

19 September 2019
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Williamtown Sand Syndicate
PO Box 898
Newcastle, NSW 2300

Attention: Darren Williams

Delivered by email: darren@arbus.com.au

Subject: **Quarterly water quality monitoring results at Cabbage Tree Road Sand Quarry – September 2019 monitoring**

Please find enclosed the Quarterly water quality monitoring results at Cabbage Tree Road Sand Quarry for the September 2019 monitoring.

1. SCOPE OF SERVICE

The scope of work includes the monthly surface and groundwater monitoring and also included additional monitoring as part of the quarterly monitoring requirements. **Figure 1** (attached) presents the surface water and groundwater sampling locations.

The September monitoring round was to include gauging of all available monitoring wells (a total of 14 wells) and sampling from 10 monitoring wells (Noting that MW239D, BH3, BH5 and BH12 were not required to be sampled) including additional analytical parameters and sampling at four surface water locations.

2. SITE WORK

The monitoring round was conducted on 16 September 2019. Additional sampling for PFAS took place on 25 September 2019 following an irregular detection of PFAS at BH4 and SW4. A summary of these results are presented in **Table 3.4**

Each well location was gauged using a water level meter to determine groundwater depth (relative to the top of the well casing) and the total depth of the well, in order to calculate the volume of water in the well. Following the gauging a HydraSleeve was then placed into the well ensuring the top of the sleeve was located under the water and left in place while all remaining wells were gauged. Following the gauging each of the HydraSleeves were removed and samples taken.

The September 2019 monitoring round included:

- Gauging of all available monitoring wells (a total of 14 wells);
- Groundwater sampling from a total of 8 monitoring wells (note MW239D, BH3, BH5 and BH12 did not require sampling, BH9 and BH10 were dry); and
- Surface water sampling from 3 locations (SW2 was dry on the day of sampling).

Water samples were collected in laboratory supplied containers and placed in an ice chilled esky. The samples were then submitted to a NATA accredited laboratory under a chain of custody (COC) for the analytical schedule as per **Table 2-1**.

Table 2-1: Summary of Quarterly Water Quality Analysis

Analysis	Number of Samples				
	Primary	Intra-lab (Duplicate)	Inter-lab (Triplicate)	Transport Blank	Rinsate Blank
Extended Water Suite*	11	0	0	0	0
Hydrocarbons**	11	1	1	1	1
Metals***	11	1	1	1	1
Iron (dissolved)	11	1	1	1	1
Total Dissolved Solids (TDS)	11	0	0	0	0
Total Suspended Solids (TSS)	11	0	0	0	0
PFAS (28 analytes, standard level)	7	1	1	1	1

* Extended Water Suite B: Ca, Mg, Na, K, pH, EC, Cl, SO₄, Alkalinity, Hardness & TDS (Calc'), Nitrite, Nitrate, Ammonia, Reactive Phosphorus, Total Phosphorus, Total Nitrogen, TKN

** TRH (C6 – C40), BTEXN (Silica Gel)

*** NEPM Metals Suite (dissolved) - Arsenic (As), Boron (B), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Selenium (Se), Vanadium (V), Zinc (Zn) - note sampling for Iron and no nickel

3. SAMPLING RESULTS

Table 3-2 provides a summary of the gauging data and **Table 3-3** provides a summary of the field parameters taken during sampling. The full set of gauging data and field parameters for each monitoring location are provided in the **Tables** section.

Table 3-2: Summary of gauging data

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth (mBTOC)	Comment
BH1	8.64	6.428	2.212	8.28	Slightly cloudy brown, no odour
BH2	7.79	5.796	1.994	9.08	Dark brown, slight sulfur odour
BH3					Well Decommissioned
BH4	3.06	1.604	1.456	6.11	Clear, no odour
BH5	7.36	5.786	1.574	8.71	No odour - No sample taken.

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth (mBTOC)	Comment
BH6	3.62	1.647	1.973	4.62	Clear, slight odour
BH7	2.98	1.542	1.438	4.61	Light brown, sulfur odour
BH8	3.88	2.282	1.598	6.27	Dark brown cloudy, sulfur odour
BH9	17.75	Dry	-	16.01	Well was dry.
BH10	6.69	Dry	-	3.58	Well was dry.
BH11	6.63	3.546	3.084	5.39	Cloudy light brown, sulfur odour
BH12	8.67	6.827	1.843	8.2	No sample taken.
MW239S	3.04	1.269	1.771	3.89	Cloudy Brown, Sulfur odour.
MW239D	3.04	1.248	1.792	20.2	Slight Sulfur odour, no sample taken
SW01*	N/A	0.26	2.76	N/A	Natural tannin stained brown, sulfur odour
SW02*	N/A	Dry		N/A	Location was dry.
SW03*	N/A	0.24	1.24	N/A	Water clear, no odour.
SW04*	N/A	0.29	2.29	N/A	Clear, no odour.

* Surface water levels measured from measuring tape installed (When dry number is ground elevation AHD).

Table 3-3: Summary of field parameters

Sample ID	Time	Temp (°C)	EC (us/cm)	pH	Redox (mV)
BH01	1130	21.02	125	5.43	101
BH02	1100	21.61	111	4.7	263
BH04	1245	20.53	96	4.27	251
BH06	1515	18.66	215	4.61	57
BH07	1415	18.34	232	4.73	-22
BH08	1330	18.64	300	4.72	-10
BH11	1200	20.26	195	4.64	31.2
MW239S	1430	17.56	397	4.61	-11
SW01	1300	16.59	1138	4.21	323
SW03	1445	17.05	449	5.02	86.7
SW04	1030	14.8	371	4.19	360

Table 3.4 presents a summary of the water monitoring results and comparison with identified trigger values. Full results tables are provided in the Tables Section. Full Laboratory results, including copies for the COC are provided in **Attachment A**.

Attachment B provides a graphical representation of data acquired during field sampling and laboratory analysis. Parameters and analytes include; electrical conductivity (µs/cm), groundwater elevation (mAHD), and concentrations of iron, nickel and zinc (mg/L). Where



relevant, the Australian Drinking Water Guideline (Aesthetic values) and ANZECC 2000 Guideline have been included to provide a benchmark for any exceedances observed.

Table 3.4 Water screening levels

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring (Refer to Trend Data Appendix B)
Physical and Chemical Stressors	Sodium	1	11	11	117	No	Similar
	Sulphate	1	11	2	244	No	Similar
	Chloride	1	11	18	193	No	Similar
	Fluoride	0.1	11	<0.1	0.7	No	Similar
	Reactive ³ Phosphorous	0.01	11	<0.01	<0.01	No	Similar
	Total Phosphorous ³	0.01	11	<0.01	0.43	9 above ANZECC 2000 Trigger range ¹	Mostly similar across all sample locations with a notable reduction at BH8
	Nitrite ³	0.01	11	<0.01	<0.01	No	Similar
	Nitrate ³	0.01	11	<0.01	1.07	1 above ANZECC 2000 Trigger range ¹	Similar
	Ammonia ³	0.01	11	<0.01	0.2	No	Similar
	Total Nitrogen ³	0.1	11	0.1	2.7	8 above ANZECC 2000 Trigger range ¹ (BH2, BH4, BH6, BH7, BH8, BH11, MW239S & SW1)	Mostly similar across all sample locations with a slight increase present at BH2 compared to previous round.
	Total Hardness	1	11	8.0	213	1 above NHMRC ADWG 6 aesthetics (SW1)	SW1 historically indicates concentrations exceeding or at criteria
	Total Dissolved Solids	1	11	55	528	1 above NHMRC ADWG 6 aesthetics (SW1)	SW1 historically indicates concentrations exceeding or at criteria
Dissolved Metals	pH	0.01	11	4.3	5.44	All outside ANZECC 2000 Trigger range ¹ and drinking water guidelines	Similar
	As	0.001	11	<0.001	0.001	No	Similar
	B	0.05	11	<0.005	0.09	No	Similar
	Ba	0.001	11	0.002	0.056	No	Similar

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring (Refer to Trend Data Appendix B)
	Be	0.001	11	<0.001	<0.001	No	Similar
	Cd	0.005-0.1	11	<0.0001	0.0002	No	Similar
	Cr	0.005-0.1	11	<0.001	0.004	4 above ANZECC 2000 Trigger Values ² (BH1, BH7, BH8 & MW239S)	Similar
	Co	0.001	11	<0.001	0.008	No	Similar
	Cu	0.001	11	<0.001	0.051	8 above ANZECC 2000 Trigger Values ² (BH2, BH4, BH6, BH7, MW238S, SW1, SW3 & SW4)	Notable increases in copper observed at BH4, BH6, BH7, SW1, SW3 and SW4
	Fe	0.05	11	0.19	8.84	9 above NHMRC ADWG 6 aesthetics (BH1, BH6, BH7, BH8, BH11, MW239S, SW1, SW3 & SW4)	Similar
	Mn	0.001	11	0.005	0.587	1 above NHMRC ADWG 6 aesthetics (SW1)	Similar
	Ni	0.001	11	<0.001	0.02	4 above ANZECC 2000 Triger Values ² (BH7, SW1, SW3 & SW4)	Increase of Nickel across most sample locations with the exception of BH1, BH2, BH8 and BH11 showing similar results to previous sample events.
	Pb	0.005-0.1	11	<0.001	0.001	No	Similar
	Se	0.005-0.1	11	<0.01	<0.01	No	Similar
	V	0.005-0.1	11	<0.01	<0.01	No	Similar
	Zn	0.005-0.1	11	<0.005	0.282	8 above ANZECC 2000 Trigger Values ² (BH1, SW1, SW3 & SW4)	Slight increase of Zinc
	Hg	0.0001	11	<0.0001	<0.0001	No	Similar
TRH – Silica Clean up	C ₆ -C ₁₀	0.02	11	<0.02	<0.02	No	Similar
	>C ₁₀ -C ₁₆	0.1	11	<0.1	<0.1	No	Similar

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring (Refer to Trend Data Appendix B)
	>C ₁₆ -C ₃₄	0.1	11	<0.1	0.14	No	Similar
	>C ₃₄ -C ₄₀	0.1	11	<0.1	<0.1	No	Similar
	Total >C ₁₀ -C ₄₀	0.1	11	<0.1	0.14	No	Similar
	C ₆ -C ₁₀ minus BTEX (F1)	0.02	11	<0.02	<0.02	No	Similar
	>C ₁₀ -C ₁₆ minus Naphthalene (F2)	0.1	11	<0.1	<0.1	No	Similar
BTEX	Benzene	0.001-0.005	11	<0.001	<0.001	No	Similar
	Toluene	0.001-0.005	11	<0.002	<0.002	No	Similar
	Ethylbenzene	0.001-0.005	11	<0.002	<0.002	No	Similar
	Total Xylene	0.001-0.005	11	<0.002	<0.002	No	Similar
	Naphthalene	0.001	11	<0.005	<0.005	No	Similar
PFAS	PFOS	0.00001-0.0001	7	<0.00001	0.00003 (0.00005)	No	It is noted that an irregular detection of PFOS was identified at SW4. Follow up sampling (25/9/19) resulted in increased values of 0.00005
	PFOA	0.00001-0.0001	7	<0.00001	<0.00001	No	Similar
	PFOS/PFHxS	0.00001-0.0001	7	<0.00001	0.00003 (0.00005)	No	It is noted that an irregular detection of PFOS was identified at SW4. Follow up sampling (25/9/19) resulted in increased values of 0.00005

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring (Refer to Trend Data Appendix B)
	PFDS	0.00001-0.0001	7	<0.00001	0.00002	No	It is noted that an irregular detection of PFDS was identified at BH4. Follow up sampling (25/9/19) resulted in a non-detect.

* The LOR is above the Heads of EPA Australia and New Zealand – National Environmental Management Plan (HEPA NEMP) 2018 99% Level of protection in freshwater. No concentrations were found to be above the LOR.

¹Australian and New Zealand Environmental Conservation Council (ANZECC) 2000 Trigger Values – Default trigger values for physical and chemical stressors, for slightly disturbed ecosystems in lowland rivers, Southeast Australia (value is for base flow and not storm event)

²ANZECC 2000 Trigger Values – 95% Level of protection in freshwater

National Health and Medical Research Council Australian Drinking Water Guidelines (NHMRC ADWG) 6 2011 Version 3.5 Updated August 2018

³Analysis only undertaken during Quarterly Sampling Event.

4. RAINWATER DATA

Table 4.5 presents the rainfall data from Williamtown RAAF base (Station Number: 061078, Latitude: 32.79°S; Longitude: 151.84°E; Elevation: 8 m). The mean monthly rainfall indicates that there was more rainfall in August than the mean leading up to the September monitoring event. September rainfall is trending towards above average rainfall. An additional 63.4mm of rainfall was recorded in the period between the initial September sampling event (16 September 2019) and the additional PFAS sampling (25 September 2019).

Table 4.5 2019 Rainfall data

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	2.0	0.8	0	0	0	0	0	9.6	7.4			
2nd	0	12.8	0	23.8	0	21.2	0	0	0.2			
3rd	0	0.4		0.6	0	0.6	0	0.2	0			
4th	0	0	0	0	20.8	0.4	5.2	0	0			
5th	0	0	0	0	0.2	25	1.8	0.2	0			
6th	0	0	0	0	23.2	2.6	1.2	0	0			
7th	5.0	0	8.2	0	0.2	1	0.6	0	1			
8th	0	0	0	0	0	0	1.6	0	0			
9th	0	6.6	0	0	0	0	0.4	0	0			
10th	0.2	0	12.0	2.2	0	0	0	0	0.6			
11th	0	0	0	0	0.6	0	0	0	2.8			
12th	3.0	0	0	0	0	0	0	0	0			
13th	0	0	0	0	1.4	0	0	0	0			
14th	0	0	0	0.2	0	0	0	0	0			
15th	0	0	0	1.4	0	0	0	0	0			
16th	0	0	4.8	3.6	0	0	0	0	0			
17th	0	0	59.4	1.4	0	0	0	0	16.8			
18th	0	0	2.6	0.2	0	17.8	0	0	39.4			
19th	0	0	2.2	0.2	0	0	0	0	7.2			
20th	2.4		0	2.0	0	0	0	0	0			
21st	1.0	1.4	0	0.2	0	0	0	0	0			
22nd	0	1.0	1.2	0.2	0	0.2	0	0	0			
23rd	0	1.4	0	0	0	20	0	0				
24th	0	9.2	5.4	0	0	50.6	0	0	0			
25th	0	0	5.2	0	0	15.2	2.0	0	0			
26th	0	0	0	0	0	1.8	0	0				
27th	0	0	0	0	0	0.8	0	0				
28th	1.0	0	0	0	0.8	0	0	0				
29th	0		0	0	0	0	0	0				
30th	0		38.2	0	0	0	0.6	21.2				
31st	0		6.6		0		10	67.4				

Monthly Total	14.6	33.6	145.8	36.0	47.2	157.2	23.4	98.6	75.4			
Mean	98.7	117.0	120.5	111.6	109.6	124.7	70.3	73.2	60.6	73.9	82.3	78.6

Based on the long-term rainfall data for the August/September period it is expected that the current groundwater and surface water levels will slightly elevated compared to current levels.
Data Trends

5. THANKYOU

We trust the information presented is acceptable. If you have any questions, please do not hesitate in contacting the undersigned.

Sincerely,

Kleinfelder Australia Pty Ltd

Daniel Kousbroek B.Env.Sc (Hons)

Environmental Consultant

Contaminated Land Management

Dkousbroek@kleinfelder.com

Mobile: 0458 197 676

Attached:

Figure 1

Data Tables

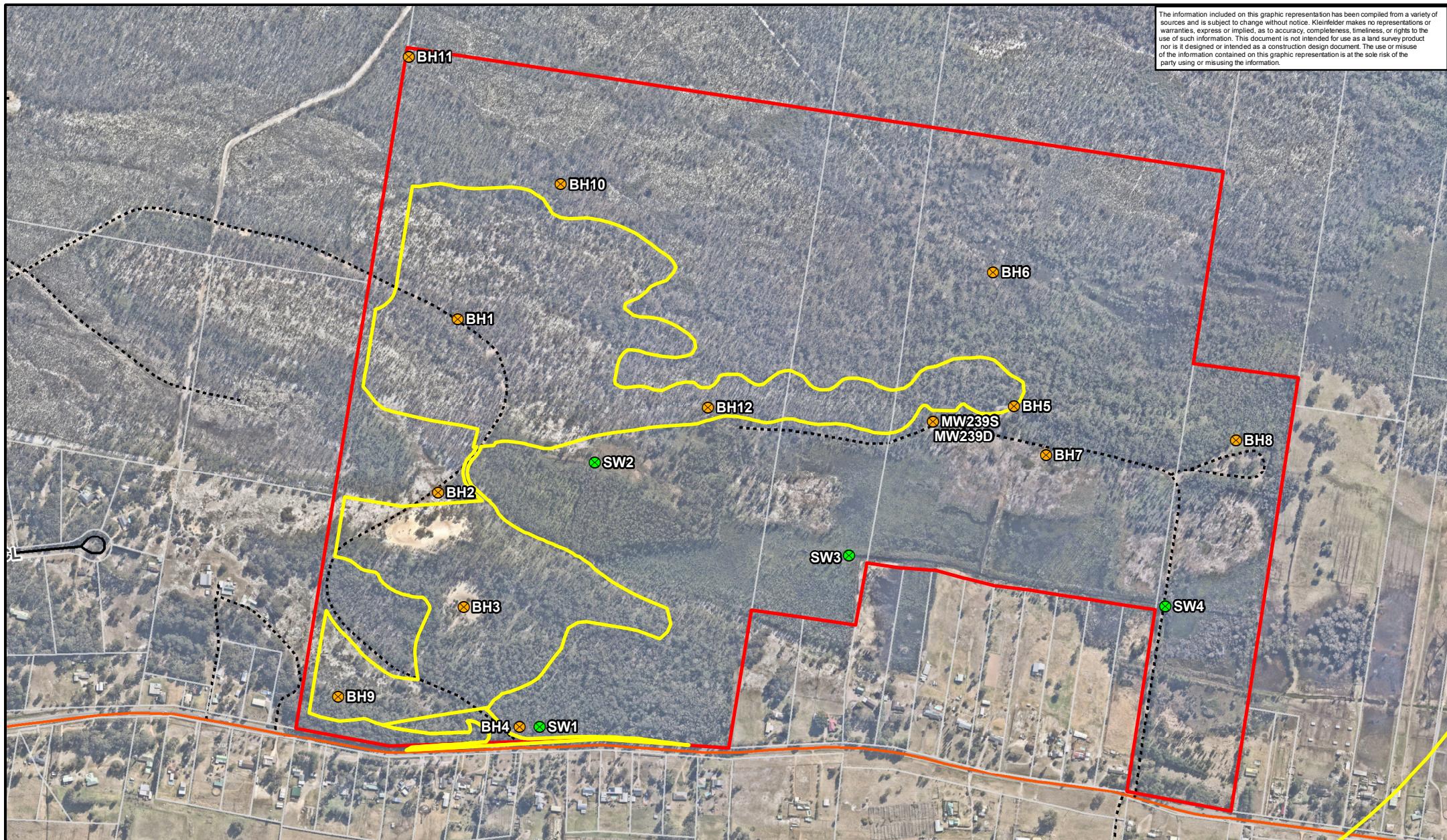
Attachment A – Laboratory reports

Attachment B – Data Trends

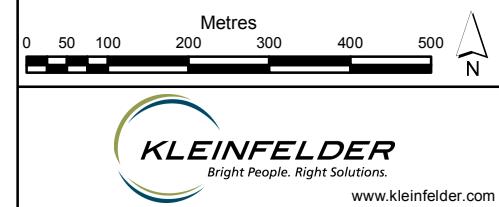


FIGURE 1

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the information contained on this graphic representation. This graphic representation is not a product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.



