHxA)	M17-Jn23195	NCP	%	106		50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	M17-Jn23195	NCP	%	104		50-150	Pass	
Perfluorooctanoic acid (PFOA)	M17-Jn23195	NCP	%	103		50-150	Pass	
Perfluorononanoic acid (PFNA)	M17-Jn23195	NCP	%	103		50-150	Pass	
Perfluorodecanoic acid (PFDA)	M17-Jn23195	NCP	%	104		50-150	Pass	
Perfluoroundecanoic acid (PFUnA)	M17-Jn23195	NCP	%	95		50-150	Pass	
Perfluorododecanoic acid (PFDoA)	M17-Jn23195	NCP	%	103		50-150	Pass	
Perfluorotridecanoic acid (PFTTrDA)	M17-Jn23195	NCP	%	78		50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M17-Jn23195	NCP	%	105		50-150	Pass	
Spike - % Recovery								
Perfluoroalkane sulfonamides (PFASAs)								
Perfluorooctane sulfonamide (FOSA)	M17-Jn23195	NCP	%	102		50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M17-Jn23195	NCP	%	110		50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M17-Jn23195	NCP	%	108		50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M17-Jn23195	NCP	%	122		50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M17-Jn23195	NCP	%	101		50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M17-Jn23195	NCP	%	107		50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M17-Jn23195	NCP	%	109		50-150	Pass	
Spike - % Recovery								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSA's)								
				Result 1				

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorobutanesulfonic acid (PFBS)	M17-Jn23195	NCP	%	101			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	M17-Jn23195	NCP	%	119			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	M17-Jn23195	NCP	%	102			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	M17-Jn23195	NCP	%	110			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)	M17-Jn23195	NCP	%	101			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	M17-Jn23195	NCP	%	111			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	M17-Jn23195	NCP	%	105			50-150	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	M17-Jn23195	NCP	%	92			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	M17-Jn23195	NCP	%	99			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	M17-Jn23195	NCP	%	87			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD			
Perfluorobutanoic acid (PFBA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
Perfluoropentanoic acid (PFPeA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorohexanoic acid (PFHxA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroheptanoic acid (PFHpA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorooctanoic acid (PFOA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorononanoic acid (PFNA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorodecanoic acid (PFDA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluoroundecanoic acid (PFUnA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorododecanoic acid (PFDoA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotridecanoic acid (PFTrDA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Perfluorotetradecanoic acid (PFTeDA)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Perfluoroalkane sulfonamides (PFASAs)				Result 1	Result 2	RPD			
Perfluorooctane sulfonamide (FOSA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate								
Perfluoroalkane sulfonic acids & Perfluoroalkane sulfonates (PFSA's)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTS)	M17-Jn23194	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTS)	M17-Jn23194	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments

Some surrogate recoveries were recorded in excess of the QC limit designated in QSM 5.1 of 50-150%. Since no positive results were reported for any PFAS compounds for any of the Samples in this case no data was affected.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard. Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds. Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
N11	

Authorised By

Nibha Vaidya	Analytical Services Manager
Jonathon Angell	Senior Analyst-Organic (QLD)


Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Appendix G – Survey Results

LISCAD Report: Point Report

File: 11828 well pickup
 Projection: Map Grid Australia 94 Zone 56
 File Date: 15 JUNE, 2017
 Surveyor: James Spagnolo

Distance Units: Metres

AHD And MGA Benchmark - PM55683 - LOCATED INTERSECTION OF MOSSMAN STREET & COOKES ROAD

BENCHMARK	EASTING	NORTHING	R.L. (A.H.D.)
PM55683	373493.044	6622019.18	992.304

Monitoring Well No.	TOP OF GATIC - EASTING	TOP OF GATIC - NORTHING	R.L. TOP OF GATIC (AHD)	R.L. TOP OF CASING (AHD)
MW03	373922.110	6622107.760	982.440	982.371

Monitoring Well No.	TOP OF GATIC - EASTING	TOP OF GATIC - NORTHING	R.L. TOP OF GATIC (AHD)	R.L. TOP OF CASING (AHD)
MW05	373955.848	6621821.165	991.014 (top of monument)	990.862
MW06	373888.089	6621932.002	987.526 (top of monument)	987.435
MW07	373902.95	6622158.315	981.461	981.381
MW08	373807.842	6622181.918	982.907	982.827
MW10	374048.009	6622307.731	978.051	977.975

Appendix H – Field Sampling Records and Calibration Certificates

Purging and Sampling Record

Bore ID: MW01

<p>Job Information</p> <p>Client: <u>Fire & Rescue NSW</u> Project: <u>Armidale Site Investigation</u> Proj. No.: <u>212558314</u> Sampler: <u>Stephanie Martin</u> Date: <u>13/6/17</u></p>	<p>Sampling Information</p> <p>Purge Method: <u>MicroPurge</u> Sample Method: <u>MicroPurge</u> WQ Meter Type: <u>YSI</u> Flow Cell: <u>Y/N</u> Pump Depth: <u>1.5</u> m WLevel Meter Type: <u>Dip / Fox (Int.Fee) Gge</u> Field Filtered? <u>Y / N</u> (filter vessel, disposable filter/syringe)</p>	<p>Bore Information</p> <p>SWL: <u>13.90</u> m Screen: From: to: m NAPL Check: <u>Nil</u> Ref. datum: Bore Depth: <u>16.54</u> m Logic Check: Stick Up: m Bore Diam.: <u>50</u> mm Well Cap Secure? <u>Yes</u> Bore Depth: m PID = <u>0 ppm</u></p>
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Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (.....)	Elec. Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when (3 consecutive readings)		stable	+/-10%	+/-3%	+/-0.05 pH	+/-10 mV		
14:10	2	13.95	0.97	1842	5.73	157	17.4	Pole brown, Turbidity = 3. CPW4 6-9
14:15	3.5	13.95	3.64	1839	5.79	165	17.4	"
14:20	5.5	13.95	3.22	1828	5.88	163	17.4	"
14:25	7	13.96	3.19	1815	5.91	162	17.4	"
14:30	9	13.96	3.84	1816	5.93	161	17.4	"
14:35	11	13.96	3.89	1813	5.93	165	17.4	"
14:40	13	13.96	2.32	1808	5.91	166	17.4	"
14:45	14.5	13.96	2.79	1807	5.89	169	17.4	"
14:50	16	13.96	2.43	1802	5.90	168	17.5	"
14:55	18	13.96	2.43	1802	5.91	169	17.4	"
15:00	20	13.96	2.04	1794	5.90	171	17.5	"

