

# Quarterly water quality monitoring results

## Cabbage Tree Road sand quarry

### November 2020 water monitoring event

NCA20R119833

16 December 2020



Williamtown Sand Syndicate  
PO Box 898  
Newcastle, NSW 2300

### **Attention: Darren Williams**

**Subject:** Quarterly water quality monitoring results  
Cabbage Tree Road sand quarry  
November 2020 water monitoring event

Please find enclosed the quarterly water monitoring results at Cabbage Tree Road Sand Quarry for the November 2020 water monitoring event

## **1 SCOPE OF SERVICE**

The scope of work includes the quarterly surface and groundwater monitoring as part of the quarterly monitoring requirements. **Figure 1 (Attachment: 1)** presents the surface water and groundwater sampling locations.

The scheduled November monitoring was a monthly monitoring event to include gauging of all available monitoring wells (a total of 14 wells) and sampling from 11 monitoring wells and four surface water locations.

## **2 SITE WORK**

The quarterly monitoring round was conducted on 16 November 2020.

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 gauging, each of the HydraSleeves were removed and samples taken.

The November 2020 monitoring round included:

- Gauging of 14 monitoring wells (BH1, BH2, BH4, BH5, BH6, BH7, BH8, BH9, BH9A, BH10, BH11, BH12, MW239S & MW239D);
- Groundwater sampling from 10 monitoring wells as outlined in **Table 5** (BH9 has been superseded by BH9A and BH10 was dry);
- Surface water sampling from three locations (SW2 was dry at the time of sampling); and

Water samples were collected into 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 1**.

**Table 1: Summary of Monthly Water Quality Analysis**

Analysis	Number of Samples				
	Primary	Intra-lab (Duplicate)	Inter-lab (Triplicate)	Transport Blank	Rinsate Blank
Hydrocarbons*	13	1	1	1	1
Metals**	12	1	1	1	1
Iron (dissolved)	12	1	1	1	1
General Water Quality Suite***	12	0	0	0	0
Total Dissolved Solids (TDS)	12	0	0	0	0
Total Suspended Solids (TSS)	12	0	0	0	0



PFAS (28 analytes, standard level)	10	2	2	1	1
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\* TRH (C6 – C40), BTEXN (Silica Gel)

\*\* NEPM Metals Suite (dissolved) - Arsenic (As), Barium (Ba), Beryllium (Be), Boron (B), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Selenium (Se), Vanadium (V), Zinc (Zn).

\*\*\* General Water Quality Suite - Ca, Mg, Na, K, pH, EC, Cl, SO<sub>4</sub>, Alkalinity, Fluoride, Hardness & TDS (Calc')

### 3 SAMPLING RESULTS

**Table 2** provides a summary of the gauging data. The full set of gauging data and field parameters for each monitoring location are provided in **Attachment 2**. Additionally, Watershed HydroGeo (2019) outlined a Trigger Action and Response Plan (TARP) to mitigate potential impacts to groundwater associated with quarry operations at Williamtown Sand. Based on these recommendations groundwater elevation has been shaded to correspond to triggers and actions outlined in **Table 3**.