- Groundwater Sample Site
- Surface Water Sample Site
- Arterial Road
- Local Road
- Track
- Subject Land Boundary
- Quarry Project Area



PROJECT REFERENCE: 20170448
DATE DRAWN: 13/02/2019 09:48 Version 1
DRAWN BY: gjoyce
DATA SOURCE:
NSW DFSI - 2017
Nearmap - 2018

Water monitoring locations September 2019 Monitoring

Williamtown Sand Syndicate
Proposed Sand Quarry
Cabbage Tree Road, Williamtown

FIGURE:
1



DATA TABLES

Analyte		Metals															
		Arsenic**	Barium	Beryllium	Boron**	Cadmium**	Chromium** 1	Cobalt	Copper**	Iron	Lead**	Manganese*	Mercury** 2	Nickel**	Selenium**	Vanadium	Zinc**
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ANZCC 2000 Trigger Values	0.013	-	0.37	0.0002	0.001	-	0.0014	-	0.0034	1.9	0.0006	0.011	0.011	-	0.008	-	
NHMRC ADWG 6	0.01	0.06	4	0.002	0.05	-	2	0.3*	0.01	0.5	0.001	0.02	0.01	-	3*	-	
Sample Name	Sample Date																
BH1	15-Feb-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	13	< 0.001	0.014	< 0.0001	< 0.001	< 0.01	< 0.01	1.27	
	12-Apr-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	10	< 0.001	0.015	< 0.0001	0.002	< 0.01	0.363	-	
	16-May-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	8.33	< 0.001	0.009	< 0.0001	0.002	< 0.01	< 0.01	0.132	
	14-Jun-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.001	6.31	< 0.001	0.009	< 0.0001	< 0.001	< 0.01	0.074	
	16-Jul-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	0.002	7.35	< 0.001	0.01	< 0.0001	0.001	< 0.01	0.116	
	15-Aug-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.003	< 0.001	0.002	7.96	< 0.001	0.008	< 0.0001	< 0.001	< 0.01	0.023	
BH2	16-Sep-19	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	0.001	8.84	< 0.001	0.009	< 0.0001	< 0.001	< 0.01	0.034	
	22-Feb-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	< 0.001	0.002	0.14	< 0.001	0.021	< 0.0001	0.015	< 0.01	< 0.01	0.006	
	15-Mar-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	< 0.005	< 0.001	0.02	< 0.0001	< 0.001	< 0.01	< 0.005	-	
	23-Apr-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	< 0.001	0.001	0.19	< 0.001	0.018	< 0.0001	0.001	< 0.01	< 0.01	0.008	
	16-May-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.06	< 0.001	0.014	< 0.0001	0.001	< 0.01	< 0.003	
	14-Jun-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	< 0.001	0.004	0.08	< 0.001	0.009	< 0.0001	0.001	< 0.01	< 0.005	-	
BH3	16-Jul-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.008	0.05	< 0.001	0.013	< 0.0001	0.001	< 0.01	0.006	
	15-Aug-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.012	0.08	< 0.001	0.011	< 0.0001	< 0.001	< 0.01	0.005	
	16-Sep-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.014	0.026	< 0.001	0.014	< 0.0001	0.001	< 0.01	0.007	
	21-Feb-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	0.06	< 0.0001	0.005	< 0.0001	0.003	< 0.01	< 0.005	
	15-Mar-19	< 0.001	0.014	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.16	< 0.001	0.039	< 0.0001	0.018	< 0.01	< 0.014	
	23-Apr-19	< 0.001	0.014	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.09	< 0.001	0.014	< 0.0001	0.022	< 0.01	0.043	
BH4	16-May-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.002	0.09	< 0.001	0.045	< 0.0001	0.007	< 0.01	0.008	
	14-Jun-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.12	< 0.001	0.035	< 0.0001	0.002	< 0.01	0.015	
	16-Jul-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.004	0.046	< 0.0001	0.019	< 0.0001	0.001	< 0.01	0.007	
	15-Aug-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.002	0.026	< 0.0001	0.018	< 0.0001	0.001	< 0.01	0.007	
	16-Sep-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.051	0.19	< 0.0001	0.026	< 0.0001	0.002	< 0.01	0.005	
	21-Feb-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	1.4	< 0.001	0.005	< 0.0001	0.003	< 0.01	< 0.01	0.008	
BH6	22-Feb-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	0.002	< 0.001	0.039	< 0.0001	0.018	< 0.01	< 0.014	
	14-Mar-19	< 0.001	0.014	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.16	< 0.001	0.02	< 0.0001	< 0.001	< 0.01	0.012	
	23-Apr-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.002	0.09	< 0.001	0.045	< 0.0001	0.007	< 0.01	0.008	
	16-May-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.27	< 0.001	0.022	< 0.0001	0.002	< 0.01	0.015	
	14-Jun-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.08	< 0.001	0.035	< 0.0001	0.001	< 0.01	0.015	
	16-Jul-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.004	0.046	< 0.0001	0.019	< 0.0001	0.001	< 0.01	0.007	
BH7	15-Aug-19	< 0.001	0.013	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.26	< 0.001	0.014	< 0.0001	0.001	< 0.01	0.015	
	16-Sep-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.051	0.19	< 0.0001	0.026	< 0.0001	0.001	< 0.01	0.005	
	21-Feb-19	< 0.001	0.001	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	1.8	< 0.001	0.026	< 0.0001	0.004	< 0.01	< 0.01	0.019	
	14-Mar-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	1.8	< 0.001	0.02	< 0.0001	0.004	< 0.01	< 0.01	0.009	
	23-Apr-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	2.0	< 0.001	0.026	< 0.0001	0.004	< 0.01	< 0.01	0.01	
	16-May-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	0.003	2.32	< 0.001	0.035	< 0.0001	0.005	< 0.01	0.013	
BH8	14-Jun-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.002	2.57	< 0.001	0.009	< 0.0001	0.001	< 0.01	0.015	
	16-Jul-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	0.08	< 0.001	0.008	< 0.0001	0.001	< 0.01	0.008	
	15-Aug-19	< 0.001	0.026	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	2.19	< 0.001	0.009	< 0.0001	0.001	< 0.01	0.007	
	16-Sep-19	< 0.001	0.034	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.008	2.08	< 0.001	0.013	< 0.0001	0.007	< 0.01	0.035	
	22-Feb-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	1.8	< 0.001	0.026	< 0.0001	0.004	< 0.01	0.019	
	14-Mar-19	< 0.001	0.006	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.001	3.25	< 0.001	0.008	< 0.0001	0.002	< 0.01	0.005	
BH11	23-Apr-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	3.2	< 0.001	0.009	< 0.0001	0.002	< 0.01	< 0.01	0.008	
	16-May-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	3.0	< 0.001	0.001	< 0.0001	0.003	< 0.01	< 0.01	0.005	
	14-Jun-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	2.5	< 0.001	0.005	< 0.0001	0.002	< 0.01	< 0.01	0.006	
	16-Jul-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	2.6	< 0.001	0.004	< 0.0001	0.002	< 0.01	< 0.005	0.005	
	15-Aug-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	1.72	< 0.001	0.004	< 0.0001	0.001	< 0.01	< 0.005	0.005	
	16-Sep-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	0.79	< 0.001	0.008	< 0.0001	0.002	< 0.01	< 0.01	0.012	
MW239	22-Feb-19	< 0.001	0.007	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	1.11	< 0.001	0.003	< 0.0001	0.001	< 0.01	< 0.01		

Table 3
Groundwater Analytical Data - PFAS
with/without Fixed Functionality



Notes:
 - Not analysed
 < - Less than laboratory limit of reporting
 µg/L - Micrograms per litre

*** 99% Level of protection in freshwater
 ^ Freshwater water

Table 4
Groundwater Analytical Data - Inorganics
Willawood Sead Syndicate



Analyte	Anions and Cations														Alkalinity										Inorganics			
	Sodium	Calcium	Magnesium	Potassium	Sulphate	Chloride	Fluoride	Reactive Phosphorus as P	Total Phosphorus	Nitrite as N	Nitrate as N	Amonia as N	Total Nitrogen as N	Total Kjeldahl Nitrogen	Total Cations	Total Anions	Ionic Balance	Sodium Adsorption Ratio	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Total Alkalinity as CaCO3	Total Hardness as CaCO3	Electrical Conductivity @ 25°C	Total Dissolved Solids	Total Dissolved Solids	pH	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	meq/L	meq/L	%	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	pH units	
ANZECC 2000 Trigger Values																												
ANZECC 2000 Trigger Values	180 ^a					290 ^b	290 ^b	1.5		3	50	0.9*	0.9**	0.35*										200 ^b	125-220 ^c	600 ^d	6.5-8.5 ^e	
Sample Name	1. Sample Date																											
15-Mar-19	11	2.0	1.0	< 1.0	< 1.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	< 1.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	< 1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	< 1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	0.69	1.01	-	10	< 1.0	10	10	105	68	164	5.62			
16-Jun-19	10	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.6	0.94	-	10	< 1.0	10	10	99	64	72	5.52			
16-Jul-19	11	2.0	1.0	2.0	3.0	24	< 0.1	-	-	-	-	-	-	-	0.69	0.93	-	10	< 1.0	10	10	101	66	84	5.53			
15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	24	< 0.1	-	-	-	-	-	-	-	0.77	0.91	-	14	< 1.0	14	14	128	83	82	6.22			
16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	0.12	0.3	0.3	0.73	0.76	-	14	< 1.0	14	14	102	66	88	5.44			
15-Mar-19	11	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.66	0.88	-	9.0	< 1.0	9.0	9.0	104	68	129	5.67			
15-Mar-19	12	2.0	1.0	< 1.0	5.0	25	< 0.1	-	-	-	-	-	-	-	0.69	0.91	-	10	< 1.0	10	10	104	55	97	5.62			
16-May-19	12	&																										

Table 5
Quality Control Sample Analysis - BTEXN
Williamtown Sand Surficate

Notes:

-- Not analysed
 < - Less than laboratory limit of reporting

< - Less than laboratory limit or reporting
NC - Not calculated

µg/L - Micrograms per litre
BTEXN - Benzene, toluene, etc.

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

Table 6
Quality Control Sample Analysis - Metals
Williamstown Sand Syndicate



Analyte			Metals																
			Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Chromium VI	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Vanadium	Zinc
Units			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sample Name	Sample Date	Sample Type																	
TRIP BLANK_13022019	13-Feb-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE01_21022019	21-Feb-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.1	< 0.001	0.012	< 0.0001	0.002	< 0.01	< 0.01	0.005
DUP01_21022019	21-Feb-19	Duplicate	0.001	0.014	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.09	< 0.001	0.012	< 0.0001	0.003	< 0.01	< 0.01	0.015
Relative Percentage Difference			67%	24%	NC	NC	NC	0%	NC	NC	0%	NC	0%	NC	40%	NC	NC	100%	
BH8_21022019	21-Feb-19	Primary	< 0.001	0.011	< 0.001	< 0.05	< 0.0001	0.001	-	< 0.001	< 0.001	4.1	< 0.001	0.012	< 0.0001	0.002	< 0.01	< 0.01	0.005
TRIP01_21022019	21-Feb-19	Triplicate	0.001	< 0.02	< 0.001	< 0.05	< 0.0002	< 0.005	< 0.0005	< 0.001	< 0.001	4.5	< 0.001	0.012	< 0.0001	0.003	< 0.005	< 0.006	
Relative Percentage Difference			67%	10%	NC	NC	NC	86%	NC	NC	9%	NC	0%	NC	40%	NC	NC	18%	
TRIP BLANK_130319	13-Mar-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK02_150319	15-Mar-19	Trip Blank	< 0.001	0.002	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE02_140319	14-Mar-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH7_140319	14-Mar-19	Primary	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	-	0.003	< 0.001	1.8	< 0.001	0.02	< 0.0001	0.004	< 0.01	< 0.01	0.009
DUP02_140319	14-Mar-19	Duplicate	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	-	0.002	< 0.001	2.51	< 0.001	0.021	< 0.0001	0.004	< 0.01	< 0.01	0.007
Relative Percentage Difference			NC	0%	NC	NC	NC	0%	NC	NC	40%	NC	33%	NC	5%	NC	0%	NC	25%
BH7_140319	14-Mar-19	Primary	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	-	0.003	< 0.001	1.8	< 0.001	0.02	< 0.0001	0.004	< 0.01	< 0.01	0.009
TRIP02_14032019	14-Mar-19	Triplicate	< 0.001	< 0.02	< 0.001	< 0.05	< 0.0002	0.001	-	0.002	< 0.001	1.7	< 0.001	0.019	< 0.0001	< 0.001	< 0.005	< 0.005	
Relative Percentage Difference			NC	0%	NC	NC	NC	0%	NC	NC	40%	NC	6%	NC	5%	NC	156%	NC	113%
TRIP BLANK_05_14062019	14-Jun-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE_05_14062019	14-Jun-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
SW3_14062019	14-Jun-19	Primary	< 0.001	0.035	< 0.001	< 0.05	< 0.0001	0.001	-	0.003	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
DUP05_14062019	14-Jun-19	Duplicate	< 0.001	0.036	< 0.001	< 0.05	< 0.0001	< 0.001	-	0.003	< 0.001	1.63	< 0.001	0.039	< 0.0001	0.003	< 0.01	< 0.01	0.013
Relative Percentage Difference			NC	3%	NC	NC	NC	0%	NC	NC	0%	NC	3%	NC	0%	NC	0%	NC	21%
SW3_14062019	14-Jun-19	Primary	< 0.001	0.035	< 0.001	< 0.05	< 0.0001	< 0.001	-	0.003	< 0.001	1.68	< 0.001	0.038	< 0.0001	0.003	< 0.01	< 0.01	0.016
TRIP05_140619	14-Jun-19	Triplicate	< 0.001	-	-	< 0.0002	0.001	-	-	< 0.001	1.6	< 0.001	-	< 0.0001	0.003	-	-	-	
Relative Percentage Difference			NC	NC	NC	NC	NC	67%	NC	NC	5%	NC	NC	0%	NC	NC	46%		
TRIP BLANK_06_16072019	16-Jul-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE06_16072019	16-Jul-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE07	15-Aug-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
TRIP BLANK_08_16092019	16-Sep-19	Trip Blank	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
RINSATE08_16092019	16-Sep-19	Rinsate	< 0.001	< 0.001	< 0.001	< 0.05	< 0.0001	< 0.001	-	< 0.001	< 0.001	< 0.05	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
SW4_16092019	16-Sep-19	Primary	< 0.001	0.046	< 0.001	< 0.05	< 0.0001	< 0.001	-	0.002	0.02	0.7	0.001	0.039	< 0.0001	0.017	< 0.01	< 0.01	0.085
DUP08_16092019	16-Sep-19	Duplicate	< 0.001	0.041	< 0.001	< 0.05	< 0.0001	< 0.001	-	0.002	< 0.001	0.76	< 0.001	0.036	< 0.0001	0.003	< 0.01	< 0.01	0.012
Relative Percentage Difference			NC	11%	NC	NC	NC	0%	NC	NC	190%	8%	67%	8%	NC	140%	NC	NC	151%
SW4_16092019	16-Sep-19	Primary	< 0.001	0.046	< 0.001	< 0.05	< 0.0001	< 0.001	-	0.002	0.02	0.7	0.001	0.039	< 0.0001	0.017	< 0.01	< 0.01	0.085
TRIP08_16092019	16-Sep-19	Triplicate	< 0.001	0.04	< 0.001	< 0.05	< 0.0002	< 0.001	< 0.005	0.002	< 0.001	0.69	< 0.001	0.037	< 0.0001	0.003	-	< 0.005	0.012
Relative Percentage Difference			NC	14%	NC	NC	NC	0%	NC	NC	190%	1%	67%	5%	NC	140%	NC	NC	151%

Table 7
Quality Control Sample Analysis - PTAS
100% Cornmeal Feed Formulate



Notes:

< - Less than laboratory limit of reporting
NC - Not calculated

NC - Not calculated
µg/L - Micrograms per litre



ATTACHMENT A: LABORATORY REPORTS

CERTIFICATE OF ANALYSIS

Work Order	ES1929844	Page	1 of 18
Client	KLEINFELDER AUSTRALIA PTY LTD	Laboratory	Environmental Division Sydney
Contact	DANIEL KOUSBROEK	Contact	Shirley LeCornu
Address	95 MITCHELL ROAD CARDIFF NSW 2285	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	----	Telephone	+6138549 9630
Project	20193820	Date Samples Received	16-Sep-2019 16:29
Order number	----	Date Analysis Commenced	17-Sep-2019
C-O-C number	----	Issue Date	23-Sep-2019 18:52
Sampler	DANIEL KOUSBROEK		
Site	WSS-CABBAGE TREE RD WATER MONITORING		
Quote number	ME/114/19		
No. of samples received	14		
No. of samples analysed	14		

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.