Field QA Checks:

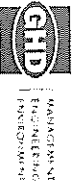
Air bubbles in vials? Y/N Any violent reactions? Y/N
 Decontamination as per GHD procedure? Y/N PFS Preserved? Y/N
 Was sampling equipment pre-cleaned? Y/N
 COC updated? Y/N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PFS	TDS
Preservatives										X	X

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc
DW01
DO readings jumped around a lot.

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7
*Double for gravel pack			



Purging and Sampling Record

Bore ID: MW02

Job Information Client: Fine & Coles NSW Project: Annetteville Site Investigation Proj. No.: 2125528314 Sampler: Stephane Worth Date: 15/6/17		Sampling Information Purge Method: micropurge Sample Method: MicroPurge MQ Meter Type: PSI Flow Cell: Y/N Pump Depth: 16.5m W Level Meter Type: Dip / Fox / Int. Fee / Gage Field Filtered? Y / N (filter vessel, disposable filter/syringe)		Bore Information SWL: 14.66 m Screen: From: 0.1 m to: 0.1 m NAPL Check: Nil Ref datum: 17.78 m Bore Depth: 17.78 m Logic Check: Stick Up: 0.1 m Bore Diam: 50 mm Well Cap Secure? Yes PID = 0 ppm	
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Time (.....)	Volume (L)	SWL mbtoc	Dis-Oxygen (+/-10%)	Elec. Cond (+/-3%)	pH (+/-0.05 pH)	Ox-Red Pt. (± mV)	Temp (°C)	Comment:
16:10	0.5	14.81	1.30	1343	6.76	-70	16.6	Red brown. Turbidity = 2. CP114 10-5
16:15	1.5	14.92	1.33	1341	6.70	-97	16.9	" " " CP114 12-3
16:20	1.5	14.82	5.11	1340	6.77	-104	16.7	" " " CP114 14-1
16:25	2	14.90	3.35	1334	6.72	-96	16.6	" " " CP114 12-3
16:30	2.5	14.92	3.59	1330	6.76	-91	16.6	" " " CP114 12-2
16:35	3	14.96	4.87	1327	6.74	-79	16.7	" " " CP114 12-3
16:40	3.5	14.88	3.44	1327	6.75	-75	15.6	" " " CP114 13-2
16:45	4	14.83	3.71	1322	6.75	-73	15.0	" " " CP114 13-2
16:50	4.5	14.85	4.34	1321	6.74	-73	15.9	" " " CP114 12.5-2.5
16:55	5	14.86	3.65	1326	6.74	-72	16.2	" " " " " "
17:00	5.5	14.86	6.86	1325	6.73	-77	16.2	" " " " " "
17:05	6	14.87	6.90	1324	6.72	-73	16.1	" " " " " "
17:10	6.3	14.88	6.89	1324	6.71	-73	16.2	" " " " " "

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
 Decontamination as per GHD procedure? Y / N
 Was sampling equipment pre-cleaned? Y / N
 COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	ADAC	TDS
Preservatives										X	X

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
 Casing Int. Dia (mm) 50 100 150
 Vol (L/m of casing) 2.0 7.9 17.7
 *Double for gravel pack

Purging and Sampling Record

Bore ID: *MW103*

<p>Job Information</p> <p>Client: <i>Fire & Rescue NSW</i> Project: <i>Armidale</i> Proj. No.: <i>212558314</i> Sampler: <i>Stephanie Mark</i> Date: <i>15/6/17</i></p>	<p>Sampling Information</p> <p>Purge Method: <i>MicroPurge</i> Sample Method: <i>MicroPurge</i> WQ Meter Type: <i>YSI</i> Flow Cell: <input checked="" type="checkbox"/> N Pump Depth: <i>17</i> m WLevel Meter Type: <i>Dip / Fox Int. Fee / Gge</i> Field Filtered? <input checked="" type="checkbox"/> Y / <input checked="" type="checkbox"/> N (filter vessel, disposable filter/syringe)</p>
<p>Bore Information</p> <p>SWL: <i>12.50</i> m Screen: From: to: m NAPL Check: <i>Nil</i> Ref datum: Bore Depth: <i>18.04</i> m Logic Check: Stick Up: <i>0</i> m Bore Diam: <i>50</i> mm Well Cap Secure? <i>Yes</i> PID: <i>0.1 ppm</i></p>	

