

31 May 2019

Document Ref: NCA19R96067

Williamtown Sand Syndicate
PO Box 898
Newcastle, NSW 2300

Attention: Darren Williams

Delivered by email: darren@arbus.com.au

Subject: Water quality monitoring results at Cabbage Tree Road Sand Quarry – April 2019 monitoring

Please find enclosed the Water quality monitoring results at Cabbage Tree Road Sand Quarry for the April 2019 monitoring.

1. SCOPE OF SERVICE

The scope of work includes monthly surface and groundwater monitoring for a combined period of 12 months. **Figure 1** (attached) presents the surface water and groundwater sampling locations.

The April 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) and sampling at four surface water locations.

2. SITE WORK

The monitoring round was conducted on 24 April 2019.

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 April 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 initial Water Quality Analysis

Analysis	Number of Samples				
	Primary	Intra-lab (Duplicate)	Inter-lab (Triplicate)	Transport Blank	Rinsate Blank
General Water Suite*	11	0	0	0	0
Hydrocarbons**	11	1	1	2	1
Metals***	11	1	1	2	1
Iron (dissolved)	11	1	1	2	1
Total Dissolved Solids (TDS)	11	0	0	0	0
Total Suspended Solids (TSS)	11	0	0	0	0
PFAS (28 analytes, standard level)	4	1	1	2	1

* General Water Suite: Ca, Mg, Na, K, pH, EC, Cl, SO₄, Alkalinity, Fluoride, Hardness & TDS (Calc')

** TRH (C6 – C40), BTEXN (Silica Gel)

*** 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	6.277	2.495	8.12	Well in good condition, will require well end cap. Slightly cloudy, no apparent odour
BH2	7.79	5.833	1.957	9.02	Dark brown to black, no odour
BH3	7.57	6.059	1.511	9.03	Data logger attached, Silty material at base. No sample taken.
BH4	3.06	1.878	1.182	5.92	Cloudy, no odour.

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth (mBTOC)	Comment
BH5	7.36	5.914	1.446	8.71	Slight sulfur odour – No sample taken.
BH6	3.62	1.761	1.859	4.52	Cloudy with slight sulfur odour.
BH7	2.98	1.744	1.236	4.51	Slightly Cloudy, light brown, slight sulfur odour.
BH8	3.88	2.511	1.369	6.18	Sulfur smell - cloudy
BH9	17.75	Dry	-	16.01	Well was dry.
BH10	6.69	Dry	-	3.58	Well was dry.
BH11	6.63	3.254	3.376	5.29	Cloudy, slight sulfur smell
BH12	8.67	6.846	1.824	8.12	40mm inner tube installed. No odour – No sample taken
MW239S	3.04	1.421	1.619	3.89	Light Brown - Slight Sulfur odour
MW239D	3.04	1.392	1.648	20.2	No odour – No sample taken
SW01*	2.5	2.49	0.01	N/A	Small pool of surface water with stained brown water.
SW02*	3.3	Dry	-	N/A	Location was dry.
SW03*	2.1	1.1	0.1	N/A	Water clear, no odour.
SW04*	2	1.9	1.9	N/A	Water 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	1315	21.41	87	5.48	91.9
BH02	1245	22.9	87	4.59	308
BH04	1210	21.43	43	4.88	269.9
BH06	1510	22.03	144	4.52	140.1
BH07	1530	22.9	233	4.45	94.3
BH08	1600	20.66	300	4.53	17.6
BH11	1345	21.64	155	4.75	78.3
MW239S	1445	21.43	352	4.72	45.3
SW01	1200	23.16	1003	3.95	405.9
SW03	1430	19.88	311	6.02	-12.8
SW04	1115	17.57	339	3.69	430.5

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**.

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
Physical and Chemical Stressors	Sodium	0.01	11	10	94	No	Similar
	Sulphate	1	11	2.0	310	SW1 outside NHMRC ADWG 6 aesthetic criteria	Similar
	Chloride	1	11	19	97	No	Similar
	Fluoride	0.1	11	<0.1	0.5	No	Similar
	Reactive Phosphorous	0.01	0	-	-	-	N/A
	Total Phosphorous	0.01	0	-	-	-	N/A
	Nitrite	0.01	0	-	-	-	N/A
	Nitrate	0.01	0	-	-	-	N/A
	Ammonia	0.01	0	-	-	-	N/A
	Total Nitrogen	0.1	0	-	-	-	N/A
	Total Hardness	1	11	9.0	299	SW1 outside NHMRC ADWG 6 aesthetic criteria	Similar
	Total Dissolved Solids	1	11	35	580	No	Similar
	pH	0.01	11	4.0	5.83	All outside All above ANZECC 2000 Trigger range ¹ and drinking water guidelines	Similar
Dissolved Metals	As	0.005-0.1	11	<0.001	0.001	No	Similar
	B	0.005-0.1	11	<0.05	0.014	No	Similar
	Ba	0.005-0.1	11	0.003	0.059	No	Similar
	Be	0.005-0.1	11	<0.001	<0.001	No	Similar
	Cd	0.005-0.1	11	<0.0001	<0.0001	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
	Cr	0.005-0.1	11	<0.001	0.004	5 above ANZECC 2000 Trigger Values ²	Similar
	Co	0.005-0.1	11	<0.001	0.017	No	Similar
	Cu	0.005-0.1	11	<0.001	0.003	5 above ANZECC 2000 Trigger Values ²	Similar – note that SW1 and SW4 had not previously been sampled due to insufficient water
	Fe	0.005-0.1	11	0.06	13	10 above NHMRC ADWG 6 aesthetic criteria	Similar – note that SW1 had not previously been sampled due to insufficient water
	Mn	0.005-0.1	11	0.003	0.841	1 above NHMRC ADWG 6 aesthetic criteria	Similar – note that SW1 had not previously been sampled due to insufficient water
	Ni	0.005-0.1	11	<0.001	0.07	1 above ANZECC 2000 Trigger Values ² , and 2 above NHMRC ADWG 6	Similar
	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	0.007	0.363	7 above ANZECC 2000 Trigger Values ²	Similar – note that SW1 and SW4 had not previously been sampled due to insufficient water
	Hg	0.0001	11	<0.0001	<0.0001	No	Similar
TRH – Silica Clean up	C ₆ -C ₁₀	0.02	11	<0.02	0.03	No	Similar – Noting that BH1 results indicate a significant reduction in C ₆ -C ₁₀ compared to previous sample round
	>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
	>C ₁₆ -C ₃₄	0.1	11	<0.1	0.28	No	Marginal increase in results at BH4 compared to previous non-detect results
	>C ₃₄ -C ₄₀	0.1	11	<0.1	<0.1	No	Similar
	Total >C ₁₀ -C ₄₀	0.1	11	<0.1	0.28	No	Marginal increase in results compared to previous non-detect results
	C ₆ -C ₁₀ minus BTEX (F1)	0.02	11	<0.02	0.03	No	Similar – Noting that BH1 results indicate a significant reduction in C ₆ -C ₁₀ minus BTEX (F1) compared to previous sample round
	>C ₁₀ -C ₁₆ minus Naphthalene (F2)	0.1	11	<0.1	<0.1	No	Similar
TPH – Silica Clean up	C ₁₀ -C ₁₄	0.05	11	<0.05	<0.05	No	Similar
	C ₁₅ -C ₂₈	0.1	11	<0.1	0.25	No	Marginal increase in results at BH4 compared to previous non-detect results
	C ₂₉ -C ₃₆	0.05	11	<0.05	<0.05	No	Similar
	C ₁₀ -C ₃₆	0.05	11	<0.05	0.25	No	Marginal increase in results at BH4 compared to previous non-detect results
BTEXN	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

Analytical Groupings	Analyte	Limit of reporting (mg/L)	Number of Samples	Minimum (mg/L)	Maximum (mg/L)	Criteria Exceeded	Relative to previous monitoring
PFAS	PFOS	0.00001-0.0001	4	<0.00001	<0.00001	HEPA NEMP 2018*	Similar
	PFOA	0.00001-0.0001	4	<0.00001	<0.00001	No	Similar
	PFOS/PFHxS	0.00001-0.0001	4	<0.00001	<0.00001	No	Similar

* 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

4. RAINWATER DATA

Table 4.5 presents the rainfall data from Williamstown RAAF base (Station Number: 061078, Latitude: 32.79°S; Longitude: 151.84°E; Elevation: 8 m). The mean monthly rainfall indicates that there was less rainfall in April than the mean.