Signatures

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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW



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

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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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: PFAS results for sample #6, #11 confirmed by re-extraction and re-analysis
- TDS by method EA-015 may bias high for sample 9 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH7	BH6	BH8	MW239S	SW3
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	---	0.01	pH Unit	5.07	4.68	4.85	4.66	4.30
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	---	0.01	-	2.79	2.44	5.43	4.70	2.57
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	222	197	293	373	374
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	181	124	206	224	201
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	144	128	190	242	243
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	44	71	79	179	7
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	16	20	12	25	50
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	5	2	<1	<1	<1
Total Alkalinity as CaCO ₃	---	1	mg/L	5	2	<1	<1	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	13	21	4	14	48
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	53	38	70	85	57
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	3	<1	<1	7
Magnesium	7439-95-4	1	mg/L	4	3	3	6	8
Sodium	7440-23-5	1	mg/L	27	25	46	55	42
Potassium	7440-09-7	1	mg/L	1	1	<1	1	<1
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	0.06	<0.05	<0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	0.016	0.034	0.010	0.010	0.045
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)	Client sample ID			BH7	BH6	BH8	MW239S	SW3
	Client sampling date / time			16-Sep-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1929844-001	ES1929844-002	ES1929844-003	ES1929844-004	ES1929844-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	0.002	<0.001	<0.001	<0.001	0.004
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	0.002	0.002	<0.001
Copper	7440-50-8	0.001	mg/L	0.007	0.008	<0.001	0.002	0.020
Manganese	7439-96-5	0.001	mg/L	0.024	0.012	0.005	0.006	0.036
Nickel	7440-02-0	0.001	mg/L	0.020	0.007	0.002	0.006	0.017
Lead	7439-92-1	0.001	mg/L	0.001	<0.001	<0.001	<0.001	0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.085	0.035	<0.005	0.032	0.094
Iron	7439-89-6	0.05	mg/L	1.42	2.08	2.06	0.94	0.69
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.20	0.19	0.13	0.10	0.01
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.06	0.07	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	---	0.01	mg/L	0.06	0.07	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	---	0.1	mg/L	1.1	0.7	1.1	1.4	0.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	---	0.1	mg/L	1.2	0.8	1.1	1.4	0.1
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	---	0.01	mg/L	0.09	0.15	0.43	0.32	<0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance								
ø Total Anions	---	0.01	meq/L	1.86	1.55	2.06	2.69	2.61
ø Total Cations	---	0.01	meq/L	1.53	1.51	2.25	2.91	2.83

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH7	BH6	BH8	MW239S	SW3
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<50	<50	<50	<50
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<100	<100	<100	<100
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	---	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	---	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
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	<0.02	<0.02	----	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH7	BH6	BH8	MW239S	SW3
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<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
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
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH7	BH6	BH8	MW239S	SW3
		Client sampling date / time		16-Sep-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1929844-001	ES1929844-002	ES1929844-003	ES1929844-004	ES1929844-005
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Ethyl perfluoroctane 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	<0.01	<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
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	---	<0.01
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	111	107	108	110	111
Toluene-D8	2037-26-5	2	%	119	101	114	114	98.9
4-Bromofluorobenzene	460-00-4	2	%	118	102	115	113	101
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	108	100	100	---	100
13C8-PFOA	----	0.02	%	103	106	100	---	88.9

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		SW4	RINSATE 08	TRIP BLANK 08	BH1	BH4
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	---	0.01	pH Unit	4.47	---	---	5.44	4.83
EA005P: pH by PC Titrator								
pH Value	---	0.01	pH Unit	4.35	---	---	---	---
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	---	0.01	-	3.01	---	---	1.84	1.32
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	360	---	---	102	95
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	208	---	---	88	58
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	234	---	---	66	62
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	<5	---	---	108	49
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	42	---	---	8	13
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	---	---	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	---	---	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	<1	---	---	8	<1
Total Alkalinity as CaCO ₃	---	1	mg/L	<1	---	---	8	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	45	---	---	2	8
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	58	---	---	20	19
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	7	---	---	<1	2
Magnesium	7439-95-4	1	mg/L	6	---	---	2	2
Sodium	7440-23-5	1	mg/L	45	---	---	13	11
Potassium	7440-09-7	1	mg/L	<1	---	---	<1	<1
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	0.046	<0.001	<0.001	0.002	0.012

Analytical Results

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		SW4	RINSATE 08	TRIP BLANK 08	BH1	BH4
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EN055: Ionic Balance - Continued								
Ø Total Anions	---	0.01	meq/L	2.57	---	---	0.76	0.70
Ø Total Cations	---	0.01	meq/L	2.80	---	---	0.73	0.74
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	130
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<50	<50	<50	130
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	140
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	140
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<100	<100	<100	<100
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	<20
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	---	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	---	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		SW4	RINSATE 08	TRIP BLANK 08	BH1	BH4
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				Result	Result	Result	Result	Result
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<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
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	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
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
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	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

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		SW4	RINSATE 08	TRIP BLANK 08	BH1	BH4
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00				
				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
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	0.01	<0.01	<0.01	----	0.02
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	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
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	110	107	106	110	108
Toluene-D8	2037-26-5	2	%	99.2	101	100	98.3	99.1
4-Bromofluorobenzene	460-00-4	2	%	100	103	100	99.3	99.3
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	93.5	97.3	98.8	----	96.3
13C8-PFOA	----	0.02	%	93.5	92.3	93.2	----	89.5

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		DUP08	SW1	BH11	BH2	---
Compound	CAS Number	LOR	Unit	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	---
				Result	Result	Result	Result	---
EA005: pH								
pH Value	---	0.01	pH Unit	---	4.32	4.66	4.72	---
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	---	0.01	-	---	3.49	3.18	1.32	---
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	---	1080	195	96	---
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	---	10	mg/L	---	689	140	60	---
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	---	1	mg/L	---	702	127	62	---
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	---	5	mg/L	---	15	533	216	---
EA065: Total Hardness as CaCO₃								
Total Hardness as CaCO ₃	---	1	mg/L	---	213	12	13	---
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	---	<1	<1	<1	---
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	---	<1	<1	<1	---
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	---	<1	<1	<1	---
Total Alkalinity as CaCO ₃	---	1	mg/L	---	<1	<1	<1	---
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	---	244	5	8	---
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	---	193	46	18	---
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	---	21	<1	2	---
Magnesium	7439-95-4	1	mg/L	---	39	3	2	---
Sodium	7440-23-5	1	mg/L	---	117	27	11	---
Potassium	7440-09-7	1	mg/L	---	4	<1	<1	---
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	---
Boron	7440-42-8	0.05	mg/L	<0.05	0.09	<0.05	<0.05	---
Barium	7440-39-3	0.001	mg/L	0.041	0.056	0.005	0.004	---
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	---
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0002	<0.0001	<0.0001	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		DUP08	SW1	BH11	BH2	---
		Client sampling date / time		16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	---
Compound	CAS Number	LOR	Unit	ES1929844-011	ES1929844-012	ES1929844-013	ES1929844-014	-----
				Result	Result	Result	Result	---
EG020F: Dissolved Metals by ICP-MS - Continued								
Cobalt	7440-48-4	0.001	mg/L	0.002	0.008	<0.001	<0.001	---
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.001	<0.001	---
Copper	7440-50-8	0.001	mg/L	<0.001	0.012	<0.001	0.008	---
Manganese	7439-96-5	0.001	mg/L	0.036	0.587	0.008	0.014	---
Nickel	7440-02-0	0.001	mg/L	0.003	0.014	0.002	0.001	---
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	<0.001	---
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
Zinc	7440-66-6	0.005	mg/L	0.012	0.282	0.012	0.007	---
Iron	7439-89-6	0.05	mg/L	0.76	2.45	0.79	0.26	---
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	---
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	---	0.7	<0.1	<0.1	---
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	---	<0.01	0.15	0.04	---
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	---	<0.01	<0.01	<0.01	---
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	---	0.02	<0.01	1.07	---
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	---	0.01	mg/L	---	0.02	<0.01	1.07	---
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	---	0.1	mg/L	---	1.2	0.7	1.6	---
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	---	0.1	mg/L	---	1.2	0.7	2.7	---
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	---	0.01	mg/L	---	0.05	0.12	0.28	---
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	---	<0.01	<0.01	<0.01	---
EN055: Ionic Balance								
ø Total Anions	---	0.01	meq/L	---	10.5	1.40	0.67	---
ø Total Cations	---	0.01	meq/L	---	9.45	1.42	0.74	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		DUP08	SW1	BH11	BH2	---
		Client sampling date / time		16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	---
Compound	CAS Number	LOR	Unit	ES1929844-011	ES1929844-012	ES1929844-013	ES1929844-014	-----
				Result	Result	Result	Result	---
EN055: Ionic Balance - Continued								
Ø Ionic Balance	---	0.01	%	---	5.38	---	---	---
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	---
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	---
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	---
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<50	<50	<50	---
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
>C10 - C16 Fraction	---	100	µg/L	<100	<100	<100	<100	---
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	---
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	---
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	---
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<100	<100	<100	---
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	---
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	---
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	---
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	---
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	---
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	---
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	---
^ Total Xylenes	---	2	µg/L	<2	<2	<2	<2	---
^ Sum of BTEX	---	1	µg/L	<1	<1	<1	<1	---
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	---
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	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		DUP08	SW1	BH11	BH2	---
		Client sampling date / time		16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	---
Compound	CAS Number	LOR	Unit	ES1929844-011	ES1929844-012	ES1929844-013	ES1929844-014	-----
				Result	Result	Result	Result	---
EP231A: Perfluoroalkyl Sulfonic Acids - Continued								
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	---	---	---
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	---	---	---
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	---	---	---

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		DUP08	SW1	BH11	BH2	---
		Client sampling date / time		16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	16-Sep-2019 00:00	---
Compound	CAS Number	LOR	Unit	ES1929844-011	ES1929844-012	ES1929844-013	ES1929844-014	-----
				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	---	---	---
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	---	---	---
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	106	106	116	102	---
Toluene-D8	2037-26-5	2	%	96.3	96.2	108	94.9	---
4-Bromofluorobenzene	460-00-4	2	%	97.5	99.2	103	97.8	---
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	96.7	96.4	---	---	---
13C8-PFOA	----	0.02	%	93.3	84.7	---	---	---

Surrogate Control Limits

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP231S: PFAS Surrogate			
13C4-PFOS	---	60	120
13C8-PFOA	---	60	120

QUALITY CONTROL REPORT

Work Order	: ES1929844	Page	: 1 of 16
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2019
Order number	: ----	Date Analysis Commenced	: 17-Sep-2019
C-O-C number	: ----	Issue Date	: 23-Sep-2019
Sampler	: DANIEL KOUSBROEK		
Site	: WSS-CABBAGE TREE RD WATER MONITORING		
Quote number	: ME/114/19		
No. of samples received	: 14		
No. of samples analysed	: 14		



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 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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, 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 (%)
EA005: pH (QC Lot: 2587556)									
ES1929844-001	BH7	EA005: pH Value	---	0.01	pH Unit	5.07	4.94	2.60	0% - 20%
ES1929802-001	Anonymous	EA005: pH Value	---	0.01	pH Unit	5.52	5.53	0.181	0% - 20%
EA005: pH (QC Lot: 2587557)									
ES1929855-001	Anonymous	EA005: pH Value	---	0.01	pH Unit	7.69	7.80	1.42	0% - 20%
WN1906820-001	Anonymous	EA005: pH Value	---	0.01	pH Unit	5.02	4.99	0.599	0% - 20%
EA005P: pH by PC Titrator (QC Lot: 2588437)									
ES1929801-003	Anonymous	EA005-P: pH Value	---	0.01	pH Unit	6.89	6.99	1.44	0% - 20%
ES1929844-006	SW4	EA005-P: pH Value	---	0.01	pH Unit	4.35	4.39	0.915	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 2588439)									
ES1929844-012	SW1	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	1080	1080	0.0931	0% - 20%
ES1929844-006	SW4	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	360	361	0.286	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 2590822)									
ES1929551-001	Anonymous	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	7790	7390	5.32	0% - 20%
ES1929819-004	Anonymous	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	151	155	2.62	0% - 50%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 2590824)									
ES1929844-006	SW4	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	208	217	4.24	0% - 20%
EW1904011-006	Anonymous	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	122	126	3.42	0% - 50%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2590821)									
ES1929551-001	Anonymous	EA025H: Suspended Solids (SS)	---	5	mg/L	6	5	26.1	No Limit
ES1929819-004	Anonymous	EA025H: Suspended Solids (SS)	---	5	mg/L	<5	<5	0.00	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2590823)									
ES1929844-006	SW4	EA025H: Suspended Solids (SS)	---	5	mg/L	<5	<5	0.00	No Limit
EW1904011-006	Anonymous	EA025H: Suspended Solids (SS)	---	5	mg/L	<5	<5	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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 2588435)									
ES1929801-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	45	47	3.92	0% - 20%
		ED037-P: Total Alkalinity as CaCO ₃	----	1	mg/L	45	47	3.92	0% - 20%
ES1929844-006	SW4	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO ₃	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA (QC Lot: 2588694)									
ES1929844-001	BH7	ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	13	13	0.00	0% - 50%
ES1929844-013	BH11	ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	5	5	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 2588697)									
ES1929844-001	BH7	ED045G: Chloride	16887-00-6	1	mg/L	53	53	0.00	0% - 20%
ES1929844-013	BH11	ED045G: Chloride	16887-00-6	1	mg/L	46	46	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 2589435)									
ES1929844-014	BH2	ED093F: Calcium	7440-70-2	1	mg/L	2	2	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	11	11	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
ES1929844-003	BH8	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	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	46	46	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2589432)									
ES1929827-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.015	0.018	14.5	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.012	0.011	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	4.21	4.56	8.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.10	<0.10	0.00	No Limit

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2589432) - continued									
ES1929827-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.055	0.056	2.42	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.038	0.037	3.78	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.19	0.20	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2589437)									
ES1929844-014	BH2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.008	0.009	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.014	0.014	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.007	0.006	24.7	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.26	0.25	0.00	No Limit
ES1929844-003	BH8	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.010	0.010	0.00	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.005	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 (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2589437) - continued									
ES1929844-003	BH8	EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.06	2.10	2.07	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 2589433)									
ES1929827-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0002	0.00	No Limit
ES1929827-011	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 2589436)									
ES1929844-004	MW239S	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1929844-012	SW1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 2588436)									
ES1929801-003	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.4	0.3	0.00	No Limit
ES1929844-006	SW4	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.1	0.1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 2588661)									
ES1929664-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
ES1929801-012	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.01	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 2588662)									
EW1904011-006	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1929844-010	BH4	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.05	65.5	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2588696)									
ES1929844-001	BH7	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1929844-013	BH11	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2588660)									
ES1929631-001	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	0.80	0.70	13.6	0% - 20%
ES1929801-012	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2588663)									
EW1904011-006	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	0.01	0.03	63.4	No Limit
ES1929844-010	BH4	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	0.24	0.24	0.00	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2588656)									
ES1929631-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	6.2	6.0	2.23	0% - 20%
ES1929801-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	0.5	0.5	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2588659)									
ES1929844-004	MW239S	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	1.4	1.3	0.00	No Limit
EW1904011-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2588657)									
ES1929631-001	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	0.06	0.06	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 (%)
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2588657) - continued									
ES1929801-003	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	<0.01	0.03	89.5	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2588658)									
ES1929844-004	MW239S	EK067G: Total Phosphorus as P	---	0.01	mg/L	0.32	0.27	17.9	0% - 50%
EW1904011-003	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 2588695)									
ES1929844-001	BH7	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES1929844-013	BH11	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2591332)									
ES1929844-002	BH6	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.00	No Limit
ES1929844-007	RINSATE 08	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2591332)									
ES1929844-002	BH6	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES1929844-007	RINSATE 08	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 2591332)									
ES1929844-002	BH6	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
ES1929844-007	RINSATE 08	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
ES1929844-007	RINSATE 08	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 2586805)									
ES1929819-001	Anonymous	EP231X: Perfluoroctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	3.46	3.46	0.00	0% - 20%
		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	0.06	0.06	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	1.06	1.07	0.00	0% - 20%
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	0.06	0.07	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
ES1929844-008	TRIP BLANK 08	EP231X: Perfluoroctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	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