**Table 2: Summary of gauging data**

Borehole	Top of Casing (mAHD)	Depth to Water (mBTOC)	Groundwater Elevation (mAHD)	Well Total Depth Current (mBTOC)	Well Total Depth 2014 (mBTOC)	Inferred Max GW Level (mAHD) <sup>1</sup>	Comment
BH1	8.64	6.075	2.565	8.22	9.45	4.5	Clear, no odour
BH2	7.79	5.328	2.462	8.46	9.45	3.8	Dark brown, sulphur odour
BH3	-	-	-	-	-	3.4	Well Decommissioned
BH4	3.06	1.052	2.008	6.00	6.45	3.0	Clear, sulphur odour
BH5	7.36	6.345	1.015	8.75	9.28	4.0	Clear, sulphur odour
BH6	3.62	0.259	3.361	4.50	4.95	4.4	Clear, sulphur odour
BH7	2.98	1.225	1.755	4.49	4.95	3.7	clear, sulphur odour.
BH8	3.88	1.472	2.408	6.14	6.28	4.0	clear, sulphur odour
BH9A	10.25	8.760	1.49	16.16	16.16	3.0 <sup>2</sup>	Dark brown, no odour
BH10	6.69	Dry	-	3.68	5.45	4.9	Well was dry.
BH11	6.63	3.405	3.225	5.82	5.95	5.5	clear, no odour
BH12	8.67	6.459	2.211	8.17	8.39	4.0	Light brown, sulphur odour
MW239S	3.04	0.998	2.042	3.90	4.0	3.9	Light Brown, sulphur odour
MW239D	3.04	1.132	1.908	20.49	20.49	3.9 <sup>3</sup> -	No sample taken
SW01*	N/A	0.6	N/A	N/A	N/A	N/A	Clear, no odour
SW02*	N/A	Dry	N/A	N/A	N/A	N/A	Location was dry
SW03*	N/A	0.39	N/A	N/A	N/A	N/A	Clear, slight odour
SW04*	N/A	0.50	N/A	N/A	N/A	N/A	Clear, slight odour

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



<sup>1</sup> – Sourced from Watershed HydroGeo ,2019, *Maximum Extraction Depth Management Plan, Cabbage Tree Road Sand Quarry*, May 2019.

<sup>2</sup> – Inferred Max Groundwater level based on adjacent wells (BH4 & BH9).

<sup>3</sup> – Inferred Max Groundwater level based on adjacent well (MW239S).

**Table 3: Groundwater level monitoring TARP rules (Watershed HydroGeo, 2019)**

Level	Trigger	Action and Response	Report to
<b>0</b>	Groundwater levels more than 0.5 m below <i>inferred</i> maximum historical level at BH1 and BH10. ( <b>Table 2</b> ).	Standard operations – monthly dipping of operational on-site monitoring bores.	n/a
<b>1</b>	Groundwater levels within 0.5 m below <i>inferred</i> maximum historical level ( <b>Table 2</b> ) at any on-site bore.	Weekly (or more frequent) monitoring (dipping) of groundwater levels until water level declines to below high frequency level bores listed in <b>Table 2</b> .	Internal and environmental consultant. Include note in Annual Report.
<b>2</b>	Groundwater levels within 0.25 m of <i>inferred</i> maximum historical level ( <b>Table 2</b> ) at any on-site bore.	Weekly (or more frequent) monitoring (dipping) of groundwater levels. Re-analysis and review of MEL.	WSS to issue letter to DPIE, documenting groundwater level and rainfall trends, and review and recommendations regarding of Minimum Extraction Level (MEL) outlined in Watershed HydroGeo, 2019.
<b>3</b>	Groundwater levels within resource area rise above previously <i>inferred</i> maximum groundwater level ( <b>Table 2</b> ).	Analysis of recent data by hydrogeologist, including site data and data from local HWC wells and local Defence wells (if available). Revision of MEL. Remediation of earlier excavations to revised MEL if required by DPIE.	WSS to issue letter to DPIE, Dol Water and HWC, documenting groundwater level trends, and revision (if necessary) of MEL. Letter to outline remedial options, considering access, vegetation condition in previously rehabilitated areas. Re-grading of previously rehabilitated areas if required by DPIE.

**Table 4** provides a summary of the field parameters taken during the September monitoring event. All gauging data and field parameters for each monitoring location are provided in **Attachment 2**.