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								
2nd	0	12.8	0	23.8								
3rd	0	0.4		0.6								
4th	0	0	0	0								
5th	0	0	0	0								
6th	0	0	0	0								
7th	5.0	0	8.2	0								
8th	0	0	0	0								
9th	0	6.6	0	0								
10th	0.2	0	12.0	2.2								
11th	0	0	0	0								
12th	3.0	0	0	0								
13th	0	0	0	0								
14th	0	0	0	0.2								
15th	0	0	0	1.4								
16th	0	0	4.8	3.6								
17th	0	0	59.4	1.4								
18th	0	0	2.6	0.2								
19th	0	0	2.2	0.2								
20th	2.4		0	2.0								
21st	1.0	1.4	0	0.2								
22nd	0	1.0	1.2	0.2								
23rd	0	1.4	0	0								
24th	0	9.2	5.4	0								
25th	0	0	5.2	0								
26th	0	0	0	0								
27th	0	0	0	0								
28th	1.0	0	0	0								
29th	0		0	0								
30th	0		38.2	0								
31st	0		6.6									
Monthly Total	14.6	33.6	145.8	36.0								
Mean	98.7	117.0	120.5	111.6	109.6	124.7	70.9	72.9	60.4	73.9	82.3	78.6

Based on the long-term rainfall data and below average rainfall for April it is expected that the current groundwater and surface water levels would still be low.

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: 045 819 7676

Attached:

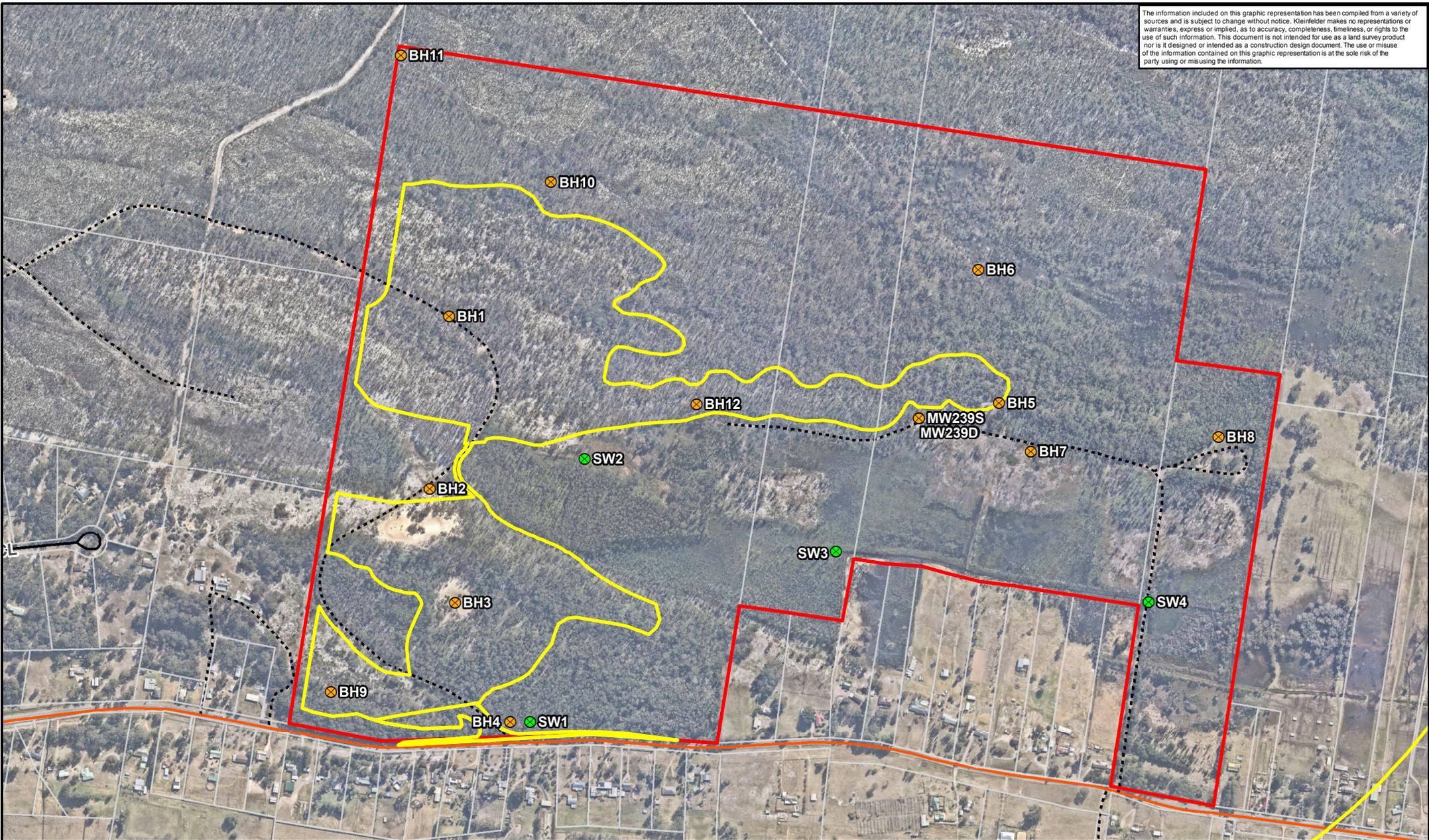
Figure 1

Data Tables

Attachment A – Laboratory reports

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 use of such information. This document is not intended for use as a land survey 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
- Subject Land Boundary
- Quarry Project Area
- Arterial Road
- Local Road
- Track



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 February 2019 Monitoring

Williamtown Sand Syndicate
 Proposed Sand Quarry
 Cabbage Tree Road, Williamtown

FIGURE:

1

DATA TABLES

Table 2
Groundwater Analytical Data - Metals
Williamstown Sand Syndicate



Analyte	Metals																
	Arsenic**	Barium	Beryllium	Boron**	Cadmium**	Chromium** ¹	Cobalt	Copper**	Iron	Lead**	Manganese*	Mercury** ²	Nickel**	Selenium**	Vanadium	Zinc**	
LOR	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	
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	
ANZECC 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 ³	0.01	0.5	0.001	0.02	0.01	-	3 ³	
Sample Name	Sample Date																
BH1	15-Mar-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	< 0.001	13	< 0.001	0.014	< 0.0001	< 0.001	< 0.01	< 0.01	1.27
	23-Apr-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.004	< 0.001	0.002	10	0.001	0.015	< 0.0001	0.002	< 0.01	< 0.01	0.363
BH2	22-Feb-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	< 0.001	< 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	< 0.001	0.003	< 0.05	< 0.001	0.02	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005
BH3	23-Apr-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	0.004	0.19	< 0.001	0.018	< 0.0001	0.001	< 0.01	< 0.01	0.008
	21-Feb-19	< 0.001	0.003	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	0.06	< 0.001	0.005	< 0.0001	0.053	< 0.01	< 0.01	< 0.005
BH4	21-Feb-19	< 0.001	0.014	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	0.002	0.16	< 0.001	0.039	< 0.0001	0.018	< 0.01	< 0.01	0.014
	15-Mar-19	< 0.001	0.014	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	0.001	< 0.05	< 0.001	0.014	< 0.0001	0.022	< 0.01	< 0.01	0.043
BH5	23-Apr-19	< 0.001	0.013	< 0.001	0.05	< 0.0001	< 0.001	< 0.001	0.002	0.99	< 0.001	0.045	< 0.0001	0.007	< 0.01	< 0.01	0.008
	22-Feb-19	< 0.001	0.01	< 0.001	< 0.05	< 0.0001	0.001	< 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	0.03	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	1.03	< 0.001	0.014	< 0.0001	0.001	< 0.01	< 0.01	0.019
	14-Mar-19	< 0.001	0.027	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	1.9	< 0.001	0.01	< 0.0001	< 0.001	< 0.01	< 0.01	0.012
BH7	23-Apr-19	< 0.001	0.03	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	0.001	0.96	< 0.001	0.01	< 0.0001	< 0.001	< 0.01	< 0.01	0.022
	22-Feb-19	< 0.001	0.004	< 0.001	< 0.05	< 0.0001	0.002	0.003	< 0.001	1.8	< 0.001	0.026	< 0.0001	0.004	< 0.01	< 0.01	0.019
BH8	14-Mar-19	< 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
	23-Apr-19	< 0.001	0.012	< 0.001	< 0.05	< 0.0001	0.002	0.003	< 0.001	2.0	< 0.001	0.026	< 0.0001	0.004	< 0.01	< 0.01	0.01
BH11	21-Feb-19	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	0.006
	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	< 0.01	< 0.005
MW239S	23-Apr-19	0.001	0.008	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	< 0.001	3.2	< 0.001	0.009	< 0.0001	0.002	< 0.01	< 0.01	0.008
	21-Feb-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	0.001	< 0.001	0.26	< 0.001	0.003	< 0.0001	0.005	< 0.01	< 0.01	0.031
SW1	15-Mar-19	< 0.001	0.005	< 0.001	< 0.05	< 0.0001	0.001	< 0.001	< 0.001	1.49	< 0.001	0.007	< 0.0001	0.037	< 0.01	< 0.01	0.016
	23-Apr-19	< 0.001	0.006	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	0.98	< 0.001	0.007	< 0.0001	0.07	< 0.01	< 0.01	0.04
SW3	22-Feb-19	< 0.001	0.007	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	1.11	< 0.001	0.003	< 0.0001	0.001	< 0.01	< 0.01	0.006
	14-Mar-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	1.25	< 0.001	0.005	< 0.0001	0.005	< 0.01	< 0.01	0.008
SW4	23-Apr-19	< 0.001	0.008	< 0.001	< 0.05	< 0.0001	0.002	< 0.001	< 0.001	1.01	< 0.001	0.004	< 0.0001	0.004	< 0.01	< 0.01	0.007
	22-Feb-19	< 0.001	0.043	< 0.001	0.14	< 0.0001	< 0.001	0.017	0.002	4.16	< 0.001	0.841	< 0.0001	0.02	< 0.01	< 0.01	0.356
SW3	22-Feb-19	0.003	0.075	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	4.84	< 0.001	0.033	< 0.0001	0.002	< 0.01	< 0.01	0.016
	14-Mar-19	0.006	0.08	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	< 0.001	9.26	< 0.001	0.048	< 0.0001	0.002	< 0.01	< 0.01	0.009
SW4	23-Apr-19	< 0.001	0.043	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	0.001	2.01	< 0.001	0.046	< 0.0001	0.004	< 0.01	< 0.01	0.016
	23-Apr-19	< 0.001	0.059	< 0.001	< 0.05	< 0.0001	< 0.001	0.003	0.003	2.09	< 0.001	0.037	< 0.0001	0.005	< 0.01	< 0.01	0.03

Notes:
 - - Not analysed
 < - Less than laboratory limit of reporting
 mg/L - Milligrams per litre
Bold indicates a detection above the laboratory limit of reporting
 ** denotes duplicate/triplicate sample result adopted for analytical use due to RPD >50%
 RPD - Relative Percentage Difference

** 95% Level of protection in freshwater
¹ value for CR VI
² as inorganic
³ Aesthetic

Table 4
Groundwater Analytical Data - Inorganics
Willamette Sand Syndrome



Analyte	Anions and Cations													Alkalinity					Inorganics		pH								
	Sodium	Calcium	Magnesium	Potassium	Sulphate	Chloride	Fluoride	Reactive phosphorus as P	Total Phosphorus	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Ammonia as N	Total Nitrogen as N	Total Kjeldahl Nitrogen as N	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 ¹	Total Dissolved Solids	Total Dissolved Solids	
LOR	1	1	1	1	1	1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.01	0.01	%	0.01	1	1	1	1	1	1	1	10	0.01	
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	%		mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	
ANZECC 2000 Trigger Values							0.02*	0.02*		0.2**			0.05**	0.35**										125-2200	600 ²				
NHMRC ADWS 6	180 ²				250 ²	250 ²	1.5			3	50		0.5 ²											200 ²	600 ²				
Sample Name	I	Sample Date																											
BH1	15Mar-19	11	2.0	1.0	<1.0	<1.0	25	<0.1	-	-	-	-	-	-	-	-	-	-	-	9.0	<1.0	<1.0	9.0	104	68	129	5.67		
	22Feb-19	14	1.0	2.0	<1.0	4.0	25	<0.1	-	-	-	-	-	-	-	-	-	-	-	10	<1.0	<1.0	10	11	84	57	5.83		
	22Feb-19	12	2.0	2.0	<1.0	6.0	22	0.1	<0.01	2.76	2.76	0.05	4.0	1.2	0.79	0.74	-	-	1.44	<1.0	<1.0	<1.0	<1.0	13	91	128	4.87		
	15Mar-19	10	3.0	2.0	<1.0	7.0	23	<0.1	-	-	-	-	-	-	0.75	0.79	-	-	-	<1.0	<1.0	<1.0	<1.0	16	101	66	50	4.71	
BH2	23Apr-19	14	2.0	2.0	<1.0	6.0	23	<0.1	-	-	-	-	-	-	0.87	0.77	-	-	-	<1.0	<1.0	<1.0	<1.0	13	79	66	84	4.82	
	21Feb-19	4.0	4.0	1.0	<1.0	4.0	10	<0.1	<0.01	2.76	<0.01	0.78	0.78	0.3	5.9	5.1	-	-	0.46	0.54	-	0.46	9.0	14	60	438	5.55		
	21Feb-19	8.0	2.0	1.0	1.0	5.0	17	<0.1	<0.01	0.19	<0.01	0.35	0.35	0.04	0.6	0.3	-	-	0.55	0.7	-	1.15	6.0	149	60	73	5.4		
	15Mar-19	9.0	2.0	<1.0	5.0	18	<0.1	-	-	-	-	-	-	-	0.49	0.61	-	-	-	<1.0	<1.0	<1.0	<1.0	9.0	77	50	70	5.12	
	23Apr-19	10	2.0	1.0	1.0	3.0	19	<0.1	-	-	-	-	-	-	0.64	0.6	-	-	-	<1.0	<1.0	<1.0	<1.0	9.0	54	35	61	5.05	
BH5	22Feb-19	42	<1.0	6.0	1.0	19	69	0.1	<0.01	<0.01	<0.01	<0.01	0.09	3.0	3.0	3.59	3.54	-	3.59	<1.0	<1.0	<1.0	<1.0	25	250	211	-	4.87	
	22Feb-19	28	3.0	4.0	1.0	28	42	<0.1	<0.01	0.05	<0.01	0.09	0.14	0.5	0.4	1.72	1.77	-	2.49	<1.0	<1.0	<1.0	<1.0	24	177	144	-	4.37	
	14Mar-19	22	2.0	4.0	1.0	17	37	<0.1	<0.01	0.05	<0.01	0.09	0.14	0.5	0.4	1.66	1.64	-	2.0	<1.0	<1.0	<1.0	2.0	21	129	116	-	4.95	
	23Apr-19	25	3.0	4.0	1.0	18	42	<0.1	-	-	-	-	-	-	-	1.99	1.56	-	-	<1.0	<1.0	<1.0	<1.0	24	156	88	115	4.64	
	22Feb-19	34	<1.0	5.0	2.0	12	64	0.2	<0.01	0.13	<0.01	0.02	0.02	0.34	2.2	2.2	1.94	2.06	-	3.16	<1.0	<1.0	<1.0	<1.0	20	213	196	-	4.76
	15Mar-19	36	<1.0	6.0	2.0	16	61	<0.1	-	-	-	-	-	-	2.11	2.05	1.37	-	-	<1.0	<1.0	<1.0	<1.0	25	271	176	212	4.73	
	23Apr-19	38	<1.0	6.0	2.0	17	62	<0.1	-	-	-	-	-	-	2.2	2.1	-	-	-	<1.0	<1.0	<1.0	<1.0	25	205	133	185	4.51	
	14Mar-19	52	<1.0	6.0	<1.0	11	90	<0.1	<0.01	1.57	<0.01	<0.01	<0.01	0.5	3.4	2.4	2.76	2.72	-	4.44	<1.0	<1.0	<1.0	<1.0	19	353	258	-	4.66
	14Mar-19	45	<1.0	6.0	<1.0	6.0	76	<0.1	-	-	-	-	-	-	2.45	2.27	-	-	-	<1.0	<1.0	<1.0	<1.0	25	319	207	283	4.77	
	23Apr-19	53	<1.0	7.0	<1.0	8.0	89	<0.1	-	-	-	-	-	-	2.89	2.68	-	-	-	<1.0	<1.0	<1.0	<1.0	29	264	172	223	4.76	
BH7	15Mar-19	48	<1.0	10	<1.0	24	80	0.1	<0.01	0.03	<0.01	0.04	0.04	0.06	1.8	1.8	2.91	2.76	-	3.21	<1.0	<1.0	<1.0	<1.0	41	346	278	-	4.67
	15Mar-19	26	<1.0	2.0	<1.0	2.0	52	<0.1	-	-	-	-	-	-	1.3	1.51	-	-	-	<1.0	<1.0	<1.0	<1.0	8.0	186	121	144	4.82	
	23Apr-19	32	<1.0	5.0	<1.0	2.0	57	<0.1	-	-	-	-	-	-	1.8	1.65	-	-	-	<1.0	<1.0	<1.0	<1.0	20	150	98	135	4.98	
	22Feb-19	61	<1.0	6.0	<1.0	6.0	104	<0.1	<0.01	0.56	<0.01	<0.01	<0.01	1.18	3.9	3.9	3.15	3.06	1.43	5.21	<1.0	<1.0	<1.0	<1.0	25	329	234	-	4.89
	14Mar-19	64	<1.0	6.0	<1.0	2.0	126	<0.1	-	-	-	-	-	-	3.28	3.64	0.18	-	-	2.0	<1.0	<1.0	<1.0	2.0	25	410	265	-	5.02
	23Apr-19	64	<1.0	7.0	5.0	9.0	97	<0.1	-	-	-	-	-	-	3.38	3.65	1.52	-	-	<1.0	<1.0	<1.0	<1.0	20	294	191	200	4.92	
BH11	23Apr-19	94	34	52	6.0	310	95	0.5	<0.01	0.66	<0.01	<0.01	<0.01	0.16	1.0	1.0	10	0.13	5.6	-	11.0	<1.0	<1.0	<1.0	289	893	880	707	4.01
	14Mar-19	40	4.0	4.0	1.0	16	82	<0.1	-	-	-	-	-	-	2.55	2.87	-	-	-	13	<1.0	<1.0	<1.0	11	36	262	228	6.31	
	14Mar-19	45	6.0	6.0	2.0	44	64	<0.1	-	-	-	-	-	-	2.8	2.8	-	-	-	4.0	<1.0	<1.0	<1.0	4.0	40	234	279	5.42	
	23Apr-19	37	8.0	6.0	1.0	42	53	<0.1	-	-	-	-	-	-	2.53	2.77	-	-	-	4.0	<1.0	<1.0	<1.0	45	220	141	190	5.2	
	23Apr-19	39	8.0	8.0	<1.0	60	64	0.1	-	-	-	-	-	-	2.30	1.05	13	-	-	<1.0	<1.0	<1.0	<1.0	33	293	190	198	4.0	