Sub-Matrix: WATER

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: 2586805) - continued									
ES1929844-008	TRIP BLANK 08	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: 2586805)									
ES1929819-001	Anonymous	EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.09	0.09	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PPPeA)	2706-90-3	0.02	µg/L	0.12	0.12	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	0.34	0.34	0.00	0% - 50%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.06	0.06	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
ES1929844-008	TRIP BLANK 08	EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PPPeA)	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
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 2586805)									
ES1929819-001	Anonymous	EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1929844-008	TRIP BLANK 08	EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 2586805) - continued									
ES1929844-008 TRIP BLANK 08									
ES1929844-008	TRIP BLANK 08	EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane 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: 2586805)									
ES1929819-001	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	0.22	0.22	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
ES1929844-008	TRIP BLANK 08	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: 2586805)									
ES1929819-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	5.53	5.55	0.361	0% - 20%
ES1929844-008	TRIP BLANK 08	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	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: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
							Low	High
EA005: pH (QCLot: 2587556)								
EA005: pH Value	---	---	pH Unit	---	7.6 pH Unit	99.3	98.5	102
EA005: pH (QCLot: 2587557)								
EA005: pH Value	---	---	pH Unit	---	7.6 pH Unit	99.3	98.5	102
EA005P: pH by PC Titrator (QCLot: 2588437)								
EA005-P: pH Value	---	---	pH Unit	---	4 pH Unit 7 pH Unit	100 100	98.0 98.0	102 102
EA10P: Conductivity by PC Titrator (QCLot: 2588439)								
EA10-P: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	2100 µS/cm	# 92.5	95.0	113
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 2590822)								
EA015H: Total Dissolved Solids @180°C	---	10	mg/L	<10 <10	2000 mg/L 293 mg/L	99.4 116	87.0 66.0	109 126
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 2590824)								
EA015H: Total Dissolved Solids @180°C	---	10	mg/L	<10 <10	2000 mg/L 293 mg/L	103 113	87.0 66.0	109 126
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2590821)								
EA025H: Suspended Solids (SS)	---	5	mg/L	<5	150 mg/L 1000 mg/L	105 97.0	83.0 82.0	129 110
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2590823)								
EA025H: Suspended Solids (SS)	---	5	mg/L	<5	150 mg/L 1000 mg/L	101 96.0	83.0 82.0	129 110
ED037P: Alkalinity by PC Titrator (QCLot: 2588435)								
ED037-P: Total Alkalinity as CaCO ₃	---	---	mg/L	---	200 mg/L 50 mg/L	85.7 96.5	81.0 70.0	111 130
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA (QCLot: 2588694)								
ED041G: Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	<1 <1	25 mg/L 500 mg/L	100 90.8	82.0 82.0	122 122
ED045G: Chloride by Discrete Analyser (QCLot: 2588697)								
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	10 mg/L 1000 mg/L	81.0 110	80.9 80.9	127 127
ED093F: Dissolved Major Cations (QCLot: 2589435)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.3	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	103	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	102	82.0	120



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
EK040P: Fluoride by PC Titrator (QC Lot: 2588436) - continued								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	104	82.0	116
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 2588661)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	90.0	114
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 2588662)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 2588696)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2588660)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.6	91.0	113
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 2588663)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.8	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2588656)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	81.6	69.0	101
				<0.1	1 mg/L	73.5	70.0	118
				<0.1	5 mg/L	78.5	74.0	118
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 2588659)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	84.2	69.0	101
				<0.1	1 mg/L	85.6	70.0	118
				<0.1	5 mg/L	91.5	74.0	118
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2588657)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.6	71.0	101
				<0.01	0.442 mg/L	88.5	72.0	108
				<0.01	1 mg/L	91.2	78.0	118
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 2588658)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	82.5	71.0	101
				<0.01	0.442 mg/L	85.7	72.0	108
				<0.01	1 mg/L	88.8	78.0	118
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 2588695)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	85.0	117
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QC Lot: 2587268)								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	76.1	55.8	112
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	86.2	71.6	113
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	56.6	56.0	121
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QC Lot: 2587268)								
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	102	57.9	119
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	69.3	62.5	110
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	80.0	61.5	121

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2591332)								
EP080: C6 - C9 Fraction	---	20	µg/L	<20	260 µg/L	90.5	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2591332)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	96.0	75.0	127
EP080: BTEXN (QCLot: 2591332)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.8	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	102	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	103	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	98.4	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	96.9	70.0	120
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2586805)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	97.0	70.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	95.0	70.0	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	103	70.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	108	70.0	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	106	70.0	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	110	70.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2586805)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	105	70.0	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	106	70.0	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	115	70.0	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	107	70.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	112	70.0	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	102	70.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	105	70.0	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	111	70.0	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	114	70.0	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	114	70.0	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	102	70.0	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2586805)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	110	70.0	130
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	116	70.0	150
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	100	70.0	150
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	109	70.0	150
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	115	70.0	150

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2586805) - continued								
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	110	70.0	130
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	104	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2586805)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	109	70.0	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	103	70.0	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	104	70.0	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	122	70.0	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	Spike Recovery(%)	Recovery Limits (%)	MS
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2588694)							
ES1929844-001	BH7	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	114	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 2588697)							
ES1929844-001	BH7	ED045G: Chloride	16887-00-6	250 mg/L	123	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 2589432)							
ES1929827-004	Anonymous	EG020A-F: Arsenic	7440-38-2	10 mg/L	91.5	70.0	130
		EG020A-F: Beryllium	7440-41-7	10 mg/L	88.2	70.0	130
		EG020A-F: Barium	7440-39-3	10 mg/L	91.6	70.0	130
		EG020A-F: Cadmium	7440-43-9	2.5 mg/L	85.1	70.0	130
		EG020A-F: Chromium	7440-47-3	10 mg/L	86.6	70.0	130
		EG020A-F: Cobalt	7440-48-4	10 mg/L	89.0	70.0	130
		EG020A-F: Copper	7440-50-8	10 mg/L	87.3	70.0	130
		EG020A-F: Lead	7439-92-1	10 mg/L	84.1	70.0	130
		EG020A-F: Manganese	7439-96-5	10 mg/L	85.6	70.0	130
		EG020A-F: Nickel	7440-02-0	10 mg/L	86.0	70.0	130
		EG020A-F: Vanadium	7440-62-2	10 mg/L	91.7	70.0	130
		EG020A-F: Zinc	7440-66-6	10 mg/L	87.4	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 2589437)							
ES1929844-004	MW239S	EG020A-F: Arsenic	7440-38-2	1 mg/L	85.5	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	80.2	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	91.2	70.0	130

Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
						Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 2588695) - continued							
ES1929844-001	BH7	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLOT: 2591332)							
ES1929844-002	BH6	EP080: C6 - C9 Fraction	----	325 µg/L	88.0	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLOT: 2591332)							
ES1929844-002	BH6	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	86.0	70.0	130
EP080: BTEXN (QCLOT: 2591332)							
ES1929844-002	BH6	EP080: Benzene	71-43-2	25 µg/L	93.7	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	96.7	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	97.5	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	95.9	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	98.7	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.8	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLOT: 2586805)							
ES1929819-001	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	107	50.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	109	50.0	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	95.6	50.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	115	50.0	130
		EP231X: Perfluoroctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	# Not Determined	50.0	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	123	50.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLOT: 2586805)							
ES1929819-001	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	112	50.0	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	103	50.0	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	130	50.0	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	118	50.0	130
		EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.5 µg/L	119	50.0	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	117	50.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	113	50.0	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	117	50.0	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	118	50.0	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	121	50.0	130
EP231C: Perfluoroalkyl Sulfonamides (QCLOT: 2586805)							
ES1929819-001	Anonymous	EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	123	50.0	130
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	119	50.0	150

Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	Spike Recovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2586805) - continued							
ES1929819-001	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	106	50.0	150
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	123	50.0	150
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	122	50.0	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	120	50.0	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	120	50.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2586805)							
ES1929819-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	118	50.0	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	113	50.0	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	120	50.0	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	118	50.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1929844	Page	: 1 of 15
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Sep-2019
Site	: WSS-CABBAGE TREE RD WATER MONITORING	Issue Date	: 23-Sep-2019
Sampler	: DANIEL KOUSBROEK	No. of samples received	: 14
Order number	: ----	No. of samples analysed	: 14

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

- 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: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EA010P: Conductivity by PC Titrator	QC-2588439-002	----	Electrical Conductivity @ 25°C	---	92.5 %	95.0-113%	Recovery less than lower control limit
Matrix Spike (MS) Recoveries							
EP231A: Perfluoroalkyl Sulfonic Acids	ES1929819--001	Anonymous	Perfluoroctane 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: WATER

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005: pH							
Clear Plastic Bottle - Natural	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	----	----	---	17-Sep-2019	16-Sep-2019
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural	SW4	----	----	---	17-Sep-2019	16-Sep-2019	1

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	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: 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	
EA005: pH									
Clear Plastic Bottle - Natural (EA005)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	16-Sep-2019	✗
EA005P: pH by PC Titrator									
Clear Plastic Bottle - Natural (EA005-P)	SW4		16-Sep-2019	---	---	---	17-Sep-2019	16-Sep-2019	✗
EA006: Sodium Adsorption Ratio (SAR)									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	18-Sep-2019	14-Oct-2019	✓
EA010P: Conductivity by PC Titrator									
Clear Plastic Bottle - Natural (EA010-P)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	14-Oct-2019	✓

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	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Clear Plastic Bottle - Natural (EA015H)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	18-Sep-2019	23-Sep-2019	✓
EA025: Total Suspended Solids dried at 104 ± 2°C									
Clear Plastic Bottle - Natural (EA025H)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	18-Sep-2019	23-Sep-2019	✓
EA065: Total Hardness as CaCO₃									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	18-Sep-2019	14-Oct-2019	✓
ED037P: Alkalinity by PC Titrator									
Clear Plastic Bottle - Natural (ED037-P)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	30-Sep-2019	✓
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Clear Plastic Bottle - Natural (ED041G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	14-Oct-2019	✓

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						
ED045G: Chloride by Discrete Analyser														
Clear Plastic Bottle - Natural (ED045G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	14-Oct-2019	✓					
ED093F: Dissolved Major Cations														
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	18-Sep-2019	14-Oct-2019	✓					
EG020F: Dissolved Metals by ICP-MS														
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	---	---	---	18-Sep-2019	14-Mar-2020	✓					
EG035F: Dissolved Mercury by FIMS														
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	---	---	---	18-Sep-2019	14-Oct-2019	✓					
EK040P: Fluoride by PC Titrator														
Clear Plastic Bottle - Natural (EK040P)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	---	---	---	17-Sep-2019	14-Oct-2019	✓					

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	
EK055G: Ammonia as N by Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK055G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	----	----	---	17-Sep-2019	14-Oct-2019	✓
EK057G: Nitrite as N by Discrete Analyser									
Clear Plastic Bottle - Natural (EK057G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	----	----	---	17-Sep-2019	18-Sep-2019	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK059G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	----	----	---	17-Sep-2019	14-Oct-2019	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK061G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	17-Sep-2019	14-Oct-2019	✓	17-Sep-2019	14-Oct-2019	✓
EK067G: Total Phosphorus as P by Discrete Analyser									
Clear Plastic Bottle - Sulfuric Acid (EK067G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	17-Sep-2019	14-Oct-2019	✓	17-Sep-2019	14-Oct-2019	✓

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	
EK071G: Reactive Phosphorus as P by discrete analyser									
Clear Plastic Bottle - Natural (EK071G)	BH7, BH8, SW3, BH1, SW1, BH2	BH6, MW239S, SW4, BH4, BH11,	16-Sep-2019	----	----	---	17-Sep-2019	18-Sep-2019	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
Amber Glass Bottle - Unpreserved (EP071SG)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	18-Sep-2019	23-Sep-2019	✓	19-Sep-2019	28-Oct-2019	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
Amber Glass Bottle - Unpreserved (EP071SG)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	18-Sep-2019	23-Sep-2019	✓	19-Sep-2019	28-Oct-2019	✓
EP080/071: Total Petroleum Hydrocarbons									
Amber VOC Vial - Sulfuric Acid (EP080)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	20-Sep-2019	30-Sep-2019	✓	20-Sep-2019	30-Sep-2019	✓

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						
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions														
Amber VOC Vial - Sulfuric Acid (EP080)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	20-Sep-2019	30-Sep-2019	✓	20-Sep-2019	30-Sep-2019	✓					
EP080: BTEXN														
Amber VOC Vial - Sulfuric Acid (EP080)	BH7, BH8, SW3, RINSATE 08, BH1, DUP08, BH11,	BH6, MW239S, SW4, TRIP BLANK 08, BH4, SW1, BH2	16-Sep-2019	20-Sep-2019	30-Sep-2019	✓	20-Sep-2019	30-Sep-2019	✓					
EP231A: Perfluoroalkyl Sulfonic Acids														
HDPE (no PTFE) (EP231X)	BH7, BH8, SW4, TRIP BLANK 08, DUP08,	BH6, SW3, RINSATE 08, BH4, SW1	16-Sep-2019	17-Sep-2019	14-Mar-2020	✓	17-Sep-2019	14-Mar-2020	✓					
EP231B: Perfluoroalkyl Carboxylic Acids														
HDPE (no PTFE) (EP231X)	BH7, BH8, SW4, TRIP BLANK 08, DUP08,	BH6, SW3, RINSATE 08, BH4, SW1	16-Sep-2019	17-Sep-2019	14-Mar-2020	✓	17-Sep-2019	14-Mar-2020	✓					
EP231C: Perfluoroalkyl Sulfonamides														
HDPE (no PTFE) (EP231X)	BH7, BH8, SW4, TRIP BLANK 08, DUP08,	BH6, SW3, RINSATE 08, BH4, SW1	16-Sep-2019	17-Sep-2019	14-Mar-2020	✓	17-Sep-2019	14-Mar-2020	✓					

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)	BH7, BH8, SW4, TRIP BLANK 08, DUP08,	BH6, SW3, RINSATE 08, BH4, SW1	16-Sep-2019	17-Sep-2019	14-Mar-2020	✓	17-Sep-2019	14-Mar-2020
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X)	BH7, BH8, SW4, TRIP BLANK 08, DUP08,	BH6, SW3, RINSATE 08, BH4, SW1	16-Sep-2019	17-Sep-2019	14-Mar-2020	✓	17-Sep-2019	14-Mar-2020

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	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator		ED037-P	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser		EK055G	4	35	11.43	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator		EA010-P	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	4	32	12.50	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	2	19	10.53	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	2	18	11.11	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	4	33	12.12	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
pH		EA005	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	2	7	28.57	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser		EK071G	2	12	16.67	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)		EA025H	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)		EA015H	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser		EK061G	4	38	10.53	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser		EK067G	4	38	10.53	10.00	✓ NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	14	0.00	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)							
Alkalinity by PC Titrator		ED037-P	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser		EK055G	2	35	5.71	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator		EA010-P	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	2	32	6.25	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	1	19	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	1	18	5.56	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	33	6.06	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
pH		EA005	2	40	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	2	7	28.57	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	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Laboratory Control Samples (LCS) - Continued							
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	12	8.33	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	2	14	14.29	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)		EA025H	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)		EA015H	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser		EK061G	6	38	15.79	15.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser		EK067G	6	38	15.79	15.00	✓ NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	1	14	7.14	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)							
Ammonia as N by Discrete analyser		EK055G	2	35	5.71	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator		EA010-P	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	2	32	6.25	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	1	19	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	1	18	5.56	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	33	6.06	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	12	8.33	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)		EA025H	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)		EA015H	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser		EK061G	2	38	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser		EK067G	2	38	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	1	14	7.14	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)							
Ammonia as N by Discrete analyser		EK055G	2	35	5.71	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	2	32	6.25	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	1	19	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	33	6.06	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	14	7.14	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	12	8.33	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	1	14	7.14	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	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Matrix Spikes (MS) - Continued							
Total Kjeldahl Nitrogen as N By Discrete Analyser		EK061G	2	38	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser		EK067G	2	38	5.26	5.00	✓ NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	14	0.00	5.00	✗ NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX		EP080	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard

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	EA005	WATER	In house: Referenced to APHA 4500 H+ B. pH of water samples is determined by ISE either manually or by automated pH meter. This method is compliant with NEPM (2013) Schedule B(3)
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 SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. 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 BaSO4 suspension is measured by a photometer and the SO4-2 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 librated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	<p>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)</p> <p>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)</p> <p>Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)</p>

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The 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)
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)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO ₃ - . This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

Analytical Methods			
	Method	Matrix	Method Descriptions
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	EP071SG	WATER	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 - C36. This method is compliant with NEPM (2013) Schedule B(3) (Method 506.1)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of 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. Where commercially available, isotopically labelled analogues of the target analytes are used as internal standards for quantification. Where a labelled analogue is not commercially available, the internal standard with similar chemistry and the closest retention time to the target is used for quantification. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. This method complies with the quality control definitions as stated in QSM 5.1. Data is reviewed in line with the DQOs as stated in QSM5.1
Preparation Methods			
	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Preparation for PFAS in water.	EP231-PR	WATER	Method presumes direct injection without workup. Preparation includes addition of internal standard and surrogate, and filtration prior to analysis.
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

CERTIFICATE OF ANALYSIS

Work Order	ES1931069	Page	: 1 of 5
Client	KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	95 MITCHELL ROAD CARDIFF NSW 2285	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 25-Sep-2019 10:40
Order number	: ----	Date Analysis Commenced	: 27-Sep-2019
C-O-C number	: ----	Issue Date	: 01-Oct-2019 16:15
Sampler	: DANIEL KOUSBROEK		
Site	: WSS-CABBAGE TREE RD WATER MONITORING		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 4		
No. of samples analysed	: 4		

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.