Time (.....)	Volume (L)	SWL mbloc	Dis. Oxygen (+/-10%)	Elec. Cond (+/-3%)	pH (pH units) (+/-0.05 pH)	Ox-Red Pt. (± mV) (+/-10 mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
12:30	0.5	12.66	1.01+	14.87	7.26	-226	18.2	Clear Turbidity: 1 CPN4 7-8 Pressure = 30
12:35	1	12.76	2.43	14.30	7.38	-228	18.0	" " " "
12:40	3	13.74	3.14	13.91	7.57	-233	17.8	" " " " CPN4 8-7 Pressure = 50
12:45	3.2	13.33	2.63	14.58	7.64	-236	18.5	" " " " CPN4 11-4 Pressure = 30
12:50	3.4	13.30	2.75	14.63	7.66	-218	19.4	" " " " CPN4 9-6 Pressure = 30
12:55	3.5	13.27	2.40	14.66	7.64	-217	20.3	" " " " CPN4 8-7 Pressure = 30
13:00	3.8	13.35	0.65	14.59	7.74	-236	18.0	" " " " CPN4 8-7 Pressure = 30
13:05	4.0	13.51	2.27	14.32	7.70	-248	17.9	" " " " CPN4 10-4 Pressure = 30
13:10	4.6	13.51	2.68	14.20	7.78	-247	18.6	" " " " CPN4 13-2 Pressure = 30
13:15	4.8	13.49	2.83	14.25	7.79	-235	19.0	" " " " " "
13:20	4.8	13.47	2.93	14.30	7.71	-230	19.4	" " " " " "
13:25	4.9	13.45	2.67	14.32	7.69	-225	19.6	" " " " " "
								*Low-mud H2S odour in well

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
 Decontamination as per GHD procedure? Y / N PFA's procedure? Y / N
 Was sampling equipment pre-cleaned? Y / N
 COC updated? Y / N

Parameters/Preservatives	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PCAS	TDS
										X	X

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes

Casing Int. Dia (mm)	50	100	150
Vol (L/m of casing)	2.0	7.9	17.7

*Double for gravel pack



Purging and Sampling Record

Bore ID: **MUN04**

Job Information Client: Fire & Rescue NSW Project: Avondale Proj. No.: 212558814 Sampler: Stephanie Mark Date: 14/6/17		Sampling Information Purge Method: MicroPurge Sample Method: MicroPurge WQ Meter Type: YSI Flow Cell: Y/N WLevel Meter Type: Dip / Fox / Int. Fc / Gge Pump Depth: 17.5 m Field Filtered? Y/N (filter vessel, disposable filter/syringe)		Bore Information SWL: 12.77 m Screen: From: to: m NAPL Check: All Ref. datum: 18.64 m Bore Depth: 18.64 m Logic Check: Stick Up: 0.75 m Bore Diam: 50 mm Well Cap Secure? Yes PFD: 0.2ppm	
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Time (.....)	Volume (L)	SWL mbtoc	Dis. Oxygen (+/-10%)	Elec. Cond (+/-3%)	pH (+/-0.05 pH)	Ox-Red Pt. (± mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
14:40	0.5	12.84	2.17	854	6.62	132	16.4	Brown Turbidity: 3-4 CPN/4 6-9 Pressure 40
14:45	2	12.85	1.79	853	6.63	130	16.4	" " " " CPN/4 9-6 Pressure 40
14:50	4	12.85	1.64	844	6.66	121	16.4	" " " " " " " "
14:55	7	12.84	2.45	851	6.67	116	16.4	" " " " " " " "
15:00	8	12.81	6.22	851	6.69	103	16.5	Run out of gas. Had to replace it.
15:15	9.5	12.82	4.15	848	6.71	118	15.4	Return Turbidity: 3-4 CPN/4 9-6 Pressure 30
15:20	9	12.82	1.80	851	6.63	119	16.0	" " " " " " " "
15:25	10.5	12.82	2.50	852	6.64	117	16.2	" " " " " " " "
15:30	12	12.82	4.60	852	6.63	120	16.2	" " " " " " " "
15:35	13	12.81	2.61	852	6.62	120	16.3	" " " " " " CPN/4 8-7 Pressure 50
15:40	15	12.83	2.94	851	6.62	127	16.2	" " " " " " " "
15:45	17	12.82	2.41	853	6.64	118	16.3	" " " " " " " "
15:50	18	12.82	2.60	852	6.66	117	16.3	" " " " " " " "
15:55	20	12.82	2.57	852	6.63	113	16.2	" " " " " " " "

Field QA Checks:

Air bubbles in vials? **Y/N** Any violent reactions? **Y/N**
 Decontamination as per GHD procedure? **Y/N** (SAS procedure)
 Was sampling equipment pre-cleaned? **Y/N**
 COC updated? **Y/N**

Parameters Preservatives	BTEX	TPH	PAH	CHC	PCB	OCF	OPP	Tot. Metal	Biol.	PCAS	TDS
										X	X

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
 Casing Int. Dia (mm) 50 100 150
 Vol (L/m of casing) 2.0 7.9 17.7
 *Double for gravel pack