Notes:
 -- Not analysed
 < - Less than laboratory limit of reporting
 LOR - Laboratory limit of reporting
 mg/L - Milligrams per litre
 µS/cm - Microsiemens per centimeter
 Bold indicates a detection above the laboratory limit of reporting
 * 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 events)
 ** 95% Level of protection in freshwater
¹ Aesthetic

Table 5
Quality Control Sample Analysis - BTEXN
Willamtown Sand Syndrome



Analyte	BTEXN							Total Petroleum Hydrocarbons							Total Petroleum Hydrocarbons - Silica Clean up				Total Recoverable Hydrocarbons					Total Recoverable Hydrocarbons - Silica Clean up							
	Benzene	Toluene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	Total Xylenes	Naphthalene	Sum of BTEX	C ₆ - C ₈	C ₉ - C ₁₄	C ₁₅ - C ₂₈	C ₂₉ - C ₃₂	C ₃₃ - C ₅₀ sum	C ₁₀ -C ₁₄ - Silica Cleanup	C ₁₅ -C ₂₈ - Silica Cleanup	C ₂₉ -C ₃₂ - Silica Cleanup	C ₃₃ -C ₅₀ Sum - Silica Cleanup	C ₆ - C ₁₀	C ₁₁ - C ₁₅ minus BTEX (F1)	>C ₁₀ - C ₁₅	minus Naphthalene	>C ₁₅ - C ₂₈	>C ₂₈ - C ₅₀	>C ₆ -C ₁₀ - Silica Cleanup	P2 - Silica Cleanup	>C ₆ -C ₁₀ - Silica Cleanup	>C ₁₁ -C ₁₅ - Silica Cleanup	>C ₁₅ -C ₂₈ - Silica Cleanup			
Units	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
TRIP BLANK 13022019	13-Feb-19	Trip Blank	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
RUNSAT01_21022019	21-Feb-19	Rinate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
BIB 21022019	21-Feb-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
DUPO1_21022019	21-Feb-19	Duplicate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
		Relative Percentage Difference	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
BIB 21022019	21-Feb-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
TRIP01_21022019	21-Feb-19	Triplicate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
		Relative Percentage Difference	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
TRIP BLANK 30319	13-Mar-19	Trip Blank	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
RUNSAT02_140319	14-Mar-19	Rinate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
BH7_140319	14-Mar-19	Primary	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
DUPO2_140319	14-Mar-19	Duplicate	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	
		Relative Percentage Difference	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes:
 - - Not analysed
 < - Less than laboratory limit of reporting
 NC - Not calculated
 µg/L - Micrograms per litre
 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	
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
RINSATED1_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	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	< 0.005	< 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	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	< 0.01	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	< 0.01	0.007
Relative Percentage Difference			NC	0%	NC	NC	NC	0%	40%	NC	33%	NC	5%	NC	0%	NC	NC	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	< 0.01	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%	40%	NC	6%	NC	5%	NC	156%	NC	NC	NC	113%

Notes:
 -- Not analysed
 < - Less than laboratory limit of reporting
 NC - Not calculated
 mg/L - Milligrams per litre
 Half the laboratory limit of reporting used when calculating RPD
 RPD - Relative Percentage Difference

ATTACHMENT A: LABORATORY REPORTS

CERTIFICATE OF ANALYSIS

Work Order : **ES1912421**
Client : **KLEINFELDER AUSTRALIA PTY LTD**
Contact : TOM OVERTON
Address : 95 MITCHELL ROAD
 CARDIFF NSW 2285
Telephone : ----
Project : 2019003
Order number :
C-O-C number : ----
Sampler : DANIEL KOUSBROEK
Site : WSS-CABBAGE TREE RD WATER MONITORING
Quote number : ME/114/19
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 18
Laboratory : Environmental Division Sydney
Contact : Shirley LeCornu
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +6138549 9630
Date Samples Received : 23-Apr-2019 16:59
Date Analysis Commenced : 26-Apr-2019
Issue Date : 01-May-2019 16:39



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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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		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 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.