Signatures

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.

Signatories	Position	Accreditation Category
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW



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

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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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

Client sample ID				SW4	BH4	RINSATE 09	TRIP BLANK 09	---
Compound	CAS Number	LOR	Unit	25-Sep-2019 00:00	25-Sep-2019 00:00	25-Sep-2019 00:00	25-Sep-2019 00:00	---
				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	<0.02	<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	0.05	<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	---
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 (PFDmA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	---
Perfluorotridecanoic acid (PFTnDA)	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: WATER (Matrix: WATER)		Client sample ID		SW4	BH4	RINSATE 09	TRIP BLANK 09	---
		Client sampling date / time		25-Sep-2019 00:00	25-Sep-2019 00:00	25-Sep-2019 00:00	25-Sep-2019 00:00	---
Compound	CAS Number	LOR	Unit	ES1931069-001	ES1931069-002	ES1931069-003	ES1931069-004	-----
				Result	Result	Result	Result	---
EP231C: Perfluoroalkyl Sulfonamides - Continued								
N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	---
N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	---
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	---
N-Ethyl perfluoroctane 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	0.05	<0.01	<0.01	<0.01	---
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.05	<0.01	<0.01	<0.01	---
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.05	<0.01	<0.01	<0.01	---
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	96.1	101	102	98.7	---
13C8-PFOA	----	0.02	%	96.7	101	102	95.7	---

Surrogate Control Limits

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP231S: PFAS Surrogate			
13C4-PFOS	---	60	120
13C8-PFOA	---	60	120

QUALITY CONTROL REPORT

Work Order	: ES1931069	Page	: 1 of 7
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 25-Sep-2019
Order number	: ----	Date Analysis Commenced	: 27-Sep-2019
C-O-C number	: ----	Issue Date	: 01-Oct-2019
Sampler	: DANIEL KOUSBROEK		
Site	: WSS-CABBAGE TREE RD WATER MONITORING		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 4		
No. of samples analysed	: 4		



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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 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>
Franco Lentini	LCMS Coordinator	Sydney Organics, 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: 2609456)									
EB1924576-012	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	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
ES1931069-004	TRIP BLANK 09	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	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: 2609456)									
EB1924576-012	Anonymous	EP231X: Perfluoroctanoic 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
ES1931069-004	TRIP BLANK 09	EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit

Sub-Matrix: WATER

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: 2609456) - continued									
ES1931069-004 TRIP BLANK 09 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 (PFDDoDA)	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: 2609456)							
EB1924576-012 Anonymous EP231X: Perfluoroctane sulfonamide (FOSA) 754-91-6 0.02 µg/L <0.02 <0.02 0.00 No Limit									
		EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		ES1931069-004 TRIP BLANK 09 EP231X: Perfluoroctane sulfonamide (FOSA) 754-91-6 0.02 µg/L <0.02 <0.02 0.00 No Limit							
		EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluoroctane 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: 2609456)							
EB1924576-012	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: 2609456) - continued									
EB1924576-012	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
ES1931069-004	TRIP BLANK 09	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: 2609456)									
EB1924576-012	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
ES1931069-004	TRIP BLANK 09	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	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: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
							LCS	Low
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2609456)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	81.8	70.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	90.8	70.0	130
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	78.8	70.0	130
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	88.6	70.0	130
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	86.0	70.0	130
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	73.8	70.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2609456)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	102	70.0	130
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	103	70.0	130
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	91.6	70.0	130
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	102	70.0	130
EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	96.0	70.0	130
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	88.4	70.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	91.4	70.0	130
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	94.0	70.0	130
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	75.8	70.0	130
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	81.4	70.0	130
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	79.7	70.0	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2609456)								
EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	108	70.0	130
EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	94.3	70.0	150
EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	80.6	70.0	150
EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	101	70.0	150
EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	97.4	70.0	150
EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	90.0	70.0	130
EP231X: N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	107	70.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2609456)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	89.8	70.0	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	91.8	70.0	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	93.2	70.0	130

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2609456) - continued								
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	77.0	70.0	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	MS	Recovery Limits (%) Low	High
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2609456)							
EB1924576-012	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	91.2	50.0	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	101	50.0	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	83.8	50.0	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	98.4	50.0	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	96.4	50.0	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	86.2	50.0	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2609456)							
EB1924576-012	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	114	50.0	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	114	50.0	130
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	104	50.0	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	114	50.0	130
		EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.5 µg/L	113	50.0	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	101	50.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	103	50.0	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	111	50.0	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	103	50.0	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	91.6	50.0	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	93.1	50.0	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2609456)							
EB1924576-012	Anonymous	EP231X: Perfluoroctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	123	50.0	130
		EP231X: N-Methyl perfluoroctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	112	50.0	150
		EP231X: N-Ethyl perfluoroctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	91.0	50.0	150
		EP231X: N-Methyl perfluoroctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	114	50.0	150
		EP231X: N-Ethyl perfluoroctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	124	50.0	150
		EP231X: N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	104	50.0	130

Sub-Matrix: WATER

				<i>Matrix Spike (MS) Report</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Spike</i>	<i>Spike Recovery(%)</i>	<i>Recovery Limits (%)</i>	
				<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2609456) - continued							
EB1924576-012	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	126	50.0	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2609456)							
EB1924576-012	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	96.8	50.0	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	104	50.0	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	112	50.0	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	106	50.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1931069	Page	: 1 of 4
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 25-Sep-2019
Site	: WSS-CABBAGE TREE RD WATER MONITORING	Issue Date	: 01-Oct-2019
Sampler	: DANIEL KOUSBROEK	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 4

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.
- **NO** Matrix Spike outliers occur.
- 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.

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: 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) SW4, RINSATE 09,	BH4, TRIP BLANK 09	25-Sep-2019	27-Sep-2019	23-Mar-2020	✓	30-Sep-2019	23-Mar-2020	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) SW4, RINSATE 09,	BH4, TRIP BLANK 09	25-Sep-2019	27-Sep-2019	23-Mar-2020	✓	30-Sep-2019	23-Mar-2020	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) SW4, RINSATE 09,	BH4, TRIP BLANK 09	25-Sep-2019	27-Sep-2019	23-Mar-2020	✓	30-Sep-2019	23-Mar-2020	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) SW4, RINSATE 09,	BH4, TRIP BLANK 09	25-Sep-2019	27-Sep-2019	23-Mar-2020	✓	30-Sep-2019	23-Mar-2020	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) SW4, RINSATE 09,	BH4, TRIP BLANK 09	25-Sep-2019	27-Sep-2019	23-Mar-2020	✓	30-Sep-2019	23-Mar-2020	✓

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.

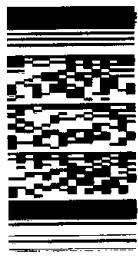
Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	2	11	18.18	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	11	9.09	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	11	9.09	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	11	9.09	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	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. Where commercially available, isotopically labelled analogues of the target analytes are used as internal standards for quantification. Where a labelled analogue is not commercially available, the internal standard with similar chemistry and the closest retention time to the target is used for quantification. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. This method complies with the quality control definitions as stated in QSM 5.1. Data is reviewed in line with the DQOs as stated in QSM5.1
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Preparation for PFAS in water.	EP231-PR	WATER	Method presumes direct injection without workup. Preparation includes addition of internal standard and surrogate, and filtration prior to analysis.

SITE, COC AND CONTACT DATA									
Client: Kleinfeildter Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200		Site Name: WSS - Cabbage Tree Rd water monitoring		Sampler Name: Dan Kousbroek		Laboratory: ALS 5/585 Maitland Rd Mayfield West, Newcastle NSW 2304 Phone: (02) 4944 2500			
QUOTE NUMBER ME114/19		Job No.: 20143820		Contact e-mail: dkousbroek@kleinfelder.com		Notes:			
Required TAT: 24 hrs		48 hrs		3 days		7 days		PM name (if not sampler): Tom Overton	
Data QA level: LAB minimum unless specified								lovernation@kleinfelder.com	
CHAIN OF CUSTODY									
Relinquished by (print): <i>D. Kousbroek</i>	(sign)	Received by (print): <i>H J</i>	(sign)	Relinquished: <i>H J</i>	(sign)	Received by: <i>H J</i>	(sign)	Send Results to:	
Date / Time: 25/9		Date / Time: 25/9/19 10:39		Date / Time: 25/9/19 17:00		Date / Time: 25/9/19		95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200	
Temp. (°C)		Temp. (°C)		Temp. (°C)		Temp. (°C)		Newcastle@kleinfelder.com	
Notes: Notes:		Notes: no pressure/ no ice seals intact / no seal		Notes: ice present / no ice seals intact / no seal		Notes: ice present / no ice seals intact / no seal		Phone: 02 4949 5200	
Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Comments
SW4	1			25/9				W-05 SG	
B44	2				1				
Risateco 9	3				1				
T-19 Blank 09	4				1				
Organic Analytes									
Additional Metals to make up NEPM 15									
Iron (dissolved)									
General Water Suite									
Total Dissolved Solids (TDS)									
Total Suspended Solids (TSS)									
PFAS (28 analytes, standard level)									
Metals									
Other Analytes									
Comments									
Environmental Division Sydney Work Order Reference ES1931069									
Telephone : +61 2 8784 8656									



V4-05 SG - TRHIB/TEKNU 8 Metals Silica Gel Clean Up
NT14 - Extended water suite B
Additional metal analysis to make up NEPM 15

Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn)
Boron (B), Barium (Ba), Beryllium (Be), Cobalt (Co), Manganese (Mn), Selenium (Se), Vanadium (V)

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order	: ES1929844		
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: DANIEL KOUSBROEK	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dkousbroek@kleinfelder.com	E-mail	: shirley.lecornu@alsglobal.com
Telephone	: ----	Telephone	: +6138549 9630
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 20193820	Page	: 1 of 3
Order number	: ----	Quote number	: EM2019ALLENVENG0010 (ME/114/19)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: WSS-CABBAGE TREE RD WATER MONITORING		
Sampler	: DANIEL KOUSBROEK		

Dates

Date Samples Received	: 16-Sep-2019 16:29	Issue Date	: 16-Sep-2019
Client Requested Due	: 20-Sep-2019	Scheduled Reporting Date	: 20-Sep-2019
Date			

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 3.8°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 14 / 14

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Sample TRIP08 to be forwarded to Eurofins as per COC's.**
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **pH analysis will be conducted by ALS Newcastle-Water.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If 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

Matrix: WATER

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA015H Total Dissolved Solids - Standard Level	WATER - EA025H Suspended Solids - Standard Level	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - NT-14 Extended Water Suite B	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-05 SG TRHBTEXN8 Metals inc Silica Gel Clean Up
ES1929844-001	16-Sep-2019 00:00	BH7	✓	✓	✓	✓	✓	✓	✓
ES1929844-002	16-Sep-2019 00:00	BH6	✓	✓	✓	✓	✓	✓	✓
ES1929844-003	16-Sep-2019 00:00	BH8	✓	✓	✓	✓	✓	✓	✓
ES1929844-004	16-Sep-2019 00:00	MW239S	✓	✓	✓		✓	✓	✓
ES1929844-005	16-Sep-2019 00:00	SW3	✓	✓	✓	✓	✓	✓	✓
ES1929844-006	16-Sep-2019 00:00	SW4	✓	✓	✓	✓	✓	✓	✓
ES1929844-007	16-Sep-2019 00:00	RINSATE 08			✓	✓		✓	✓
ES1929844-008	16-Sep-2019 00:00	TRIP BLANK 08			✓	✓		✓	✓
ES1929844-009	16-Sep-2019 00:00	BH1	✓	✓	✓		✓	✓	✓
ES1929844-010	16-Sep-2019 00:00	BH4	✓	✓	✓	✓	✓	✓	✓
ES1929844-011	16-Sep-2019 00:00	DUP08			✓	✓		✓	✓
ES1929844-012	16-Sep-2019 00:00	SW1	✓	✓	✓	✓	✓	✓	✓
ES1929844-013	16-Sep-2019 00:00	BH11	✓	✓	✓		✓	✓	✓
ES1929844-014	16-Sep-2019 00:00	BH2	✓	✓	✓		✓	✓	✓

Matrix: WATER

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EA005: pH
ES1929844-001	16-Sep-2019 00:00	BH7	✓
ES1929844-002	16-Sep-2019 00:00	BH6	✓
ES1929844-003	16-Sep-2019 00:00	BH8	✓
ES1929844-004	16-Sep-2019 00:00	MW239S	✓
ES1929844-005	16-Sep-2019 00:00	SW3	✓
ES1929844-006	16-Sep-2019 00:00	SW4	✓
ES1929844-009	16-Sep-2019 00:00	BH1	✓
ES1929844-010	16-Sep-2019 00:00	BH4	✓
ES1929844-012	16-Sep-2019 00:00	SW1	✓
ES1929844-013	16-Sep-2019 00:00	BH11	✓

WATER - EA005: pH
pH

ES1929844-014 | 16-Sep-2019 00:00 | BH2



Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

DANIEL KOUSBROEK

- | | | |
|--|-------|----------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | dkousbroek@kleinfelder.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | dkousbroek@kleinfelder.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | dkousbroek@kleinfelder.com |
| - A4 - AU Sample Receipt Notification - Environmental HT (SRN) | Email | dkousbroek@kleinfelder.com |
| - A4 - AU Tax Invoice (INV) | Email | dkousbroek@kleinfelder.com |
| - Chain of Custody (CoC) (COC) | Email | dkousbroek@kleinfelder.com |
| - EDI Format - ENMRG (ENMRG) | Email | dkousbroek@kleinfelder.com |
| - EDI Format - EQuIS V5 for KLEINFELDER (KLEINFELDER) | Email | dkousbroek@kleinfelder.com |
| - EDI Format - ESDAT (ESDAT) | Email | dkousbroek@kleinfelder.com |

INVOICES

- | | | |
|-----------------------------|-------|------------------------------|
| - A4 - AU Tax Invoice (INV) | Email | Aus_Accounts@kleinfelder.com |
|-----------------------------|-------|------------------------------|

Newcastle

- | | | |
|--|-------|---------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | newcastle@kleinfelder.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | newcastle@kleinfelder.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | newcastle@kleinfelder.com |
| - A4 - AU Sample Receipt Notification - Environmental HT (SRN) | Email | newcastle@kleinfelder.com |
| - A4 - AU Tax Invoice (INV) | Email | newcastle@kleinfelder.com |
| - Chain of Custody (CoC) (COC) | Email | newcastle@kleinfelder.com |
| - EDI Format - ENMRG (ENMRG) | Email | newcastle@kleinfelder.com |
| - EDI Format - EQuIS V5 for KLEINFELDER (KLEINFELDER) | Email | newcastle@kleinfelder.com |
| - EDI Format - ESDAT (ESDAT) | Email | newcastle@kleinfelder.com |

TOM OVERTON

- | | | |
|--|-------|--------------------------|
| - *AU Certificate of Analysis - NATA (COA) | Email | toverton@kleinfelder.com |
| - *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) | Email | toverton@kleinfelder.com |
| - *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) | Email | toverton@kleinfelder.com |
| - A4 - AU Sample Receipt Notification - Environmental HT (SRN) | Email | toverton@kleinfelder.com |
| - Chain of Custody (CoC) (COC) | Email | toverton@kleinfelder.com |
| - EDI Format - ENMRG (ENMRG) | Email | toverton@kleinfelder.com |
| - EDI Format - EQuIS V5 for KLEINFELDER (KLEINFELDER) | Email | toverton@kleinfelder.com |
| - EDI Format - ESDAT (ESDAT) | Email | toverton@kleinfelder.com |

20/9

W-05 SG - TRH/BTEXN/ 8 Metals Silica Gel Clean Up
NT14 - Extended water sulfo B

Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Zinc (Zn)

Additional metals analysis to make up NEPM 15

Boron (B), Barium (Ba), Beryllium (Be), Cobalt (Co), Manganese (Mn), Selenium (Se), Vanadium (V)

pH even.

Sample Receipt Advice

Company name: **Kleinfelder Aust Pty Ltd (NEWCASTLE)**

Contact name: Tom Overton

Project name: WSS - CABBAGE TREE RD WATER MONITORING

Project ID: 20193820

COC number: Not provided

Turn around time: 5 Day

Date/Time received: Sep 17, 2019 4:45 PM

Eurofins reference: **677582**

Sample information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table.
 - 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.
 - Split sample sent to requested external lab.
 - 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:

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Tom Overton - toverton@kleinfelder.com.