Purging and Sampling Record

Bore ID: *MWD5*

<p>Job Information</p> <p>Client: <i>Fire & Rescue NSW</i></p> <p>Project: <i>Amudale</i></p> <p>Proj. No.: <i>212558314</i></p> <p>Sampler: <i>Stephanie Wain</i></p> <p>Date: <i>14/6/17</i></p> <p>Round</p>	<p>Sampling Information</p> <p>Purge Method: <i>Wet purge</i></p> <p>Sample Method: <i>Wet purge</i></p> <p>WQ Meter Type: <i>YSI</i></p> <p>Flow Cell: <input checked="" type="checkbox"/> N</p> <p>Pump Depth: <i>22.5m</i></p> <p>Dip / Fox / Mt. Fce / Gge</p> <p>Field Filtered? <input type="checkbox"/> Y / <input type="checkbox"/> N (filter vessel, disposable filter/syringe)</p>	<p>Bore Information</p> <p>SWL: <i>18.00</i> m</p> <p>Logic Check:</p> <p>Screen: From: to: m</p> <p>Stick Up: <i>0.75</i> m</p> <p>NAPL Check: <i>Nil</i></p> <p>Bore Diam: <i>50 mm</i></p> <p>Ref. datum:</p> <p>Well Cap Secure? <i>Yes</i></p> <p>Bore Depth: <i>23.98</i> m</p> <p>PID = <i>0.1 ppm</i></p>
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Time (.....)	Volume (L)	SWL mbtoc	Dis. Oxygen (.....)	Elec. Cond (.....)	pH (pH units)	Ox-Red Pt. (± mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
Stable when 3 consecutive readings?		stable	+/-10%	+/-3%	+/-0.05 pH	+/-10 mV	-	
10:05	0.5	18.02	3.78	1467	6.39	148	16.4	<i>Pale brown Turbidity=1-2 RPM 8-7</i>
10:10	1	18.03	5.15	1479	6.21	159	17.6	"
10:15	2.5	18.02	5.55	1483	6.26	166	18.0	"
10:20	3.5	18.01	5.75	1482	6.27	169	18.1	"
10:25	5	18.02	5.41	1492	6.31	168	18.1	"
10:30	6	18.03	7.15	1480	6.33	167	18.0	"
10:35	7	18.02	6.30	1475	6.37	162	18.2	"
10:40	8	18.02	6.19	1473	6.40	161	18.2	"
10:45	9	18.02	4.05	1470	6.46	160	18.3	"
10:50	10	18.02	4.34	1471	6.48	158	18.2	"
10:55	11	18.02	4.63	1468	6.51	155	18.3	"
11:00	12	18.02	4.80	1466	6.53	155	18.1	"
11:05	13	18.02	4.70	1465	6.53	154	18.0	"

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N

Decontamination as per GHD procedure? Y / N PAs procedure?

Was sampling equipment pre-cleaned? Y / N

COC updated? Y / N

Parameters/Preservatives	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PA5	TDS
										<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

DWP02

Purge Volumes
Casing Int. Dia (mm) 50 100 150
Vol (L/m of casing) 2.0 7.9 17.7
*Double for gravel pack



Purging and Sampling Record

Bore ID: MW03

Job Information Client: Fine & Rescue NSW Project: 212558314 Proj. No.: 212558314 Sampler: Saeed Alwarthan Date: 15/6/17		Sampling Information Purge Method: water purge Sample Method: water purge WQ Meter Type: YSI Flow Cell: <input checked="" type="checkbox"/> N Pump Depth: 20.5m WLevel Meter Type: Dip / Fox / Int.Face / Gge		Bore Information SWL: 12.48 m Screen: From: to: m NAPL Check: 01 Ref. datum: Well Cap Secure? Yes Bore Depth: 21.65 m	
Field Filtered? <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N (filter vessel, disposable filter/syringe)					

Time (.....)	Volume (L)	SWL mbtoc	Dis.Oxygen (+/-10%)	Elec.Cord (+/-3%)	pH (+/-0.05 pH)	Ox-Red Pt. (± mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
8:05	0.5	12.51	3.45	2543	7.20	143	15.8	clear. Turbidity = 1. CPW4 7-8 Residual: 30
8:10	0.6	12.61	4.38	2665	7.16	139	15.2	CPW4 9-6
8:15	0.8	12.77	4.50	2767	7.00	138	15.3	
8:20	0.9	12.80	4.72	2795	6.88	137	15.3	CPW4 11-4
8:25	1	12.84	3.11	2800	6.83	138	14.7	
8:30	1.1	12.90	2.81	2800	6.74	140	14.2	
8:35	1.2	12.91	3.79	2797	6.73	140	14.3	CPW4 13-2
8:40	1.3	12.90	3.75	2801	6.73	137	14.3	
8:45	1.3	12.90	3.81	2801	6.72	136	14.3	

Field QA Checks:

Air bubbles in vials? Y / N Any violent reactions? Y / N
 Decontamination as per GHD procedure? Y / N
 Was sampling equipment pre-cleaned? Y / N
 COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									
									PFAS
									TDS

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
 Casing Int. Dia (mm) 50 100 150
 Vol (L/m of casing) 2.0 7.9 17.7
 *Double for gravel pack

Job Information Client: <i>Env 4 Recor NSW</i> Project: <i>Armidale</i> Proj. No.: <i>2155834</i> Sampler: <i>Stephanie Martin</i> Date: <i>15/6/17</i>		Sampling Information Purge Method: <i>Micropurge</i> Sample Method: <i>Micropurge</i> WQ Meter Type: <i>YSI</i> Flow Cell: <i>SI N</i> Pump Depth: <i>19</i> m WLevel Meter Type: <i>Dip / Fox / Kit Fca / Gge</i> Field Filtered? <i>Y / N</i> (filter vessel, disposable filter/syringe)		Bore Information SWL: <i>14.18</i> m Screen: From: to: m NAPL Check: <i>Nil</i> Ref datum: Bore Depth: <i>20.11</i> m Logic Check: Stick Up: m Bore Diam: <i>50</i> mm Well Cap Secure? <i>Yes</i> PID: <i>0 ppm</i>	
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Time (.....)	Volume (L)	SWL mbtoc	Dis. Oxygen (+/-10%)	Elec. Cond (+/-3%)	pH (+/-0.05 pH)	Ox-Red Pt. (+/-10 mV)	Temp (°C)	Comment: Colour, turbidity, sediment load, sheen, odour, flow rate, purged dry?
9:45	0.5	14.19	4.62	1982	7.18	159	16.4	Clear Turbidity = 1 Bore Turbidity = 2 CPM4 8-7 Residue = 30
9:50	1	14.22	5.00	1999	7.17	144	17.0	
9:55	2.5	14.22	5.45	1992	7.16	139	17.0	
10:00	3.7	14.22	4.40	1985	7.15	132	17.1	
10:05	4.7	14.22	3.62	1983	7.12	128	17.1	
10:10	5.5	14.22	3.61	1979	7.10	124	17.0	
10:15	6.5	14.22	3.54	1979	7.10	116	17.2	
10:20	7.2	14.22	3.27	1974	7.12	110	17.3	
10:25	8.0	14.22	3.24	1970	7.13	100	17.4	
10:30	9.0	14.22	3.19	1979	7.13	108	17.4	