- TDS by method EA-015 may bias high FOR VARIOUS SAMPLES due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EN055: Ionic Balance out of acceptable limits for sample 1 and 8 due to analytes not quantified in this report.
- 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				
				SW4	SW1	BH4	BH2	BH1
Client sampling date / time				23-Apr-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1912421-001	ES1912421-002	ES1912421-003	ES1912421-004	ES1912421-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.00	4.01	5.05	4.82	5.83
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	293	893	54	70	84
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	198	707	61	84	97
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	190	580	35	46	55
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	32	147	575	248
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	33	299	9	13	11
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	<1	10
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	<1	10
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	60	310	3	6	4
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	64	95	19	23	25
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	5	34	2	2	1
Magnesium	7439-95-4	1	mg/L	5	52	1	2	2
Sodium	7440-23-5	1	mg/L	39	94	10	14	14
Potassium	7440-09-7	1	mg/L	<1	6	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	0.14	0.05	<0.05	<0.05
Barium	7440-39-3	0.001	mg/L	0.059	0.043	0.013	0.005	0.003
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
Cobalt	7440-48-4	0.001	mg/L	0.003	0.017	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.004



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW4	SW1	BH4	BH2	BH1
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-001	ES1912421-002	ES1912421-003	ES1912421-004	ES1912421-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Copper	7440-50-8	0.001	mg/L	0.003	0.002	0.002	0.004	0.002	
Manganese	7439-96-5	0.001	mg/L	0.037	0.841	0.045	0.018	0.015	
Nickel	7440-02-0	0.001	mg/L	0.005	0.020	0.007	0.001	0.002	
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	0.030	0.356	0.008	0.008	0.363	
Iron	7439-89-6	0.05	mg/L	2.09	4.16	0.99	0.19	10.1	
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	0.5	<0.1	<0.1	<0.1	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	3.05	9.13	0.60	0.77	0.99	
Total Cations	----	0.01	meq/L	2.36	10.2	0.64	0.87	0.82	
Ionic Balance	----	0.01	%	12.9	5.60	----	----	----	
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	250	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	250	<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	280	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	280	<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	40	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	30	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	30	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW4	SW1	BH4	BH2	BH1
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-001	ES1912421-002	ES1912421-003	ES1912421-004	ES1912421-005	
				Result	Result	Result	Result	Result	
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	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	----	<0.02	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	----	----	<0.02	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	----	<0.02	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	----	<0.01	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	----	<0.02	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	----	----	<0.1	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	----	<0.02	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	----	<0.02	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	----	<0.02	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	----	<0.01	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	----	----	<0.02	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	----	----	<0.02	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	----	----	<0.02	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	----	----	<0.02	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	----	----	<0.02	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW4	SW1	BH4	BH2	BH1
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-001	ES1912421-002	ES1912421-003	ES1912421-004	ES1912421-005	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	----	----	<0.05	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	----	----	<0.02	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	----	----	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	----	----	<0.05	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	----	----	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	----	----	<0.05	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	----	----	<0.02	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	----	----	<0.02	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	----	----	<0.05	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	----	----	<0.05	----	----	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	----	----	<0.05	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	----	----	<0.05	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	----	----	<0.01	----	----	
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	----	----	<0.01	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	----	----	<0.01	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	99.7	104	102	106	
Toluene-D8	2037-26-5	2	%	114	116	112	115	112	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SW4	SW1	BH4	BH2	BH1
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-001	ES1912421-002	ES1912421-003	ES1912421-004	ES1912421-005	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%	122	117	119	115	116	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	----	----	102	----	----	
13C8-PFOA	----	0.02	%	----	----	83.9	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH11	SW3	MW239S	BH6	BH7
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-006	ES1912421-007	ES1912421-008	ES1912421-009	ES1912421-010	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	4.99	5.20	4.92	4.64	4.51	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	150	220	294	136	205	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	135	190	208	115	185	
EA016: Calculated TDS (from Electrical Conductivity)									
Total Dissolved Solids (Calc.)	----	1	mg/L	98	143	191	88	133	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	112	9	385	62	20	
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L	20	45	29	24	25	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	<1	<1	<1	
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	<1	<1	<1	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	42	9	18	17	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	57	53	97	42	62	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	<1	8	<1	3	<1	
Magnesium	7439-95-4	1	mg/L	5	6	7	4	6	
Sodium	7440-23-5	1	mg/L	32	37	64	25	38	
Potassium	7440-09-7	1	mg/L	<1	1	1	1	2	
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	0.006	0.043	0.008	0.030	0.012	
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	
Cobalt	7440-48-4	0.001	mg/L	<0.001	0.003	<0.001	<0.001	0.003	
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	0.002	<0.001	0.002	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH11	SW3	MW239S	BH6	BH7
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-006	ES1912421-007	ES1912421-008	ES1912421-009	ES1912421-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Copper	7440-50-8	0.001	mg/L	<0.001	0.001	<0.001	0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.007	0.046	0.004	0.010	0.026	
Nickel	7440-02-0	0.001	mg/L	0.070	0.004	0.004	<0.001	0.004	
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	0.040	0.016	0.007	0.022	0.010	
Iron	7439-89-6	0.05	mg/L	0.98	2.01	1.01	0.96	2.00	
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	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	1.65	2.37	2.92	1.56	2.10	
Total Cations	----	0.01	meq/L	1.80	2.53	3.38	1.59	2.20	
Ionic Balance	----	0.01	%	----	----	7.32	----	----	
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 (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH11	SW3	MW239S	BH6	BH7
Client sampling date / time					23-Apr-2019 00:00				
Compound	CAS Number	LOR	Unit	ES1912421-006	ES1912421-007	ES1912421-008	ES1912421-009	ES1912421-010	ES1912421-010
				Result	Result	Result	Result	Result	Result
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<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
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	----	----	----	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	----	----	----	<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
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	----	----	----	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	----	----	----	<0.02	<0.02	<0.02



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH11	SW3	MW239S	BH6	BH7
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-006	ES1912421-007	ES1912421-008	ES1912421-009	ES1912421-010	
				Result	Result	Result	Result	Result	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
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	
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	%	104	107	100	109	111	
Toluene-D8	2037-26-5	2	%	115	111	113	112	113	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH11	SW3	MW239S	BH6	BH7
Client sampling date / time				23-Apr-2019 00:00					
Compound	CAS Number	LOR	Unit	ES1912421-006	ES1912421-007	ES1912421-008	ES1912421-009	ES1912421-010	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%	115	118	112	120	120	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	----	----	----	105	110	
13C8-PFOA	----	0.02	%	----	----	----	80.4	76.1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH8	RINSATE 03	TRIP BLANK 03	----	----
Client sampling date / time		23-Apr-2019 00:00		23-Apr-2019 00:00	23-Apr-2019 00:00	23-Apr-2019 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1912421-011	ES1912421-012	ES1912421-013	-----	-----
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	4.76	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	264	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	223	----	----	----	----
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	172	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	121	----	----	----	----
EA065: Total Hardness as CaCO3								
Total Hardness as CaCO3	----	1	mg/L	29	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	8	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	89	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	7	----	----	----	----
Sodium	7440-23-5	1	mg/L	53	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	<0.001	----	----
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	----	----
Barium	7440-39-3	0.001	mg/L	0.008	<0.001	<0.001	----	----
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH8	RINSATE 03	TRIP BLANK 03	----	----
Client sampling date / time				23-Apr-2019 00:00	23-Apr-2019 00:00	23-Apr-2019 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES1912421-011	ES1912421-012	ES1912421-013	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS - Continued									
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.009	<0.001	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
Zinc	7440-66-6	0.005	mg/L	0.008	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	3.20	<0.05	<0.05	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	2.68	----	----	----	----	
Total Cations	----	0.01	meq/L	2.88	----	----	----	----	
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
>C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
EP080: BTEXN									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH8	RINSATE 03	TRIP BLANK 03	----	----
Client sampling date / time				23-Apr-2019 00:00	23-Apr-2019 00:00	23-Apr-2019 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES1912421-011	ES1912421-012	ES1912421-013	-----	-----	
				Result	Result	Result	----	----	
EP080: BTEXN - Continued									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids									
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<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	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH8	RINSATE 03	TRIP BLANK 03	----	----
Client sampling date / time				23-Apr-2019 00:00	23-Apr-2019 00:00	23-Apr-2019 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES1912421-011	ES1912421-012	ES1912421-013	-----	-----	
				Result	Result	Result	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids - Continued									
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<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	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<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	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<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	----	----	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<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	----	----	
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
EP231P: PFAS Sums									
Sum of PFAS	----	0.01	µg/L	<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	----	----	
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	104	108	106	----	----	
Toluene-D8	2037-26-5	2	%	115	111	111	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH8	RINSATE 03	TRIP BLANK 03	----	----
Client sampling date / time				23-Apr-2019 00:00	23-Apr-2019 00:00	23-Apr-2019 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES1912421-011	ES1912421-012	ES1912421-013	-----	-----	
				Result	Result	Result	----	----	
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%	112	116	115	----	----	
EP231S: PFAS Surrogate									
13C4-PFOS	----	0.02	%	108	106	104	----	----	
13C8-PFOA	----	0.02	%	84.8	91.7	89.3	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	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	: ES1912421	Page	: 1 of 13
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 2019003	Date Samples Received	: 23-Apr-2019
Order number	:	Date Analysis Commenced	: 26-Apr-2019
C-O-C number	: ----	Issue Date	: 01-May-2019
Sampler	: DANIEL KOUSBROEK		
Site	: WSS-CABBAGE TREE RD WATER MONITORING		
Quote number	: ME/114/19		
No. of samples received	: 13		
No. of samples analysed	: 13		