**Table 4: Summary of Field Measurements**

Borehole	Turbidity (NTU)	Temp (°C)	DO (mg/L)	EC (µc/cm)	TDS (mg/L)	pH	Redox (mV)
BH1	1594	24.23	3.22	348	227	5.43	131.1
BH2	ND	29.50	5.84	346	224	4.91	297.2
BH4	ND	24.40	3.76	382	248	4.64	164.4
BH5	ND	21.33	4.53	356	232	4.70	-29.8
BH6	1827	24.95	3.55	226	145	4.07	5.5
BH7	2515	22.80	3.30	792	519	4.42	-104
BH8	1500	22.70	1.83	1053	675	4.64	-116.1
BH9A	ND	24.6	3.51	686	438	5.73	304.3
BH11	1760	23.40	3.45	541	351	4.77	6.6
BH12	836	24.90	4.77	525	342	5.02	-34.6
MW239S	2487	22.40	3.45	1443	934	4.55	-83.8



SW01	ND	22.90	2.60	461	301	6.91	1140
SW03	1826	20.10	0.41	1218	796	4.78	398.5
SW04	1135	20.30	1.54	1239	801	5.66	256.0

ND: No Data (Turbidity meter failed while in the field)

**Table 5** and **Table 6** presents a summary of the water monitoring results for key analytes found to be elevated above the LOR for groundwater and surface water. Groundwater and surface water criteria outlined in the baseline water quality summary (BWQS) report, developed by Kleinfelder (KLF 2020), has been applied to the monthly report including a comment comparing results with previous data. It should be noted that since undertaking the BWQS report increased rainfall has occurred throughout 2020 (compared to 2019) which may influence baseline concentrations across the site, most notably in metals, inorganics and general water quality parameters.

Non detect for analytes BTEXN, TRH, TPH and PFAS were reported at all locations and are therefore not included in the below summary tables. Full results tables are provided in the **Attachment 2**. Full Laboratory results, including copies of the COC are provided in **Attachment 3**.



**Table 5: Groundwater screening levels**

Analyte	Metals							Relative to previous monitoring (details on specific data trends provided in Section 5 below)
	Barium	Chromium** <sup>1</sup>	Copper**	Iron	Manganese**	Nickel	Zinc**	
LOR	0.001	0.001	0.001	0.05	0.001	0.001	0.005	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Baseline Trigger Values (KLF 2020)	0.035	0.004	0.013 (0.051 for BH4)	4.1 <sup>2</sup> /1.0 <sup>3</sup>	1.9	0.022 (0.037 for BH11)	0.085	
NHMRC ADWG (2018)	-	0.05	2	-	0.5	0.02	-	
Sample Name	Groundwater							
BH1	0.002	0.003	0.001	7.05	0.012	<0.001	0.045	Concentrations of metals were generally consistent with historical results and below adopted criteria. Iron concentrations (7.05 mg/L) were elevated above the Baseline Trigger Values (4.1 mg/L). Spike is likely to be a result of the recent rainfall. Iron concentrations are within historical variations and will continue to be closely monitored during subsequent monthly monitoring rounds to confirm trends.
BH11	0.007	0.001	<0.001	0.84	0.011	0.002	0.016	Metal concentrations were generally consistent with historical results and below adopted criteria.
BH12	-	0.002	0.002	-	-	0.002	0.017	Concentrations of metals were all below adopted criteria
BH2	0.005	<0.001	0.02	0.36	0.015	<0.001	0.018	Generally metal concentrations were consistent with historical results. Copper concentrations remain elevated (0.020 mg/L) above Baseline Trigger Values. Copper concentrations are within historical variations and will continue to be closely monitored during subsequent monthly monitoring rounds to confirm trends.
BH4	0.008	<0.001	0.005	0.18	0.008	0.001	0.005	Metal concentration were generally consistent with historical results and remain below adopted criteria.
BH6	0.061	<0.001	<0.001	1.72	0.014	<0.001	0.001	Generally metal concentrations were consistent with historical results. Barium concentrations (0.061 mg/L) remain elevated above the Baseline Trigger Values (0.035mg/L), most likely a result of above average rainfall. Concentrations will continue to be closely monitored during subsequent monthly monitoring rounds to confirm trends.