Field QA Checks:

Air bubbles in vials? *Y / N* Any violent reactions? *Y / N*
 Decantamination as per GHD procedure? *Y / N* *PCAS* *PCAS*
 Was sampling equipment pre-cleaned? *Y / N*
 COC updated? *Y / N*

Parameters / Preservatives	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.	PCAS	TDS
										<i>X</i>	<i>X</i>

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
 Casing Int. Dia (mm) 50 100 150
 Vol (L/m of casing) 2.0 7.9 17.7
 *Double for gravel pack



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Website: www.encoremonitoring.com.au

Address: 4/199 Balcatta Road
Balcatta WA 6021
Postal Address: PO Box 1040
Balcatta WA 6914

Calibration Certificate

02/05/2017 13:00

CUSTOMER

Company Name: Encore Monitoring

Site: Hire

DEVICE

Type: Multi Gas Monitor

Next Cal Due: 2017-10-29

Job Number: 4002907

Manufacturer: RAE Systems

Model Code: MiniRAE 3000

Serial Number: 592-915846

UNIT REPORT

Receival Comments: Hire Unit

Completion Comments: Unit setup for PID data logging
and calibrated

SENSOR REPORT


Type: PID
Low Alarm: 50000ppb
High Alarm: 100000ppb
TWA Alarm: 50000ppb
STEL Alarm: 100000ppb


TEST GAS

Type: ISOBUTYLENE
Concentration: 100 ppm
Lot Number: D407106


SIGNED

Client	FANSW		Contractor	AMWORLD		Groundwater	Scribe - m bgl		Logged By	S. Martin		Location	Level 15, 133 Castlereagh Street, Sydney, NSW 2000		Location No.	Sealiment			
Project	2155837E		Level (m AHD)	Level (m bgl)		Groundwater	Level (after 20 mins) - m bgl		Granular Soils (e.g. Gravels)	Particle Shape: Composition		Consistency:	Moisture: <th>Zoning:</th> <td colspan="2">Odours: (Description & Strength) / PSH</td>		Zoning:	Odours: (Description & Strength) / PSH			
Project No.	2155837E		Level (m AHD)	Level (m bgl)		Groundwater	Level (after 20 mins) - m bgl		Granular Soils (e.g. Gravels)	Particle Shape: Composition		Consistency:	Moisture: <th>Zoning:</th> <td colspan="2">Odours: (Description & Strength) / PSH</td>		Zoning:	Odours: (Description & Strength) / PSH			
Location	—		Coordinates	—		Groundwater	Level (after 20 mins) - m bgl		Granular Soils (e.g. Gravels)	Particle Shape: Composition		Consistency:	Moisture: <th>Zoning:</th> <td colspan="2">Odours: (Description & Strength) / PSH</td>		Zoning:	Odours: (Description & Strength) / PSH			
Date Drilled	—		Coordinates	—		Groundwater	Level (after 20 mins) - m bgl		Granular Soils (e.g. Gravels)	Particle Shape: Composition		Consistency:	Moisture: <th>Zoning:</th> <td colspan="2">Odours: (Description & Strength) / PSH</td>		Zoning:	Odours: (Description & Strength) / PSH			
Depth From (m bgl)	Depth To (m bgl)	Sample Depth From (m bgl)	Sample Depth To (m bgl)	Sample Type	PIB (ppm)	Natural / Fill	Secondary Composition:	Primary Composition:	Colour: black / white / grey / red / brown / orange / yellow / green / blue / include pale, dark or mottled	Plasticity: low plasticity, medium plasticity, high plasticity	Consistency: Very Soft, Soft, Firm, Stiff, Very Stiff, Hard	Particle Size: Fine, Medium, Coarse	Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-Rounded / Sub-Angular / Angular	Composition (e.g. Sandstone, Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Very Dense	Moisture: Dry / Slightly Moist / Moist / Very Moist	Zoning: layers / pockets / cemented	fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc.
GL	SS01	333854	6622060	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	SILT	brown	LOW-MED	SOFT	F-M	—	SubAng	—	VM1	—	In drain	Gravel
13/6/17	SS01	373911	6622053	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	SILT	brown	LOW-MED	SOFT	F-M	—	SubAng	—	VM	—	Side of drain next to Suor.	Gravel. Granulofest / silt / silt
14/6/17	SS03	373826	6621929	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	CLAY	brown / grey	Med	SOFT	F	—	SubAng	—	VM	—	drain on eastern boundary.	Gravel. Granulofest / silt / silt
14/6/17	SS04	373915	6621855	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	CLAY	mottled brown / grey	Med	SOFT	F	—	Rounded	—	VM	—	Dam near S.L. on bank.	Gravel. Granulofest / silt / silt
14/6/17	SS09	374108	6621729	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	CLAY	mottled brown / grey	Med	SOFT	F	—	Rounded	—	VM	—	Drain on eastern end of site.	Gravel. Granulofest / silt / silt
14/6/17	SS05	374054	6621901	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	CLAY	brown	Low	SOFT	F-M	—	SubAng	—	VM	—	Drain on northern side of road	Gravel. Granulofest / silt / silt
14/6/17	SS04	374053	6622014	GRAVELLY SAND	—	GRAVELLY SAND	GRAVELLY SAND / SILTY / clayey etc.	CLAY	pale brown	Med	SOFT	F	—	Rounded	—	VM	—	Drain before dam	Gravel. Granulofest / silt / silt
Investigation Method	Backfill and Compact - V / N	Monitoring Well - V / N	Hollow Flight Auger	Termination Depth (m)	Screen From (m)	Screen To (m)	Gravel / Sand From (m)	Gravel / Sand To (m)	Bentonite Seal From (m)	Bentonite Seal To (m)	Hand Auger	Push Tube	Test Pit	Refusal / Proposed Depth / Instability / Water Ingress / Other:	Well Cover: Gate / Monument / Other	Additional Comments			