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>
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		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 (%)
EA005P: pH by PC Titrator (QC Lot: 2316377)									
ES1912421-001	SW4	EA005-P: pH Value	----	0.01	pH Unit	4.00	3.90	2.53	0% - 20%
ES1912421-010	BH7	EA005-P: pH Value	----	0.01	pH Unit	4.51	4.49	0.444	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 2316380)									
ES1912421-001	SW4	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	293	289	1.26	0% - 20%
ES1912421-010	BH7	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	205	206	0.00	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 2314835)									
ES1911927-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	169	155	8.63	0% - 50%
ES1912421-002	SW1	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	707	702	0.638	0% - 20%
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 2314834)									
ES1911927-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ES1912421-002	SW1	EA025H: Suspended Solids (SS)	----	5	mg/L	32	34	8.36	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 2316379)									
ES1912421-001	SW4	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ES1912421-010	BH7	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.00	No Limit
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 2316032)									
ES1912421-001	SW4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	60	57	6.32	0% - 20%
ES1912421-010	BH7	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	17	16	6.46	0% - 50%
ED045G: Chloride by Discrete Analyser (QC Lot: 2316033)									



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 (%)
ED045G: Chloride by Discrete Analyser (QC Lot: 2316033) - continued									
ES1912421-001	SW4	ED045G: Chloride	16887-00-6	1	mg/L	64	59	7.71	0% - 20%
ES1912421-010	BH7	ED045G: Chloride	16887-00-6	1	mg/L	62	62	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 2315894)									
ES1912421-001	SW4	ED093F: Calcium	7440-70-2	1	mg/L	5	5	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	5	5	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	39	39	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
ES1912494-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	3	3	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	319	319	0.00	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2315892)									
ES1912421-001	SW4	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	0.059	0.059	0.00	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	0.003	0.003	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	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	0.037	0.038	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.030	0.027	10.5	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	2.09	2.12	1.70	0% - 20%
ES1912494-001	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	0.006	0.007	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	0.006	0.006	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	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.003	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	0.007	0.007	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.032	0.031	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



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: 2315892) - continued									
ES1912494-001	Anonymous	EG020A-F: Boron	7440-42-8	0.05	mg/L	0.09	0.09	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 2317350)									
ES1912361-011	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	0.074	0.076	1.98	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	3.66	3.66	0.0574	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	<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	1.05	1.05	0.00	0% - 20%		
ES1912586-001	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	0.008	0.009	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	<0.001	<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	0.019	0.020	6.19	0% - 50%
		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	0.15	0.16	0.00	No Limit		
EG035F: Dissolved Mercury by FIMS (QC Lot: 2315893)									
ES1912421-002	SW1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1912421-009	BH6	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 2317347)									
ES1912345-008	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES1912345-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	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 (%)	
EK040P: Fluoride by PC Titrator (QC Lot: 2316378)										
ES1912421-001	SW4	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.1	<0.1	0.00	No Limit	
ES1912421-010	BH7	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 2318345)										
ES1912421-001	SW4	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
ES1912421-010	BH7	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 2318345)										
ES1912421-001	SW4	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
ES1912421-010	BH7	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 2318345)										
ES1912421-001	SW4	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	
ES1912421-010	BH7	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							
ES1912421-012	RINSATE 03	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	
		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	
ES1912561-001	Anonymous	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	
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	150	156	4.38	0% - 20%	
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	1.56	1.64	5.12	0% - 20%	
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	0.88	0.89	0.00	0% - 20%	
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 2318601)										
ES1912421-012	RINSATE 03	EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	5.65	5.77	2.07	0% - 20%	
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	4.04	4.16	2.95	0% - 20%	
ES1912421-012	RINSATE 03	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit	
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit	



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 2318601) - continued									
ES1912421-012	RINSATE 03	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 (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
ES1912561-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	0.95	0.95	0.00	0% - 20%
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	0.93	0.91	2.50	0% - 20%
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	3.56	3.46	2.80	0% - 20%
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	0.42	0.43	2.58	0% - 20%
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	0.54	0.50	8.03	0% - 20%
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	0.90	0.86	4.68	0% - 20%
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	0.10	0.11	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	0.03	0.03	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	0.7	0.8	0.00	No Limit
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 2318601)									
ES1912421-012	RINSATE 03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
ES1912561-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	0.68	0.64	6.68	0% - 20%
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 2318601) - continued									
ES1912561-001	Anonymous	EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 2318601)									
ES1912421-012	RINSATE 03	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
ES1912561-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	5.00	4.98	0.441	0% - 20%
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
EP231P: PFAS Sums (QC Lot: 2318601)									
ES1912421-012	RINSATE 03	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit
ES1912561-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	176	182	3.47	0% - 20%