BH7	0.006	0.002	<0.001	1.72	0.023	0.003	0.006	Metal concentrations were generally consistent with historical results and below adopted criteria.
BH8	0.013	<0.001	<0.001	3.48	0.008	0.002	<0.005	Metal concentrations were consistent with historical results and below adopted criteria.
BH9A	0.001	<0.001	0.001	0.11	0.03	0.002	0.011	Metal concentrations were generally consistent with historical results and below adopted criteria.
MW239S	0.001	0.002	0.001	0.3	0.011	0.003	0.021	Metal concentrations were generally consistent with historical results and below adopted criteria.

Notes:

< - Less than laboratory limit of reporting

\*\* 95% Level of protection in freshwater

<sup>1</sup> value for CR VI

<sup>2</sup> Northern half of site – BH5, BH6, BH7, BH8, BH11 & MW239S

<sup>3</sup> Southern half of site - BH2, BH4 & BH9

NS – No Sample



**Table 6: Surface water screening levels**

Analyte	Metals								PFAS	Relative to previous monitoring (details on specific data trends provided in Section 5 below)
	Arsenic	Barium	Chromium** <sup>1</sup>	Copper**	Iron	Manganese**	Nickel	Zinc**		
LOR	0.001	0.001	0.001	0.001	0.05	0.001	0.001	0.005	0.01	
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	
Baseline Trigger Values (KLF 2020)	0.001	0.08	0.002	0.013	9.26	0.841 (SW1)/0.048 (SW3 & SW4)	0.022	0.535 (SW1) / 0.085 (SW3 & SW4)	0.01 <sup>2</sup>	
NHMRC ADWG 6	0.01	-	0.05	2	-	0.5	0.02	-	-	
Sample Name	Surface Water Screening Levels									
SW1	<0.001	0.020	<0.001	0.005	0.18	0.17	<0.001	0.030	<0.01	Metal concentrations were generally consistent with historical results. Concentrations of Arsenic have been reduced to below adopted criteria (<0.001mg/L). Arsenic will continue to be closely monitored following subsequent monthly sampling events to ensure concentrations remain below baseline trigger values.
SW3	<0.001	0.029	<0.001	0.002	4.79	0.032	0.009	0.030	<0.01	Metal concentrations were generally consistent with historical results and below adopted criteria.
SW4	<0.001	0.031	<0.001	0.001	1.93	0.074	0.005	0.016	0.02	Metal concentrations were generally consistent with historical results. Concentrations of Manganese (0.074 mg/L) are above baseline trigger values (0.048 mg/L) however within historical variations. PFOS was reported above criteria however was within historical variations. It is likely increased rainfall above mean trends for October may have contributed to reported concentrations. Analyte concentrations above criteria will continue to be monitored closely during subsequent monthly monitoring rounds to identify any further trends.

Notes:

< - Less than laboratory limit of reporting

\*\* 95% Level of protection in freshwater

<sup>1</sup> value for CR VI

<sup>2</sup> HEPA NEMP 2018 – Recreational Water



## 4 RAINWATER DATA

**Table 7** presents the rainfall data from Williamtown RAAF base (Station Number: 061078, Latitude: 32.79°S; Longitude: 151.84°E; Elevation: 8 m) for the period 2020. The mean monthly rainfall for the month of October/November indicates that there was above average rainfall leading up to the November 16 sampling event. November rainfall is, however, trending towards below average rainfall. Based on current rainfall data (mean and monthly totals) for November 2020 it is expected that surface and groundwater elevations will continue to decrease.