Client	Project	Contractor	Groundwater Strike - (m bgl)	Logged By	Location	Location No.	Sediment												
RNSW	PNW-2416			S. MANTLE															
Project No.	21255374	Level (m AHD)	Groundwater Level (after 20 mins) - (m bgl)		Level 15, 133 Castlereagh Street, Sydney, NSW 2000														
Location		Coordinates																	
Date Drilled																			
Depth From (m bgl)	Depth To (m bgl)	Sample Depth From (m bgl)	Sample Depth To (m bgl)	Sample Type	PID (bpm)	Natural / Fill	Secondary Composition: gravely / sandy / silty / clayey etc.	Primary Composition: BOULDER / COBBLE / GRAVEL / SAND / SILT / CLAY / ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue / include pale, dark or mottled	Cohesive Soils (e.g. Clays)	Granular Soils (e.g. Gravels)	Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-ang. / angular / angular	Composition: Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Very Dense	Moisture: Dry / Slightly Moist / Moist / Very Moist	Zoning: lens / layers / pockets / cemented	Fill Material e.g. glass, metal, ash, brick, asbestos, concrete etc.	Odours: (Description & Strength) / PSH
14/6/17	373990	6622041	6622041	Gravel				CLAY	brown	Med	Soft	Fine	Sub-ang. / Rounded			W		Dam near gravel/rocks present.	
14/6/17	373990	6622095	6622095	Gravel				CLAY	brown	Med	Soft	Fine	Sub-ang. / Rounded			W		Dam near gravel/rocks present.	
15/6/17	373990	6622157	6622157	Gravel				CLAY	brown	Med	Soft	Fine	Sub-ang. / Rounded			W		Dam on NW Lovel's some roots present.	
16/6/17	373990	6622311	6622311	Gravel				CLAY	brown	Med	Soft	Fine	Sub-ang. / Rounded			W		Dam on NW Lovel's some roots present.	
16/6/17	374006	6622329	6622329	Gravel				CLAY	brown/grey	Low-med	Soft	Fine	Rounded			W		Dam on NW Lovel's some roots present.	
16/6/17	374044	6622402	6622402	Gravel				SILT	brown	Low-med	Soft	Fine	Sub-ang. / Rounded			W		Dam on NW Lovel's some roots present.	
16/6/17	374043	6622540	6622540	Gravel				GRAVEL	Red/brown	Low	Soft	C	Sub-ang. / Rounded			W		Dam on NW Lovel's some roots present.	
Investigation Method	Backfill and Compact - Y / N	Monitoring Well - Y / N	Termination Depth (m)	Screen From (m)	Screen To (m)	Casing From (m)	Casing To (m)	Refusal / Proposed Depth / Instability / Water Ingress / Other:											
Solid Flight Auger																			
Hand Auger																			
Push Tubes																			
Test Pit																			
Well Construction Details	Well Diameter (mm)	Depth (m)	Gravel / Sand From (m)	Gravel / Sand To (m)	Bentonite Seal From (m)	Bentonite Seal To (m)	Well Cover: Galic / Monument / Other												
Additional Comments																			

Client	Project	Contractor	Groundwater Stride - m bgl	Logged By	Location	Location No.	Zoning:	Fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc.	Odours: (Description & Strength) / PSH										
FRNSW	Amendable			S. Math															
Project No.	212556314	Level (m AHD)	Groundwater Level (after 20 mins) - mbgl		Level 15, 133 Castlereagh Street, Sydney, NSW 2000														
Location		Co-ordinates																	
Date Drilled																			
Depth From (m bgl)	Depth To (mbgl)	Sample Depth From (m-bgl)	Sample Depth To (m bgl)	Sample Type	PID (ppm)	Natural / Fill	Secondary Composition: gravelly / sandy / silty / clayey etc.	Primary Composition: BOULDER/ COBBLE/ GRAVEL/ SAND/ SILT/ CLAY/ ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue / include: pale, dark or mottled	Cohesive soils (e.g. Clays)	Granular soils (e.g. Gravels)	Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-ang. / Angular / Angular / Angular	Composition (e.g. Quartz, Organic etc.)	Consistency: Very loose, Loose, Medium Dense, Very Dense	Moisture: Dry / Slightly Moist / Moist / Very Moist / Wet	Zoning: lens / layers / pockets / cemented		
16/6/17	SS14	374092	6622240	LOCATIONS															
16/6/17	SS15	374138	66222892																
16/6/17	SS16	374238	66222927																
16/6/17	SS17	374486	66222885																
16/6/17	SS18	374449	66222890																
16/6/17	SS19	374385	66222950																
Investigation Method	Solid Flight Auger	(mm)	Hollow Flight Auger	(mm)	Hard Auger	(mm)	Push Tube	(mm)	Test Pit	m by	m	Other							
Investigation Abandonment	Backfill and Compact - V / N		Monitoring Well - V / N		Termination Depth (m)		Screen From (m)		Screen To (m)		Casing From (m)		Casing To (m)		Refusal / Proposed Depth / Instability / Water Ingress / Other:				
Well Construction Details	Well Diameter (mm)		Depth (m)		Gravel / Sand From (m)		Gravel / Sand To (m)		Bentonite Seal From (m)		Bentonite Seal To (m)		Well Cover: Gate / Monument / Other						
Additional Comments	<p>Excavated sediment from down: Trench from southern side of site.</p> <p>collected from creek & just below street level down some rocks / leaves.</p> <p>From dam wall west. ants present</p> <p>In drain on Stafford's property, near road before dam. water present ~ 5m deep</p> <p>From dam wall east.</p> <p>In drain on Stafford's property below house. water present ~ 2.5m deep</p>																		