Environment Testing

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e.mail : EnviroSales@eurofins.com
web : www.eurofins.com.au

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NATA # 1261
Site # 1254 & 14271

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NATA # 1261 Site # 18217

Brisbane
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NATA # 1261 Site # 20794

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2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Kleinfelder Aust Pty Ltd (NEWCASTLE)	Order No.:		Received:	Sep 17, 2019 4:45 PM
Address:	95 Mitchell Rd Cardiff NSW 2285	Report #:	677582	Due:	Sep 24, 2019
Project Name:	WSS - CABBAGE TREE RD WATER MONITORING	Phone:	02 4949 5200	Priority:	5 Day
Project ID:	20193820	Fax:		Contact Name:	Tom Overton
					Eurofins Analytical Services Manager : Andrew Black

Sample Detail

Melbourne Laboratory - NATA Site # 1254 & 14271

Sydney Laboratory - NATA Site # 18217

Brisbane Laboratory - NATA Site # 20794

Perth Laboratory - NATA Site # 23736

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID							
1	TRIP08	Sep 16, 2019		Water	S19-Se27286	X	X	X	X	X	X	X
						1	1	1	1	1	1	1

Test Counts

Environment Testing

Kleinfelder Australia Pty Ltd (NEWC)
95 Mitchell Rd
Cardiff
NSW 2285



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: Tom Overton

Report 677582-W
Project name WSS - CABBAGE TREE RD WATER MONITORING
Project ID 20193820
Received Date Sep 17, 2019

Client Sample ID			TRIP08
Sample Matrix			Water
Eurofins Sample No.			S19-Se27286
Date Sampled	LOR	Unit	Sep 16, 2019
Test/Reference			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	0.20
TRH C15-C28	0.1	mg/L	0.4
TRH C29-C36	0.1	mg/L	0.2
TRH C10-C36 (Total)	0.1	mg/L	0.8
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	147
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene ^{N02}	0.01	mg/L	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	0.18
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	0.18
TRH >C16-C34	0.1	mg/L	0.4
TRH >C34-C40	0.1	mg/L	0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.68
TRH - 2013 NEPM Fractions (after silica gel clean-up)			
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1
TRH - 1999 NEPM Fractions (after silica gel clean-up)			
TRH C10-C36 (Total) (after silica gel clean-up)	0.4	mg/L	< 0.1
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1
Chromium (hexavalent)	0.005	mg/L	< 0.005
Chromium (trivalent filtered)	0.005	mg/L	< 0.005

Client Sample ID			TRIP08
Sample Matrix			Water
Eurofins Sample No.			S19-Se27286
Date Sampled			Sep 16, 2019
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic (filtered)	0.001	mg/L	< 0.001
Barium (filtered)	0.02	mg/L	0.04
Beryllium (filtered)	0.001	mg/L	< 0.001
Boron (filtered)	0.05	mg/L	< 0.05
Cadmium (filtered)	0.0002	mg/L	< 0.0002
Chromium (filtered)	0.001	mg/L	< 0.001
Cobalt (filtered)	0.001	mg/L	0.002
Copper (filtered)	0.001	mg/L	< 0.001
Iron (filtered)	0.05	mg/L	0.69
Lead (filtered)	0.001	mg/L	< 0.001
Manganese (filtered)	0.005	mg/L	0.037
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	0.003
Vanadium (filtered)	0.005	mg/L	< 0.005
Zinc (filtered)	0.005	mg/L	0.012
Perfluoroalkyl carboxylic acids (PFCAs)			
Perfluorobutanoic acid (PFBA) ^{N11}	0.05	ug/L	< 0.05
Perfluoropentanoic acid (PFPeA) ^{N11}	0.01	ug/L	< 0.01
Perfluorohexanoic acid (PFHxA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanoic acid (PFHpA) ^{N11}	0.01	ug/L	< 0.01
Perfluorooctanoic acid (PFOA) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanoic acid (PFNA) ^{N11}	0.01	ug/L	< 0.01
Perfluorodecanoic acid (PFDA) ^{N11}	0.01	ug/L	< 0.01
Perfluoroundecanoic acid (PFUnDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorododecanoic acid (PFDoDA) ^{N11}	0.01	ug/L	< 0.01
Perfluorotridecanoic acid (PFTrDA) ^{N15}	0.01	ug/L	< 0.01
Perfluorotetradecanoic acid (PFTeDA) ^{N11}	0.01	ug/L	< 0.01
13C4-PFBA (surr.)	1	%	65
13C5-PFPeA (surr.)	1	%	61
13C5-PFHxA (surr.)	1	%	77
13C4-PFHpA (surr.)	1	%	85
13C8-PFOA (surr.)	1	%	87
13C5-PFNA (surr.)	1	%	93
13C6-PFDA (surr.)	1	%	89
13C2-PFUnDA (surr.)	1	%	77
13C2-PFDoDA (surr.)	1	%	72
13C2-PFTeDA (surr.)	1	%	78
Perfluoroalkyl sulfonamido substances			
Perfluorooctane sulfonamide (FOSA) ^{N11}	0.05	ug/L	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) ^{N11}	0.05	ug/L	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) ^{N11}	0.05	ug/L	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) ^{N11}	0.05	ug/L	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) ^{N11}	0.05	ug/L	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) ^{N11}	0.05	ug/L	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) ^{N11}	0.05	ug/L	< 0.05
13C8-FOSA (surr.)	1	%	79

Client Sample ID			TRIP08
Sample Matrix			Water
Eurofins Sample No.			S19-Se27286
Date Sampled			Sep 16, 2019
Test/Reference	LOR	Unit	
Perfluoroalkyl sulfonamido substances			
D3-N-MeFOSA (surr.)	1	%	61
D5-N-EtFOSA (surr.)	1	%	66
D7-N-MeFOSE (surr.)	1	%	91
D9-N-EtFOSE (surr.)	1	%	79
D5-N-EtFOSAA (surr.)	1	%	90
D3-N-MeFOSAA (surr.)	1	%	70
Perfluoroalkyl sulfonic acids (PFASs)			
Perfluorobutanesulfonic acid (PFBS) ^{N11}	0.01	ug/L	< 0.01
Perfluorononanesulfonic acid (PFNS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropropanesulfonic acid (PFPrS) ^{N15}	0.01	ug/L	< 0.01
Perfluoropentanesulfonic acid (PFPeS) ^{N15}	0.01	ug/L	< 0.01
Perfluorohexanesulfonic acid (PFHxS) ^{N11}	0.01	ug/L	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) ^{N15}	0.01	ug/L	< 0.01
Perfluorooctanesulfonic acid (PFOS) ^{N11}	0.01	ug/L	^{N09} 0.03
Perfluorodecanesulfonic acid (PFDS) ^{N15}	0.01	ug/L	< 0.01
13C3-PFBS (surr.)	1	%	130
18O2-PFHxS (surr.)	1	%	125
13C8-PFOS (surr.)	1	%	113
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)			
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA) ^{N11}	0.05	ug/L	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) ^{N11}	0.01	ug/L	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) ^{N15}	0.01	ug/L	< 0.01
13C2-4:2 FTSA (surr.)	1	%	66
13C2-6:2 FTSA (surr.)	1	%	111
13C2-8:2 FTSA (surr.)	1	%	87
PFASs Summations			
Sum (PFHxS + PFOS)*	0.01	ug/L	0.03
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.03
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.03
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1

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.

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	7 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	14 Days
TRH - 2013 NEPM Fractions (after silica gel clean-up) - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	7 Days
TRH - 1999 NEPM Fractions (after silica gel clean-up) - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 17, 2019	7 Days
NEPM 1999 Metals : Metals M15 (Filtered)			
Chromium (hexavalent) - Method: E057 Total Speciated Chromium	Sydney	Sep 17, 2019	28 Days
Chromium (trivalent filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 17, 2019	28 Days
Metals M8 filtered - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 17, 2019	28 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 18, 2019	180 Days
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Brisbane	Sep 19, 2019	14 Days
Perfluoroalkyl sulfonamido substances - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Brisbane	Sep 19, 2019	14 Days
Perfluoroalkyl sulfonic acids (PFSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Brisbane	Sep 19, 2019	14 Days
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs) - Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)	Brisbane	Sep 19, 2019	14 Days

Company Name:	Kleinfelder Aust Pty Ltd (NEWCASTLE)	Order No.:		Received:	Sep 17, 2019 4:45 PM
Address:	95 Mitchell Rd Cardiff NSW 2285	Report #:	677582	Due:	Sep 24, 2019
Project Name:	WSS - CABBAGE TREE RD WATER MONITORING	Phone:	02 4949 5200	Priority:	5 Day
Project ID:	20193820	Fax:		Contact Name:	Tom Overton
					Eurofins Analytical Services Manager : Andrew Black

Sample Detail
Melbourne Laboratory - NATA Site # 1254 & 14271
Sydney Laboratory - NATA Site # 18217
Brisbane Laboratory - NATA Site # 20794
Perth Laboratory - NATA Site # 23736
External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID							
1	TRIP08	Sep 16, 2019		Water	S19-Se27286	X	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food 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. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. 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 SRA.

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.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****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	US Department of Defense Quality Systems Manual Version 5.3
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 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpa, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
Method Blank							
Chromium (hexavalent)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Barium (filtered)	mg/L	< 0.02			0.02	Pass	
Beryllium (filtered)	mg/L	< 0.001			0.001	Pass	
Boron (filtered)	mg/L	< 0.05			0.05	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Vanadium (filtered)	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
Method Blank							
Perfluoroalkyl carboxylic acids (PFCAs)							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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 (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
Method Blank							
Perfluoroalkyl sulfonamido substances							
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							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluorononanesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPrS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexamersulfonic 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 (n:2 FTSA)							
1H.1H.2H.2H-perfluorohexamersulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	102			70-130	Pass	
TRH C10-C14	%	120			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	109			70-130	Pass	
Toluene	%	110			70-130	Pass	
Ethylbenzene	%	110			70-130	Pass	
m&p-Xylenes	%	110			70-130	Pass	
o-Xylene	%	112			70-130	Pass	
Xylenes - Total	%	111			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	120			70-130	Pass	
TRH C6-C10	%	101			70-130	Pass	
TRH >C10-C16	%	108			70-130	Pass	
LCS - % Recovery							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	%	71			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	71			70-130	Pass	
LCS - % Recovery							
Chromium (hexavalent)	%	96			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	97			70-130	Pass	
Barium (filtered)	%	93			70-130	Pass	
Beryllium (filtered)	%	96			70-130	Pass	
Boron (filtered)	%	80			70-130	Pass	
Cadmium (filtered)	%	109			70-130	Pass	
Chromium (filtered)	%	98			70-130	Pass	
Cobalt (filtered)	%	96			70-130	Pass	
Copper (filtered)	%	95			70-130	Pass	
Iron (filtered)	%	95			70-130	Pass	
Lead (filtered)	%	96			70-130	Pass	
Manganese (filtered)	%	95			70-130	Pass	
Mercury (filtered)	%	94			70-130	Pass	
Nickel (filtered)	%	97			70-130	Pass	
Vanadium (filtered)	%	96			70-130	Pass	
Zinc (filtered)	%	94			70-130	Pass	
LCS - % Recovery							
Perfluoroalkyl carboxylic acids (PFCAs)							
Perfluorobutanoic acid (PFBA)	%	95			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	79			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	98			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	91			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	92			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	91			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	103			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	101			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	%	104			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	83			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	110			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonamido substances							
Perfluorooctane sulfonamide (FOSA)	%	103			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	102			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	99			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	90			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	103			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	108			50-150	Pass	
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	%	111			50-150	Pass	
LCS - % Recovery							
Perfluoroalkyl sulfonic acids (PFSAs)							
Perfluorobutanesulfonic acid (PFBS)	%	97			50-150	Pass	
Perfluoronananesulfonic acid (PFNS)	%	110			50-150	Pass	
Perfluoropropanesulfonic acid (PFPoS)	%	94			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	103			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	86			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	%	69			50-150	Pass	

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluorooctanesulfonic acid (PFOS)		%	93			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)		%	103			50-150	Pass	
LCS - % Recovery								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	91			50-150	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	142			50-150	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	103			50-150	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	108			50-150	Pass
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1				
TRH C6-C9	S19-Se28681	NCP	%	72			70-130	Pass
Spike - % Recovery								
BTEX				Result 1				
Benzene	S19-Se28681	NCP	%	82			70-130	Pass
Toluene	S19-Se28681	NCP	%	83			70-130	Pass
Ethylbenzene	S19-Se28681	NCP	%	85			70-130	Pass
m&p-Xylenes	S19-Se28681	NCP	%	84			70-130	Pass
o-Xylene	S19-Se28681	NCP	%	84			70-130	Pass
Xylenes - Total	S19-Se28681	NCP	%	84			70-130	Pass
Spike - % Recovery								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1				
Naphthalene	S19-Se28681	NCP	%	85			70-130	Pass
TRH C6-C10	S19-Se28681	NCP	%	71			70-130	Pass
Spike - % Recovery								
Chromium (hexavalent)	S19-Se29873	NCP	%	36			70-130	Fail
Spike - % Recovery								
Heavy Metals				Result 1				
Arsenic (filtered)	S19-Se26165	NCP	%	92			70-130	Pass
Barium (filtered)	S19-Se26165	NCP	%	89			70-130	Pass
Beryllium (filtered)	S19-Se26165	NCP	%	119			70-130	Pass
Boron (filtered)	S19-Se26165	NCP	%	82			70-130	Pass
Cadmium (filtered)	S19-Se26165	NCP	%	107			70-130	Pass
Chromium (filtered)	S19-Se26165	NCP	%	93			70-130	Pass
Cobalt (filtered)	S19-Se26165	NCP	%	91			70-130	Pass
Copper (filtered)	S19-Se26165	NCP	%	92			70-130	Pass
Iron (filtered)	S19-Se26165	NCP	%	84			70-130	Pass
Lead (filtered)	S19-Se26165	NCP	%	94			70-130	Pass
Manganese (filtered)	S19-Se26165	NCP	%	78			70-130	Pass
Mercury (filtered)	S19-Se26165	NCP	%	87			70-130	Pass
Nickel (filtered)	S19-Se26165	NCP	%	93			70-130	Pass
Vanadium (filtered)	S19-Se26165	NCP	%	92			70-130	Pass
Zinc (filtered)	S19-Se26165	NCP	%	91			70-130	Pass
Spike - % Recovery								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1				
Perfluorobutanoic acid (PFBA)	S19-Se28429	NCP	%	106			50-150	Pass
Perfluoropentanoic acid (PFPeA)	S19-Se28429	NCP	%	63			50-150	Pass
Perfluorohexanoic acid (PFHxA)	S19-Se28429	NCP	%	76			50-150	Pass
Perfluoroheptanoic acid (PFHpA)	S19-Se28429	NCP	%	108			50-150	Pass
Perfluorooctanoic acid (PFOA)	S19-Se28429	NCP	%	83			50-150	Pass
Perfluorononanoic acid (PFNA)	S19-Se28429	NCP	%	100			50-150	Pass
Perfluorodecanoic acid (PFDA)	S19-Se28429	NCP	%	95			50-150	Pass

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroundecanoic acid (PFUnDA)	S19-Se28429	NCP	%	99			50-150	Pass	
Perfluorododecanoic acid (PFDODA)	S19-Se28429	NCP	%	97			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	S19-Se28429	NCP	%	94			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	S19-Se28429	NCP	%	110			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonamido substances				Result 1					
Perfluoroctane sulfonamide (FOSA)	S19-Se28429	NCP	%	96			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	S19-Se28429	NCP	%	93			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	S19-Se28429	NCP	%	87			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	S19-Se28429	NCP	%	85			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	S19-Se28429	NCP	%	86			50-150	Pass	
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	S19-Se28429	NCP	%	102			50-150	Pass	
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	S19-Se28429	NCP	%	102			50-150	Pass	
Spike - % Recovery									
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1					
Perfluorobutanesulfonic acid (PFBS)	S19-Se28429	NCP	%	94			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	S19-Se28429	NCP	%	95			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	S19-Se28429	NCP	%	87			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	S19-Se28429	NCP	%	102			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	S19-Se28429	NCP	%	96			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHps)	S19-Se28429	NCP	%	83			50-150	Pass	
Perfluoroctanesulfonic acid (PFOS)	S19-Se28429	NCP	%	100			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	S19-Se28429	NCP	%	80			50-150	Pass	
Spike - % Recovery									
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1					
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	S19-Se28429	NCP	%	101			50-150	Pass	
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	S19-Se28429	NCP	%	106			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	S19-Se28429	NCP	%	115			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	S19-Se28429	NCP	%	117			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S19-Se28680	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	

Duplicate								
BTEX								
Benzene	S19-Se28680	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Toluene	S19-Se28680	NCP	mg/L	0.010	0.009	8.0	30%	Pass
Ethylbenzene	S19-Se28680	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
m&p-Xylenes	S19-Se28680	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass
o-Xylene	S19-Se28680	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Xylenes - Total	S19-Se28680	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	S19-Se28680	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass
TRH C6-C10	S19-Se28680	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Chromium (hexavalent)	S19-Se29644	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic (filtered)	S19-Se27286	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Barium (filtered)	S19-Se27286	CP	mg/L	0.04	0.04	1.0	30%	Pass
Beryllium (filtered)	S19-Se27286	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Boron (filtered)	S19-Se27286	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
Cadmium (filtered)	S19-Se27286	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass
Chromium (filtered)	S19-Se27286	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Cobalt (filtered)	S19-Se27286	CP	mg/L	0.002	0.002	1.0	30%	Pass
Copper (filtered)	S19-Se27286	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Iron (filtered)	S19-Se27286	CP	mg/L	0.69	0.69	<1	30%	Pass
Lead (filtered)	S19-Se27286	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Manganese (filtered)	S19-Se27286	CP	mg/L	0.037	0.036	2.0	30%	Pass
Mercury (filtered)	S19-Se27286	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass
Nickel (filtered)	S19-Se27286	CP	mg/L	0.003	0.003	6.0	30%	Pass
Vanadium (filtered)	S19-Se27286	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass
Zinc (filtered)	S19-Se27286	CP	mg/L	0.012	0.011	5.0	30%	Pass
Duplicate								
Perfluoroalkyl carboxylic acids (PFCAs)				Result 1	Result 2	RPD		
Perfluorobutanoic acid (PFBA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Perfluoropentanoic acid (PFPeA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanoic acid (PFHxA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanoic acid (PFHpA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroctanoic acid (PFOA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanoic acid (PFNA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanoic acid (PFDA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroundecanoic acid (PFUnDA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorododecanoic acid (PFDoDA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotridecanoic acid (PFTrDA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorotetradecanoic acid (PFTeDA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
Perfluorooctane sulfonamide (FOSA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass

Duplicate								
Perfluoroalkyl sulfonamido substances				Result 1	Result 2	RPD		
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
Duplicate								
Perfluoroalkyl sulfonic acids (PFASs)				Result 1	Result 2	RPD		
Perfluorobutanesulfonic acid (PFBS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorononanesulfonic acid (PFNS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropropanesulfonic acid (PFPrS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoropentanesulfonic acid (PFPeS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorohexanesulfonic acid (PFHxS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroheptanesulfonic acid (PFHpS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluoroctanesulfonic acid (PFOS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTsAs)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	M19-Se27052	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	M19-Se27052	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

Comments**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
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
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.
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.
N15	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).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Bryan Wilson	Senior Analyst-PFAS (QLD)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)



Glenn Jackson
General Manager

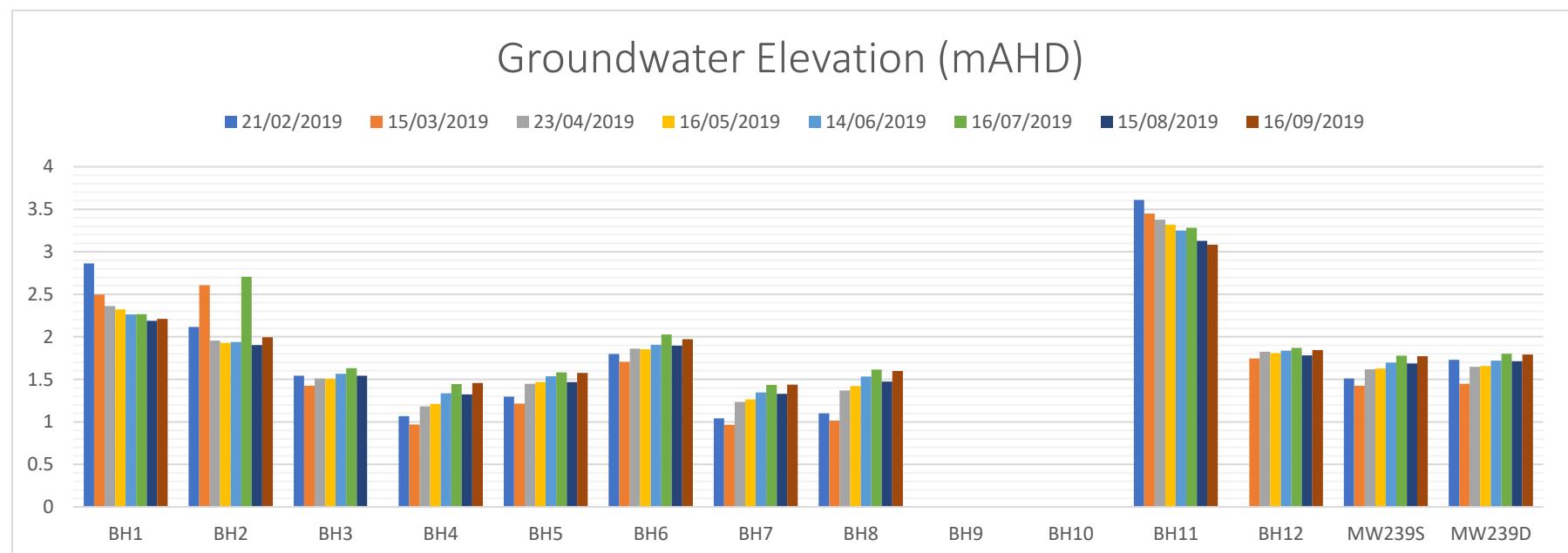
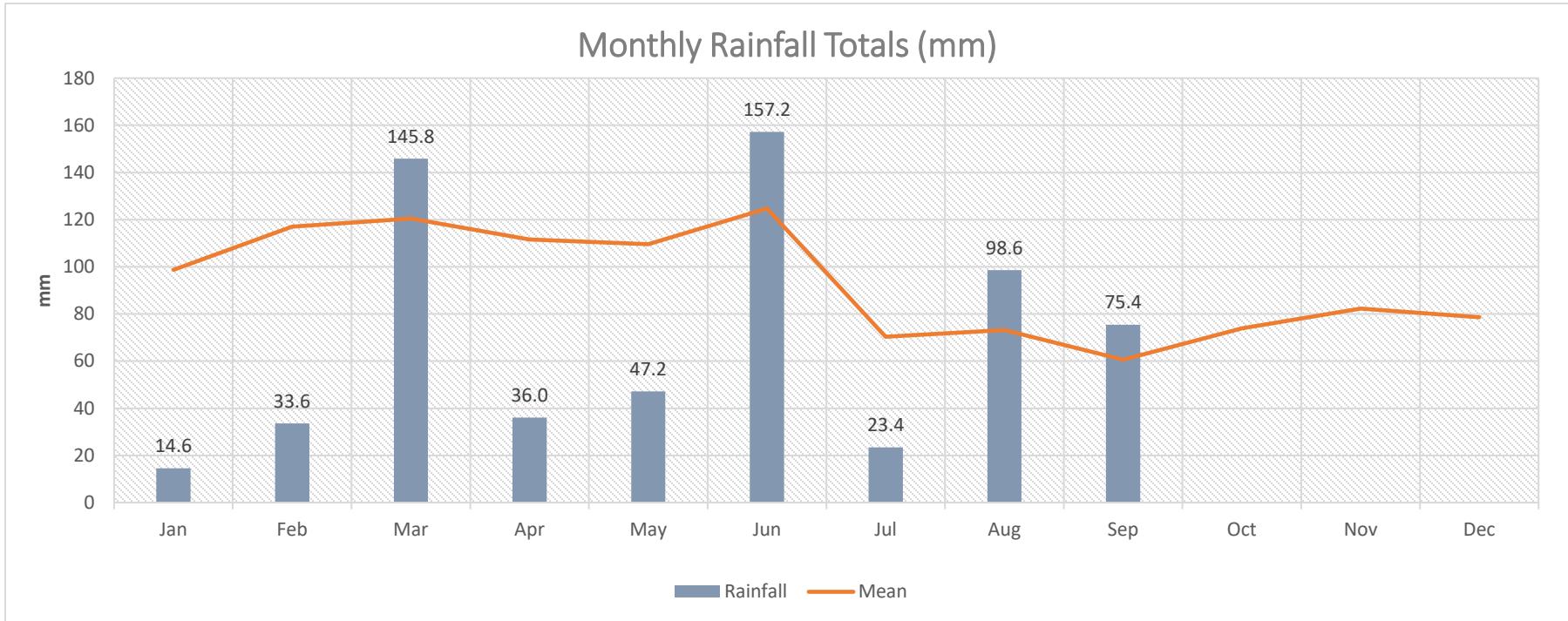
Final report - this Report replaces any previously issued Report

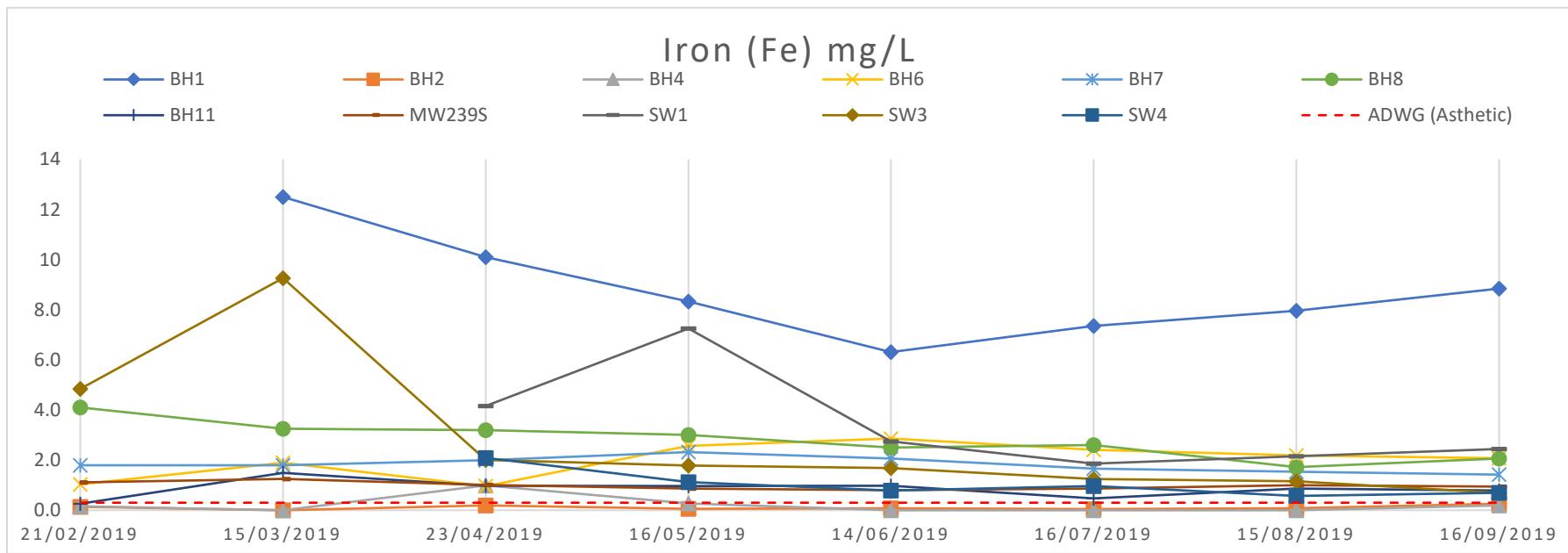
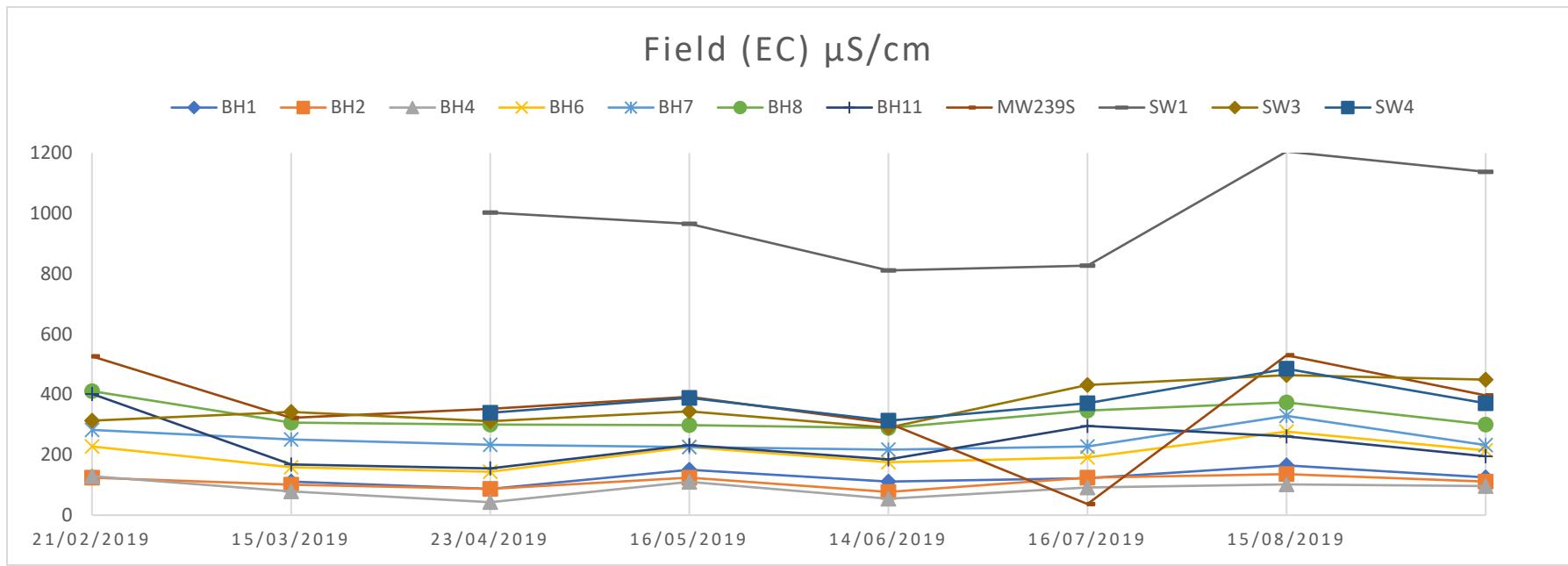
- Indicates Not Requested
- * Indicates NATA accreditation does not cover the performance of this service

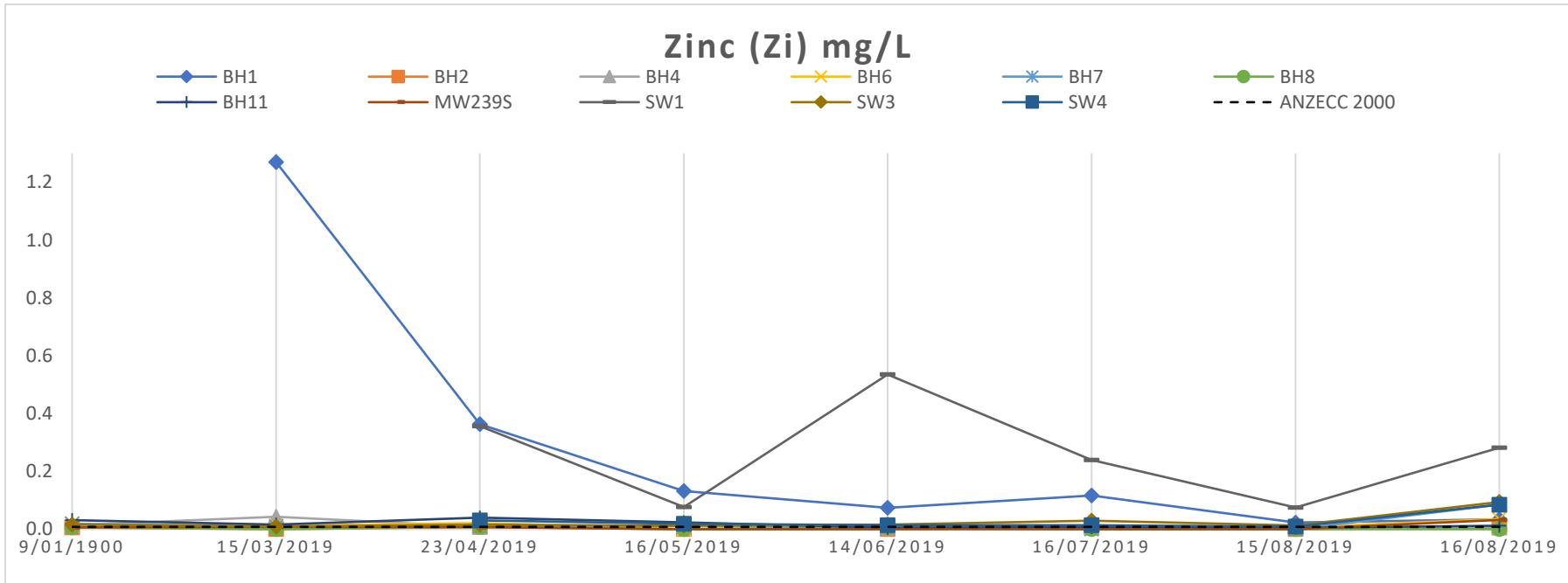
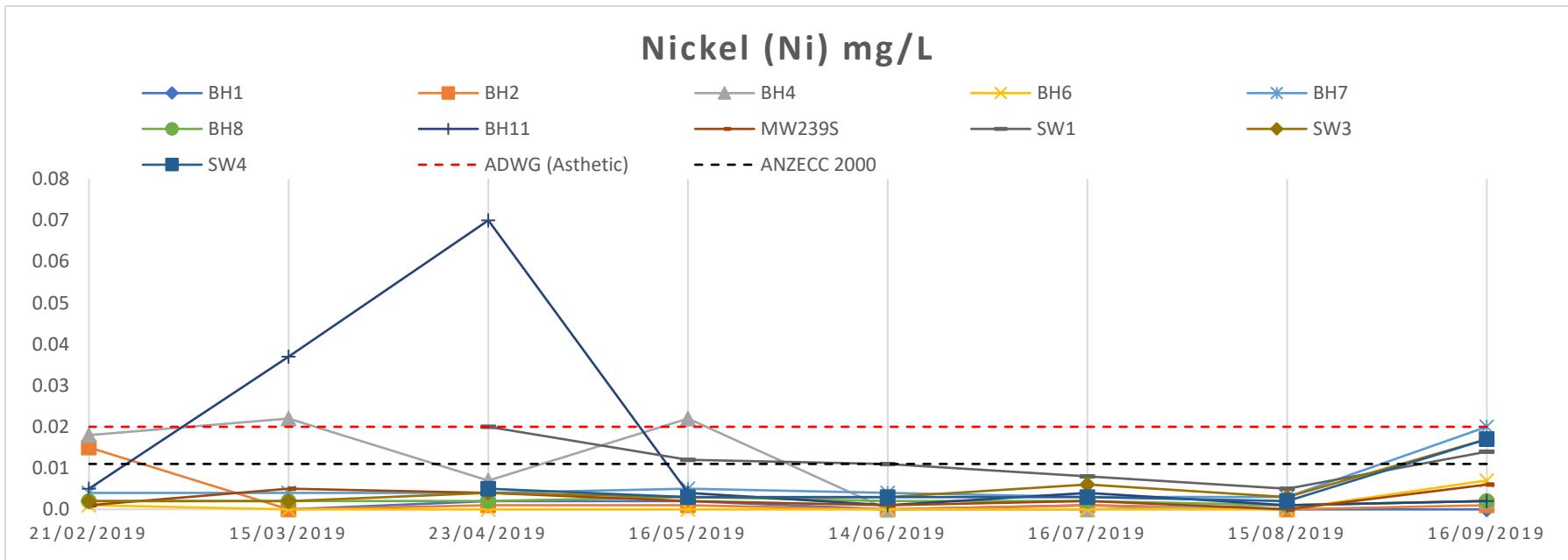
Measurement uncertainty of test data is available on request or please [click here](#).