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

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

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA005P: pH by PC Titrator (QCLot: 2316377)									
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.2	98	102	
				----	7 pH Unit	99.3	98	102	
EA010P: Conductivity by PC Titrator (QCLot: 2316380)									
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	2000 µS/cm	98.4	95	113	
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 2314835)									
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	99.3	87	109	
				<10	293 mg/L	110	66	126	
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 2314834)									
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	90.7	83	129	
				<5	1000 mg/L	99.4	82	110	
ED037P: Alkalinity by PC Titrator (QCLot: 2316379)									
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	84.9	81	111	
				----	50 mg/L	89.1	70	130	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2316032)									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	103	82	122	
ED045G: Chloride by Discrete Analyser (QCLot: 2316033)									
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	106	81	127	
				<1	1000 mg/L	102	81	127	
ED093F: Dissolved Major Cations (QCLot: 2315894)									
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	80	114	
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	109	90	116	
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	108	82	120	
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	107	85	113	
EG020F: Dissolved Metals by ICP-MS (QCLot: 2315892)									
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85	114	
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	103	85	115	
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	104	82	110	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	85	111	
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	102	82	112	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.4	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	82	110	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 2315892) - continued									
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	82	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	102	85	115	
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	105	83	109	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	81	117	
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	113	85	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	112	82	112	
EG020F: Dissolved Metals by ICP-MS (QCLot: 2317350)									
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	86.9	85	114	
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	95.8	85	115	
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	89.3	82	110	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	88.2	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	86.8	85	111	
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	84.5	82	112	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	84.0	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.9	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	84.8	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	83.1	82	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.9	85	115	
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	90.3	83	109	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	85.8	81	117	
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	87.9	85	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	85.4	82	112	
EG035F: Dissolved Mercury by FIMS (QCLot: 2315893)									
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.1	83	105	
EG035F: Dissolved Mercury by FIMS (QCLot: 2317347)									
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	94.5	83	105	
EK040P: Fluoride by PC Titrator (QCLot: 2316378)									
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	87.0	82	116	
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 2314899)									
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	2000 µg/L	80.0	75	117	
EP071SG: C15 - C28 Fraction	----	100	µg/L	<100	3000 µg/L	98.3	81	113	
EP071SG: C29 - C36 Fraction	----	50	µg/L	<50	2000 µg/L	103	71	117	
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 2314899)									
EP071SG: >C10 - C16 Fraction	----	100	µg/L	<100	2500 µg/L	85.1	73	119	
EP071SG: >C16 - C34 Fraction	----	100	µg/L	<100	3500 µg/L	101	81	113	
EP071SG: >C34 - C40 Fraction	----	100	µg/L	<100	1500 µg/L	100	65	127	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2318345)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	83.8	75	127	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2318345)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	85.2	75	127	
EP080: BTEXN (QCLot: 2318345)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.0	70	122	
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.1	69	123	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	95.7	70	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	94.5	69	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	98.5	72	122	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	104	70	120	
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2318601)									
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.5 µg/L	90.0	70	130	
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.5 µg/L	100	70	130	
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	0.5 µg/L	99.0	70	130	
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.5 µg/L	99.6	70	130	
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.5 µg/L	96.6	70	130	
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.5 µg/L	92.6	70	130	
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2318601)									
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	2.5 µg/L	105	70	130	
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.5 µg/L	108	70	130	
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.5 µg/L	110	70	130	
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.5 µg/L	97.2	70	130	
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.5 µg/L	105	70	130	
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.5 µg/L	106	70	130	
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.5 µg/L	103	70	130	
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.5 µg/L	96.4	70	130	
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.5 µg/L	107	70	130	
EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	0.5 µg/L	111	70	130	
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	1.25 µg/L	105	70	150	
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2318601)									
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.5 µg/L	91.6	70	130	
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	1.25 µg/L	110	70	150	
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	1.25 µg/L	93.2	70	150	
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	1.25 µg/L	102	70	150	
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	1.25 µg/L	97.4	70	150	
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.5 µg/L	105	70	130	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2318601) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.5 µg/L	108	70	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2318601)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.5 µg/L	115	70	130
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.5 µg/L	98.2	70	130
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.5 µg/L	114	70	130
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.5 µg/L	94.8	70	130

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 2316032)							
ES1912421-001	SW4	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 2316033)							
ES1912421-001	SW4	ED045G: Chloride	16887-00-6	250 mg/L	99.6	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 2315892)							
ES1912421-003	BH4	EG020A-F: Arsenic	7440-38-2	1 mg/L	103	70	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	105	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	102	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	101	70	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	102	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	103	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	98.8	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	101	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	102	70	130
EG020A-F: Vanadium	7440-62-2	1 mg/L	101	70	130		
EG020A-F: Zinc	7440-66-6	1 mg/L	106	70	130		
EG020F: Dissolved Metals by ICP-MS (QCLot: 2317350)							
ES1912361-012	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	128	70	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	130	70	130
		EG020A-F: Barium	7440-39-3	1 mg/L	86.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	89.3	70	130



Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
				Low	High		
EG020F: Dissolved Metals by ICP-MS (QCLot: 2317350) - continued							
ES1912361-012	Anonymous	EG020A-F: Chromium	7440-47-3	1 mg/L	95.2	70	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	130	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	130	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	110	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	92.1	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	130	70	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	92.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	91.3	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 2315893)							
ES1911757-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.5	70	130
EG035F: Dissolved Mercury by FIMS (QCLot: 2317347)							
ES1911923-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	84.5	70	130
EK040P: Fluoride by PC Titrator (QCLot: 2316378)							
ES1912421-001	SW4	EK040P: Fluoride	16984-48-8	5 mg/L	80.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 2318345)							
ES1912421-001	SW4	EP080: C6 - C9 Fraction	----	325 µg/L	87.6	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 2318345)							
ES1912421-001	SW4	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	85.7	70	130
EP080: BTEXN (QCLot: 2318345)							
ES1912421-001	SW4	EP080: Benzene	71-43-2	25 µg/L	85.4	70	130
		EP080: Toluene	108-88-3	25 µg/L	93.5	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	96.9	70	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	95.6	70	130
		EP080: ortho-Xylene	106-42-3	25 µg/L	99.9	70	130
		EP080: Naphthalene	95-47-6	25 µg/L	99.9	70	130
EP080: Naphthalene	91-20-3	25 µg/L	95.9	70	130		
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 2318601)							
ES1912421-012	RINSATE 03	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.5 µg/L	94.6	50	130
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.5 µg/L	114	50	130
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.5 µg/L	104	50	130
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.5 µg/L	109	50	130
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.5 µg/L	97.2	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	94.0	50	130
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.5 µg/L	94.0	50	130
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2318601)							
ES1912421-012	RINSATE 03	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	2.5 µg/L	103	50	130
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.5 µg/L	111	50	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 2318601) - continued							
ES1912421-012	RINSATE 03	EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.5 µg/L	118	50	130
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.5 µg/L	110	50	130
		EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.5 µg/L	106	50	130
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.5 µg/L	106	50	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.5 µg/L	110	50	130
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.5 µg/L	105	50	130
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.5 µg/L	118	50	130
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.5 µg/L	105	50	130
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	1.25 µg/L	103	50	150
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 2318601)							
ES1912421-012	RINSATE 03	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.5 µg/L	91.0	50	130
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	1.25 µg/L	104	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	1.25 µg/L	78.3	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	1.25 µg/L	105	50	150
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	1.25 µg/L	101	50	150
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.5 µg/L	114	50	130
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.5 µg/L	107	50	130
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 2318601)							
ES1912421-012	RINSATE 03	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.5 µg/L	106	50	130
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.5 µg/L	101	50	130
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.5 µg/L	102	50	130
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.5 µg/L	113	50	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES1912421	Page	: 1 of 11
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Telephone	: +6138549 9630
Project	: 2019003	Date Samples Received	: 23-Apr-2019
Site	: WSS-CABBAGE TREE RD WATER MONITORING	Issue Date	: 01-May-2019
Sampler	: DANIEL KOUSBROEK	No. of samples received	: 13
Order number	:	No. of samples analysed	: 13

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

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

Outliers : Analysis Holding Time Compliance

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

Outliers : Frequency of Quality Control Samples

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



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES1912421--001	SW4	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	----	----	----	26-Apr-2019	23-Apr-2019	3

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 C	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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	Sample Date	Extraction / Preparation			Analysis		
		Container / Client Sample ID(s)	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis



Matrix: **WATER**

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

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8	23-Apr-2019	----	----	----	26-Apr-2019	23-Apr-2019	✘	
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8	23-Apr-2019	----	----	----	26-Apr-2019	21-May-2019	✔	
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Clear Plastic Bottle - Natural (EA015H) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8	23-Apr-2019	----	----	----	26-Apr-2019	30-Apr-2019	✔	
EA025: Total Suspended Solids dried at 104 ± 2°C								
Clear Plastic Bottle - Natural (EA025H) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8	23-Apr-2019	----	----	----	26-Apr-2019	30-Apr-2019	✔	
EA065: Total Hardness as CaCO3								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8	23-Apr-2019	----	----	----	26-Apr-2019	21-May-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	
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	07-May-2019	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	21-May-2019	✓
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	21-May-2019	✓
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	21-May-2019	✓
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	20-Oct-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) RINSATE 03,	TRIP BLANK 03	23-Apr-2019	----	----	----	29-Apr-2019	20-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	
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	29-Apr-2019	21-May-2019	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) RINSATE 03,	TRIP BLANK 03	23-Apr-2019	----	----	----	30-Apr-2019	21-May-2019	✓
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P) SW4, BH4, BH1, SW3, BH6, BH8	SW1, BH2, BH11, MW239S, BH7,	23-Apr-2019	----	----	----	26-Apr-2019	21-May-2019	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup								
Amber Glass Bottle - Unpreserved (EP071SG) SW4, BH4, BH1, SW3, BH6, BH8, TRIP BLANK 03	SW1, BH2, BH11, MW239S, BH7, RINSATE 03,	23-Apr-2019	29-Apr-2019	30-Apr-2019	✓	01-May-2019	08-Jun-2019	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup								
Amber Glass Bottle - Unpreserved (EP071SG) SW4, BH4, BH1, SW3, BH6, BH8, TRIP BLANK 03	SW1, BH2, BH11, MW239S, BH7, RINSATE 03,	23-Apr-2019	29-Apr-2019	30-Apr-2019	✓	01-May-2019	08-Jun-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 Petroleum Hydrocarbons								
Amber VOC Vial - Sulfuric Acid (EP080) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	30-Apr-2019	07-May-2019	✓	30-Apr-2019	07-May-2019	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber VOC Vial - Sulfuric Acid (EP080) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	30-Apr-2019	07-May-2019	✓	30-Apr-2019	07-May-2019	✓	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) SW4, SW1, BH4, BH2, BH1, BH11, SW3, MW239S, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	30-Apr-2019	07-May-2019	✓	30-Apr-2019	07-May-2019	✓	
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) BH4, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	29-Apr-2019	20-Oct-2019	✓	30-Apr-2019	20-Oct-2019	✓	
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) BH4, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	29-Apr-2019	20-Oct-2019	✓	30-Apr-2019	20-Oct-2019	✓	
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) BH4, BH6, BH7, BH8, RINSATE 03, TRIP BLANK 03	23-Apr-2019	29-Apr-2019	20-Oct-2019	✓	30-Apr-2019	20-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	
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) BH4, BH7, RINSATE 03,	BH6, BH8, TRIP BLANK 03	23-Apr-2019	29-Apr-2019	20-Oct-2019	✓	30-Apr-2019	20-Oct-2019	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) BH4, BH7, RINSATE 03,	BH6, BH8, TRIP BLANK 03	23-Apr-2019	29-Apr-2019	20-Oct-2019	✓	30-Apr-2019	20-Oct-2019	✓



Quality Control Parameter Frequency Compliance

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

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

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	36	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	18	11.11	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 by PC Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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
Chloride by Discrete Analyser	ED045G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	5.56	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 by PC Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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)							
Chloride by Discrete Analyser	ED045G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard



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

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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)							
Chloride by Discrete Analyser	ED045G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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 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 liberated 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	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
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.



Analytical Methods	Method	Matrix	Method Descriptions
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)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Total Recoverable Hydrocarbons - Silica Gel C	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
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.



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES1912421

Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: TOM OVERTON	Contact	: Shirley LeCornu
Address	: 95 MITCHELL ROAD CARDIFF NSW 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: toverton@kleinfelder.com	E-mail	: shirley.lecornu@Alsglobal.com
Telephone	: ----	Telephone	: +6138549 9630
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 2019003	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	: 23-Apr-2019 16:59	Issue Date	: 25-Apr-2019
Client Requested Due Date	: 01-May-2019	Scheduled Reporting Date	: 01-May-2019

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 0.6°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 13 / 13

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
- **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).**
- 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 recommends 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-12 General Water Suite	WATER - W-03 15 Metals (NEPM Suite)	WATER - W-05 SG TRH/BTEX/N8 Metals inc Silica Gel Clean Up
ES1912421-001	23-Apr-2019 00:00	SW4	✓	✓	✓		✓	✓	✓
ES1912421-002	23-Apr-2019 00:00	SW1	✓	✓	✓		✓	✓	✓
ES1912421-003	23-Apr-2019 00:00	BH4	✓	✓	✓	✓	✓	✓	✓
ES1912421-004	23-Apr-2019 00:00	BH2	✓	✓	✓		✓	✓	✓
ES1912421-005	23-Apr-2019 00:00	BH1	✓	✓	✓		✓	✓	✓
ES1912421-006	23-Apr-2019 00:00	BH11	✓	✓	✓		✓	✓	✓
ES1912421-007	23-Apr-2019 00:00	SW3	✓	✓	✓		✓	✓	✓
ES1912421-008	23-Apr-2019 00:00	MW239S	✓	✓	✓		✓	✓	✓
ES1912421-009	23-Apr-2019 00:00	BH6	✓	✓	✓	✓	✓	✓	✓
ES1912421-010	23-Apr-2019 00:00	BH7	✓	✓	✓	✓	✓	✓	✓
ES1912421-011	23-Apr-2019 00:00	BH8	✓	✓	✓	✓	✓	✓	✓
ES1912421-012	23-Apr-2019 00:00	RINSATE 03			✓	✓	✓	✓	✓
ES1912421-013	23-Apr-2019 00:00	TRIP BLANK 03			✓	✓		✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: WATER

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

Method	Client Sample ID(s)	Container	Due for extraction	Due for analysis	Samples Received		Instructions Received	
					Date	Evaluation	Date	Evaluation
EA005-P: pH by PC Titrator								
BH11		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH1		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH2		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH4		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH6		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH7		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
BH8		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
MW239S		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
SW1		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
SW3		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗
SW4		Clear Plastic Bottle - Natural	----	23-Apr-2019	23-Apr-2019	✓	24-Apr-2019	✗



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
- 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
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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
- 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
- A4 - AU Tax Invoice (INV)	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



Client: Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200	Site Name: WSS - Cabbage Tree Rd water monitoring QUOTE NUMBER ME/114/19 Job No.: 20190803 Required TAT: 24 hrs Date CA level: LAB minimum unless specified:	Sampler Name: Dan Koustrook Contact Number: 045 8197 676 Contact e-mail: dkoustrook@kleinfelder.com PM e-mail: toverton@kleinfelder.com	Site, COC AND CONTACT DATA
Requisitioned by (print/): (sign)	Charging Out: Date / Time: Temp. (°C) Notes:	Received by (print/): (sign) Date / Time: Temp. (°C) Notes:	Relinquished: (sign) Date / Time: Temp. (°C) Notes:
Notes:	Notes:	Notes:	Notes:

Chain of Custody	Received by (print/): (sign)	Relinquished: (sign)	Received by (print/): (sign)
Date / Time: 23/4/19 16:55	Date / Time: 23/4/19 19:30	Date / Time: 24/4/19 17:00	Date / Time: 24/4/19 19:30
Temp. (°C)	Temp. (°C)	Temp. (°C)	Temp. (°C)
Notes:	Notes:	Notes:	Notes:

Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	W-05 SG	Organic Analyses			Metals			Other Analyses			Comments
										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)				
SW4	1		Water	23.4				5	X	X	X	X	X	X	X				
SW1	2		Water	23.4				5	X	X	X	X	X	X	X				
BH4	3							5	X	X	X	X	X	X	X				
BH2	4							5	X	X	X	X	X	X	X				
BH1	5							5	X	X	X	X	X	X	X				
BH11	6							5	X	X	X	X	X	X	X				
SV3	7							5	X	X	X	X	X	X	X				
MW2395	8							5	X	X	X	X	X	X	X				
BH6	9							6	X	X	X	X	X	X	X				
BH7	10							6	X	X	X	X	X	X	X				
BH8	11							6	X	X	X	X	X	X	X				
Rinsate 09	12							5	X	X	X	X	X	X	X				
Trip Blank 08	13							5	X	X	X	X	X	X	X				

W-05 SG - TRHIBITENX[®] & Metals Silica Gel Clean Up
 NT14 - Extended water suite B
 Additional metals analysis to make up NEPM 15

Arsenic (As), Cadmium (Cd), Chromium (Cr), Co
 Barium (Ba), Beryllium (Be), Cobalt (C)

Environmental Division
 Sydney
 Work Order Reference
ES1912421

LAB OF ORIGIN:
NEWCASTLE

95 Mitchell Road
 Cardiff, NSW 2285
 Newcastle@kleinfelder.com
 Phone: 02 4949 5200

Send Results to:

ALS
 5/585 Maitland Rd
 Meyfield West,
 Newcastle NSW 2304
 Phone: (02) 4014 2500

0-6°C
 1.0