Sediment

Client	CRNSU		Contractor			Groundwater Strike - m bgl			Logged By	S. Mark		Location No.								
Project	Amidale		Level (m AHD)			Groundwater Level (after 20 mins) - m bgl			 Level 15, 133 Castlereagh Street, Sydney, NSW 2000		Sediment									
Project No.	21255834		Co-ordinates	E N																
Location			Date Drilled			Cohesive Soils (e.g. Clays)		Granular Soils (e.g. Gravels)												
Depth From (m bgl)	Depth To (m bgl)	Sample Depth From (m bgl)	Sample Depth To (m bgl)	Sample Type	PID (ppm)	Natural / Fill	Secondary Composition: gravelly / sandy / silty / clayey etc.	Primary Composition: BOULDER / COBBLE / GRAVEL / SAND / SILT / CLAY / ORGANIC	Colour: black / white / grey / red / brown / orange / yellow / green / blue	plasticity: low / medium / high plasticity	Consistency: Very Soft, Soft, Firm, Stiff, Very Stiff, Hard	Particle Size: Fine, Medium, Coarse	Particle Characteristics: Well Graded / Poorly Graded / Gap Graded / Uniform	Particle Shape: Rounded / Sub-Rounded / Sub-Angular / Angular	Composition (e.g. Quartz, Organic etc.)	Consistency: Very loose, loose, Medium Dense, Very Dense	Moisture: Dry / Slightly Moist / Moist / Very Moist / Wet	Zoning: lens / layers / pockets / cemented	Fill Materials e.g. glass, metal, ash, brick, asbestos, concrete etc.	Odours: (Description & Strength) / PSH
GL				LOCATION																
16/6/17	SS21	374338	6625038	Sandy			Silty		brown	med	S	M	-	Rounded	-	-	W	-	Collected from core of western extent of rockers pond.	
16/6/17	SS23	374285	6622898	sandy			CLAY		grey	med	S	F	-	Rounded	-	-	W	-	From Staffords dam.	
16/6/17	SS24	374306	6623030	gravelly			CLAY		brown / grey	med	S	F-C	-	Sub-ang	-	-	DM	-	circled sediment stripped out of dam.	



Purging and Sampling Record

Surface water samples

Bore ID:

Job Information
 Client: *Red Beech NSW*
 Project: *Amv2106*
 Proj. No: *212558314*
 Sampler: *Stephanie Marks*
 Date: *12/6/17*

Sampling Information
 Purge Method:
 Sample Method:
 MQ Meter Type:
 Flow Cell: Y / N
 Pump Depth: m
 WLevel Meter Type:
 Field Filtered? Y / N (filter vessel, disposable filter/syringe)
 Dip / Fox / Int. Fee / Gge m

Bore Information
 SWL: m Logic Check:
 Screen: From: to: m Stick Up: m
 NAPL Check:
 Ref datum:
 Bore Depth: m Well Cap Secure?

Time (.....)	Volume (L)	SWL mhtoc	Dis. Oxygen (+/-10%)	Elec. Cond (+/-3%)	pH (pH units) (+/-0.05 pH)	Ox-Red Pt. (± mV) (+/-10 mV)	Temp (°C)	(.....)	Comment:
SWD01	13/6/17	Drawn	3.54	134	7.37	202	10.6	373811 6622053	Low-mud turbidity. Green algae on surface. No odour. No sheen.
SWI13	14/6/17	Drawn	1.43	701	7.24	101	10.4	3738326	Mod turbidity. No odour. No sheen. Not too dark.
SWD02	14/6/17	Drawn	6.93	71	7.61	109	11.0	373815 6621855	Mod turbidity. No odour. No sheen.
SWI4	14/6/17	Drawn	7.03	120	8.24	81	11.4	374093 6621765	Mod turbidity. No odour. No sheen. Dark on water side of well.
SWI5	14/6/17	Drawn	5.84	92	7.72	90	11.7	374056 6621801	Mod turbidity. No odour. No sheen. Dark on glass.
SWD03	14/6/17	Drawn	5.61	74	7.39	109	11.3	374044 6621841	Mod turbidity. No odour. No sheen.
SWD04	14/6/17	Drawn	3.80	179	7.84	102	11.1	373998 6621895	Mod turbidity. No odour. No sheen.
SWD05	15/6/17	Drawn	6.71	107	7.62	192	10.5	373975 6621879	Mod turbidity. No odour. No sheen.
SWD09	16/6/17	Drawn	5.80	107	8.32	70	8.6	374008 6622211	Mod turbidity. No odour. No sheen.
SWI6	16/6/17	Drawn	1.85	107	7.81	83	10.1	374008 6622211	Mod turbidity. No odour. No sheen.
SWI7	16/6/17	Drawn	10.52	94	8.31	173	10.1	374008 6622211	Mod turbidity. No odour. No sheen.
SWI0	16/6/17	Drawn	4.22	108	7.90	165	9.7	374008 6622211	Mod turbidity. No odour. No sheen.
SWD07	16/6/17	Drawn	8.95	145	8.35	85	11.4	374008 6622211	Mod turbidity. No odour. No sheen. DUP04
SWI11	16/6/17	Drawn	6.56	283	8.02	167	11.1	374008 6622211	Low turbidity. No odour. No sheen. Good acid.
SWD08	16/6/17	Drawn	8.50	285	8.05	134	12.0	374008 6622211	Low turbidity. No odour. No sheen. Good acid.