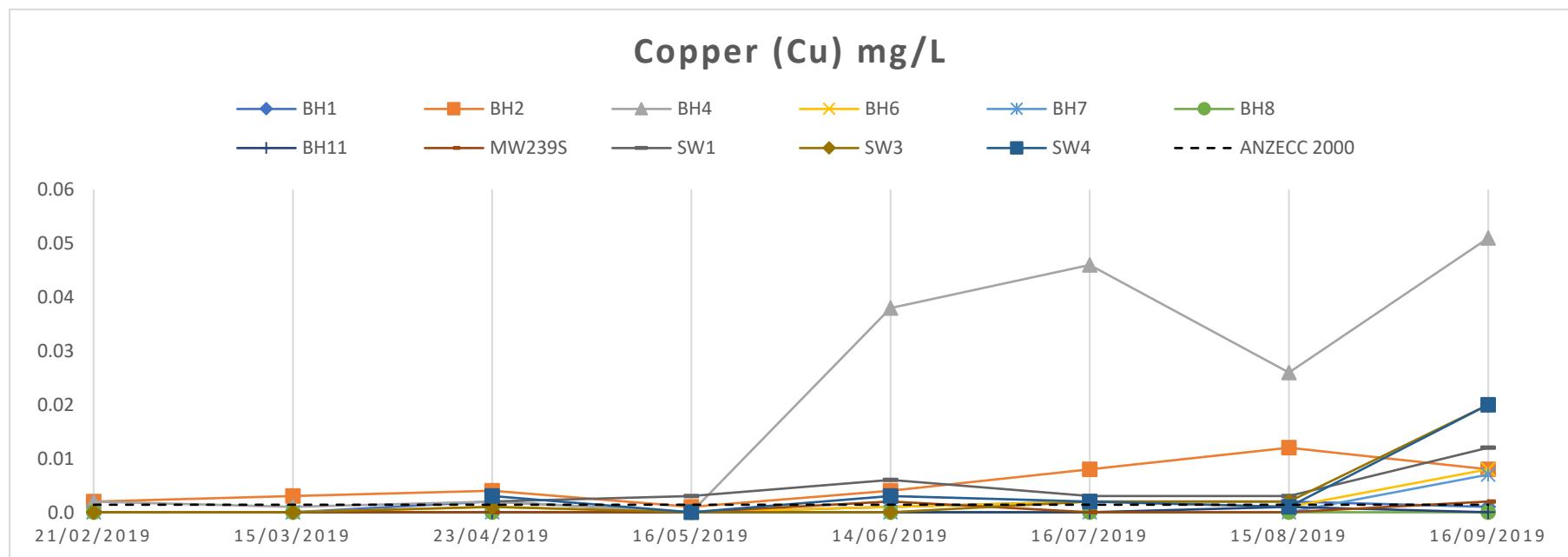
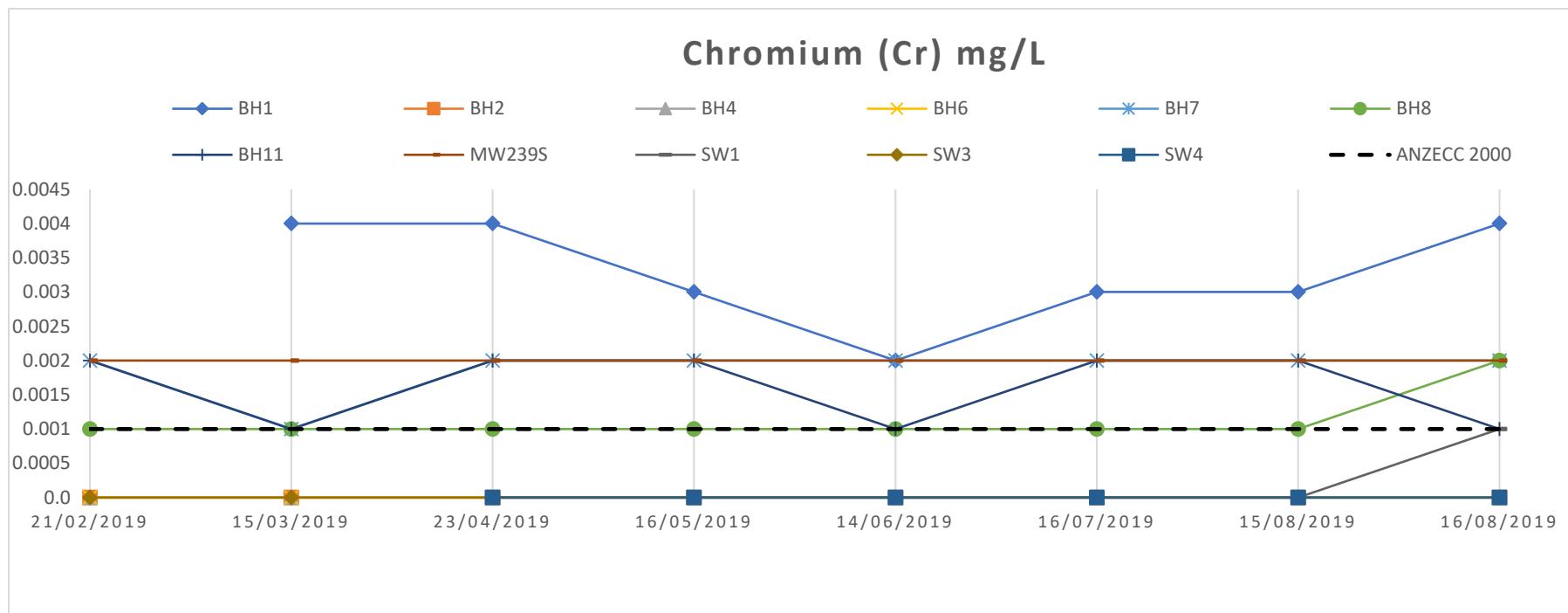
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APPENDIX B: TREND DATA



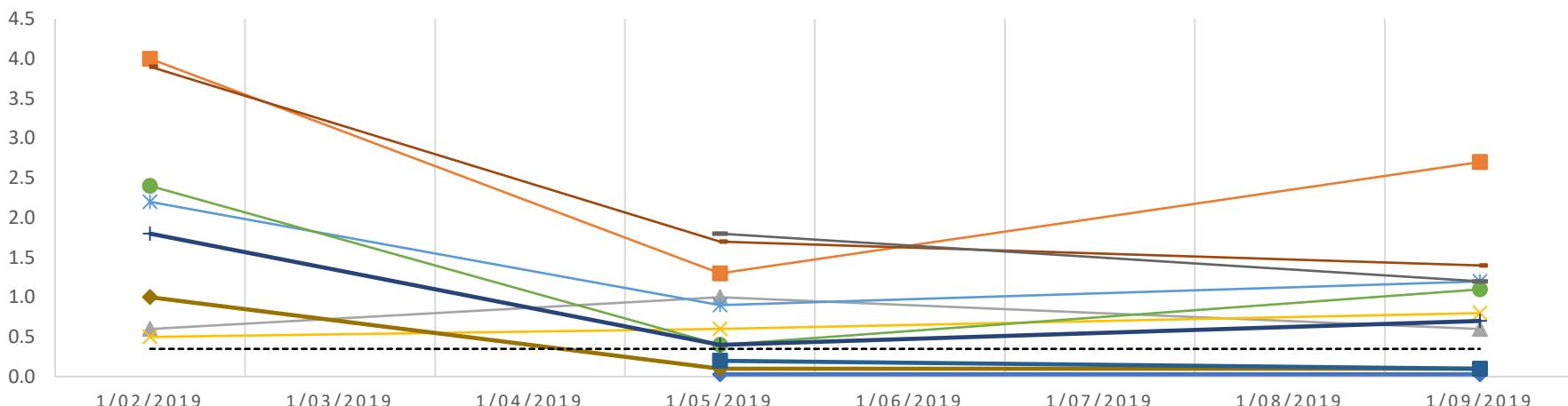






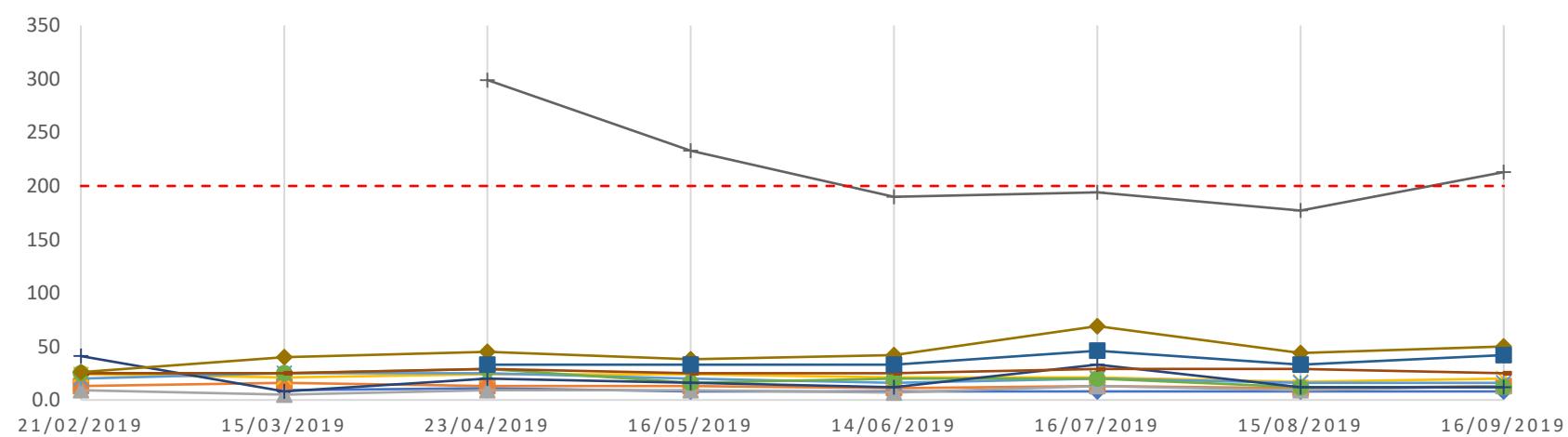
Total Nitrogen (N) mg/L

BH1 (blue diamond), BH2 (orange square), BH4 (grey triangle), BH6 (yellow asterisk), BH7 (light blue asterisk), BH8 (green circle),
 BH11 (dark blue plus), MW239S (brown line), SW1 (grey line), SW3 (brown diamond), SW4 (dark blue square), ANZECC 20000 (dashed black line)

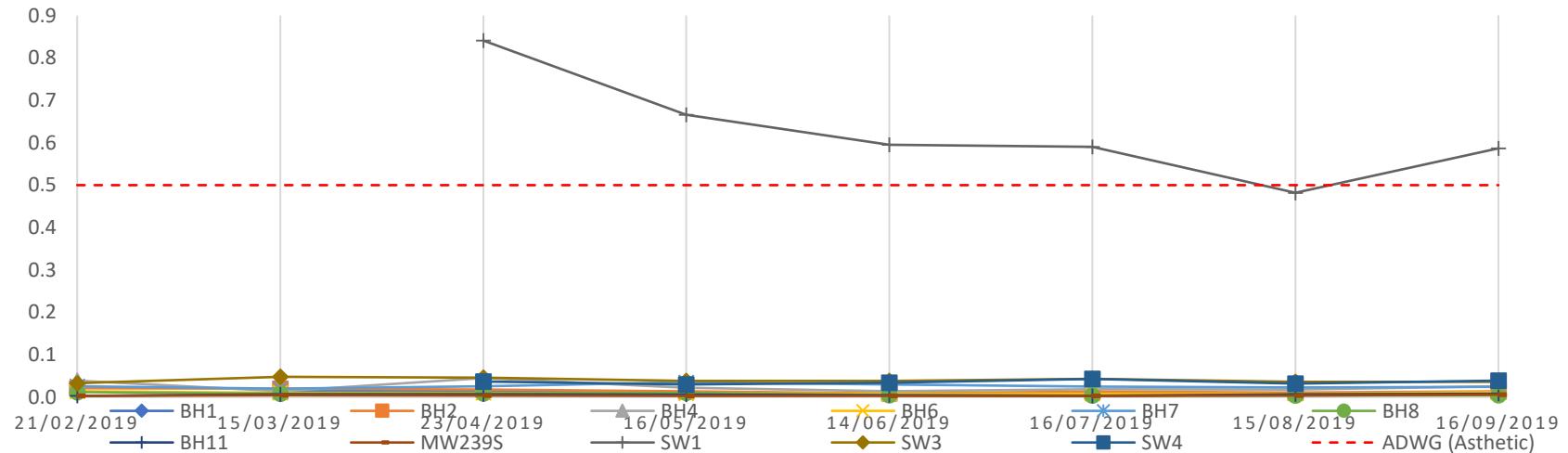


Total Hardness (CaCO₃) mg/L

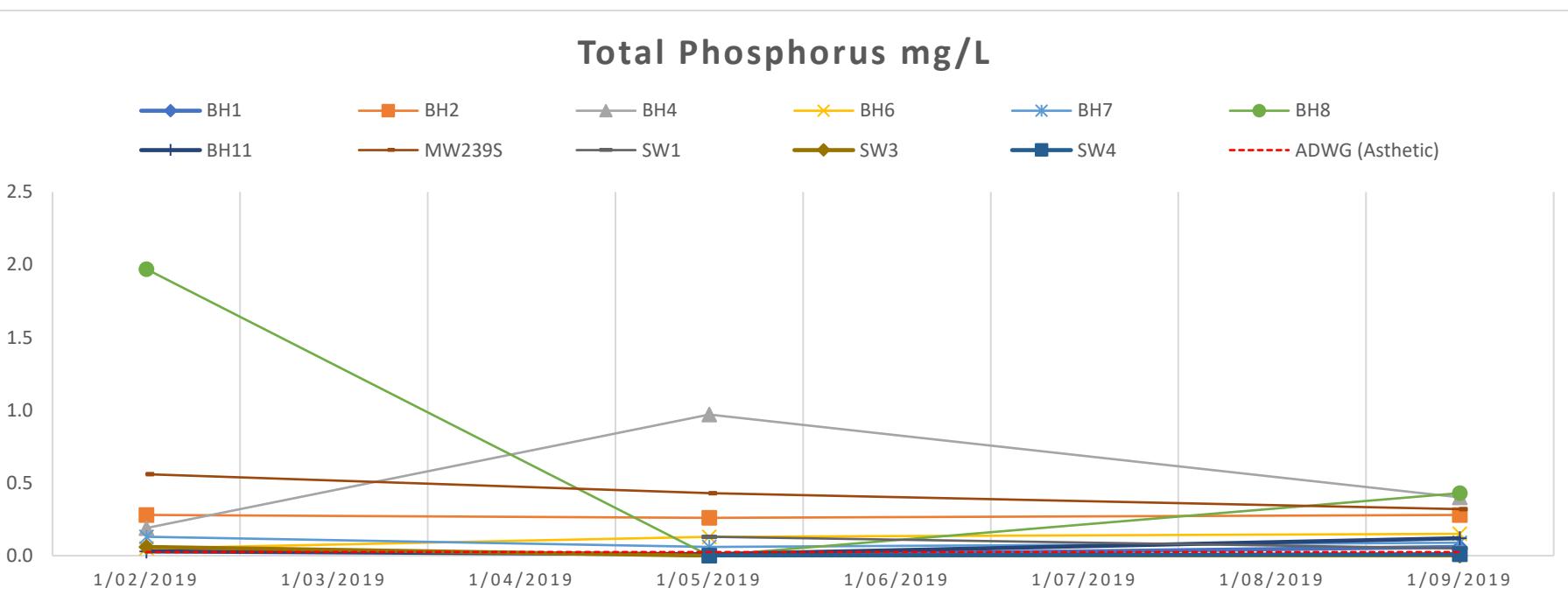
BH1 (blue diamond), BH2 (orange square), BH4 (grey triangle), BH6 (yellow asterisk), BH7 (light blue asterisk), BH8 (green circle),
 BH11 (dark blue plus), MW239S (brown line), SW1 (grey line), SW3 (brown diamond), SW4 (dark blue square), ADWG (Aesthetic) (red dashed line)



Manganese (Mg) mg/L



Total Phosphorus mg/L



Total Dissolved Solids (TDS) mg/L

BH1 (blue diamond), BH2 (orange square), BH4 (grey triangle), BH6 (yellow asterisk), BH7 (light blue asterisk), BH8 (green circle),
 BH11 (dark blue line), MW239S (brown line), SW1 (black line), SW3 (dark brown diamond), SW4 (dark blue square),
 ADWG (Aesthetic) (red dashed line)