Field QA Checks:
 Air bubbles in vials? Y / N Any violent reactions? Y / N
 Decontamination as per GHD procedure? Y / N
 Was sampling equipment pre-cleaned? Y / N
 COC updated? Y / N

Parameters	BTEX	TPH	PAH	CHC	PCB	OCP	OPP	Tot. Metal	Biol.
Preservatives									

Comment: Duplicate samples collected, bottles used, access, condition of headworks etc

Purge Volumes
 Casing Int. Dia (mm) 50 100 150
 Vol (L/m of casing) 2.0 7.9 17.7
 *Double for gravel pack

Appendix I – Waste Disposal Certificate



Cleanaway Operations Pty Ltd
Raven Street
KOORAGANG NSW 2304

Page 1 of 5
Trip 1155
Driver Jason Wilson
Date 19/07/2017

Service Docket Driver Copy

Job **207087** Order Number **5485252** 3T 00350 Service Reference PO# 212558314 Frequency CAL
 Site **GHD (Fire & Rescue NSW)** Debtor **GHD Pty Ltd** Receiver **Cleanaway Operations Pty Ltd**
2 - 16 Mann St **PO Box 5403** **Raven Street**
ARMIDALE NSW 2350 **HUNTER REGION MC NSW 2310** **KOORAGANG NSW 2304**
 Ph:02 67714968

6 x 205L drums of contaminated soil
 2 x 205L drums of contaminated water.
 Need to have a drum trolley to move the drums onto the rigid tautliner's hydraulic tailgate to load onto truck.
 Site contact: Chris Ridley 02 6771 4968 or 0438 749 155
 Acces from 7am to 4pm.

Ref	FDK0036	BarCode	N120 NDG - Soil 205L	N120 NDG - Soil 205L	Last Service	Estimate	Actual	6 2D 205L Drum	Yes <input checked="" type="checkbox"/>	Completed	No <input type="checkbox"/>
		Location									
		Access									
Trip	1155	CA Note			Certificate						
Ref	FDK0036	BarCode	J120 NDG - Cont Water	J120 NDG - Cont Water	Last Service	Estimate	Actual	2 2D 205L Drum	Yes <input checked="" type="checkbox"/>	Completed	No <input type="checkbox"/>
		Location									
		Access									
Trip	1155	CA Note			Certificate						

2 drums unable to collect

Driver Signature  Customer Name and Signature 

Travel Time To	Job Time In	Pump Time Start	Pump Time End	Job Time End	Travel Time From
0400	0940			1030	

WASTE DATA FORM

NEW SOUTH WALES



Job No # 207087

BEFORE COMPLETING AND SIGNING THIS FORM
READ THE NEXT PAGE OF THIS FORM FOR
IMPORTANT INFORMATION ON HOW TO FILL IN THIS
FORM AND FOR INFORMATION ABOUT OBLIGATIONS
AND OFFENCES

Dangerous Goods

Complete this part if waste is a dangerous good.

Proper Shipping Name (00150) Contaminated soil
Dangerous Goods Class _____ Subsidiary Risk/s (if any) _____ UN Number _____ Packing Group _____
Type of Packaging _____ Number of Packages _____ Aggregate Net Quantity _____

Load Identification

Consignment Authorisation Number 509939-1-N120-6124-20180630 Load Number 1155
This consignment authorisation is valid From: 01/07/2017 To: 30/06/2018 (DD/MM/YY)

Waste Consignor (Activity)

Licensed Non-licensed License No _____

Company Name GHD (Fire & Rescue NSW) Address of waste source
Address 2 - 16 Mann St (If not the same as company address)
ARMIDALE NSW 2350
Contact Phone 0438 49155
Name of Consignor (print) *Roby* Signature of Consignor *[Signature]* Date 19/7/17

Waste Description

List Contaminants:

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Waste Name **N120 L SOILS CONTAMINATED WITH A CONTROLLED WASTE, Soils contaminated with a controlled waste**
Waste Origin Code (ANZSIC) _____ Waste Code **N120** Amount of Waste **1230.000** tonnes kilograms
Physical nature of waste (solid, liquid, sludge, etc) **Liquid**
Waste Type (hazardous, industrial, group A) ***Soils contaminated TPI Waste Category** litres
Proposed treatment at destination (landfill, incineration, immobilisation, storage, treatment etc) **Not Assigned**

Date of Waste Movements

Date of dispatch _____ Expected date of delivery to destination _____

Transporter

Licensed Non-licensed License No 6124

Company Name Cleanaway Operations Pty Ltd RTA Registration No. of Vehicle XVB862
Address Raven Street Type of Transport (Road, Rail, Road & Rail) Road
KOORAGANG NSW 2304
Contact Phone 02 49391111
*Name of Driver (print) Jason Wilson *Signature of Driver *[Signature]* *Date 19/7/17

Waste Consignee (Destination)

Company Name Cleanaway Operations Pty Ltd License No.: 6124
Destination Raven Street *Quantity Received: *6 x 205L Drums*
KOORAGANG NSW 2304 *Treatment given to waste at destination: *Treatment*
Contact Phone 02 49391111 *Date Received: *19/07/17*
*Name of Representative (print) *Michael Elger* *Signature of Representative *[Signature]*

EMERGENCY CONTACT (24 HOURS)

NAME: Chris Ridley
PH: 02 67714968 M: 02 67714968

GHD

133 Castlereagh St Sydney NSW 2000

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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	N Rosen	J Hallchurch		M Clough		18/10/2017

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