**Table 7: 2020 Rainfall data**

2020	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	6.4	0	0	0	0	0.4	0.2	
2nd	0	0	0	0.2	0	0	0.2	0	0	0	0	3.2
3rd	0	0.4	1.4	9.2	0	0.6	0	0	0	0	0	
4th	0	0.2	6.8	12.4	0	0.2	1.6	0	0	0	0	
5th	0	0	0.2	4.2	5.6	0	0	0	3	0	0	
6th	0	0.2	24.6	0	5.6	0	0	0	0	0	30.2	
7th	0	25	8.2	0	0.2	0	0	0	0	0	0	
8th	0.2	28	0.2	0	0	0.4	4	3	0	0	0.4	
9th	0.2	66.2	0	0.8	0	26.8	0	2.8	0	0	0	
10th	0	16.2	0	0	0	14	0	8.4	12.6	0	0	
11th	0.2	5.6	0.2	4	0	11.4	0.6	18.4	0	0	0	
12th	1.4	0.2	1.6	0	0	1.4	1.8	0	0	0	0	
13th	0.4	1.8	0.2	0	0	0.2	17	1.2	0	0	4.4	
14th	0	3.2	0	0	0.2	11.2	24.6	0	0	0	13.6	
15th	0	0	5.8	0	9.2	0	4	5	0	0	0	
16th	0	0.2	2.6	0	3.4	0	0	0	0	0	0	
17th	37.4	0.2	0	0	0	0	0	0	0			
18th	21.6	5.8	3.2	0	6.2	4.2	7.8	0	0.4	0.2		
19th	3.6	4.6	0	0	2.2	0	0	0	0	18.0		
20th	0.6	0.2	0	0	0.2	0	0	0	2.2	1.0		
21st	0.2	0	0	0	0.8	0.4	0	0	8.8	0		
22nd	0	0	0	0	12	10.2	0	0	0.4	0		
23rd	0	0.4	0.6	0	0.2	0.2	0	0	0	0		
24th	0	0.2	0.6	0	0.2	0	0	0	0	9.4		
25th	1	0	0	0	0	0	0	0	0	14.0		
26th	0.4	0	21.2	0	38.8	0	23.4	0	0.6	128.8		
27th	0	13	19.6	17.2	0	0.2	133	0	0	76.2		
28th	0	0	0	4.6	0	0	16.2	0	0	0		
29th		0	8.4	1	1.6	0	8.4	0	0	4.0		



2020	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
30th	0	-	0	0	12.6	0.2	0	0	0	0		
31st	0	-	0.8	-	0.2	-	0	0	-			
Total	67.2	171.6	106.2	53.6	105.6	70.4	242.6	38.8	28	252.0		
Mean	98.3	117.8	120.7	109.8	108.6	124.6	72.6	72.8	60.6	75.9	81.9	77.5

## 5 DATA TRENDS

Data trends, taken from analyses undertaken throughout the duration of the sampling program (January 2019 – current), are provided as **Appendix 4**. Generally, the trends indicate an increase in groundwater elevation across the site relative to below average rainfall recorded in the October 2020 to November 2020 period.

Notable changes in data trends were observed for the following analytes:

- Iron – generally remained stable across the site with the expectation of a notable increase in concentration at BH1;
- Barium –concentrations of barium remain generally consistent across the site, however BH6 concentration levels are elevated above the Baseline Trigger Value and is historically higher;
- Nickel – concentrations of nickel are generally within historical variations;
- Cobalt – a spike in concentrations can be observed at SW3, SW4 and BH7 which may be a result of recent above average rainfall;
- Copper – Concentrations of copper are generally within historical variations;
- Calcium – Generally calcium concentrations across the site have remained stable or marginally decreased however location SW4 has reported a slight increase since recent monitoring event;
- Zinc – A spike in concentration was observed at SW4 following the April sampling event however subsequent sampling has shown continued stabilisation of concentrations at all locations.

## 6 THANK YOU

Overall, the results suggest that since quarry operations began in August 2019 there has been no immediate change in analytical results.

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**

Environmental Consultant  
Contaminated Land Management  
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## Attachments

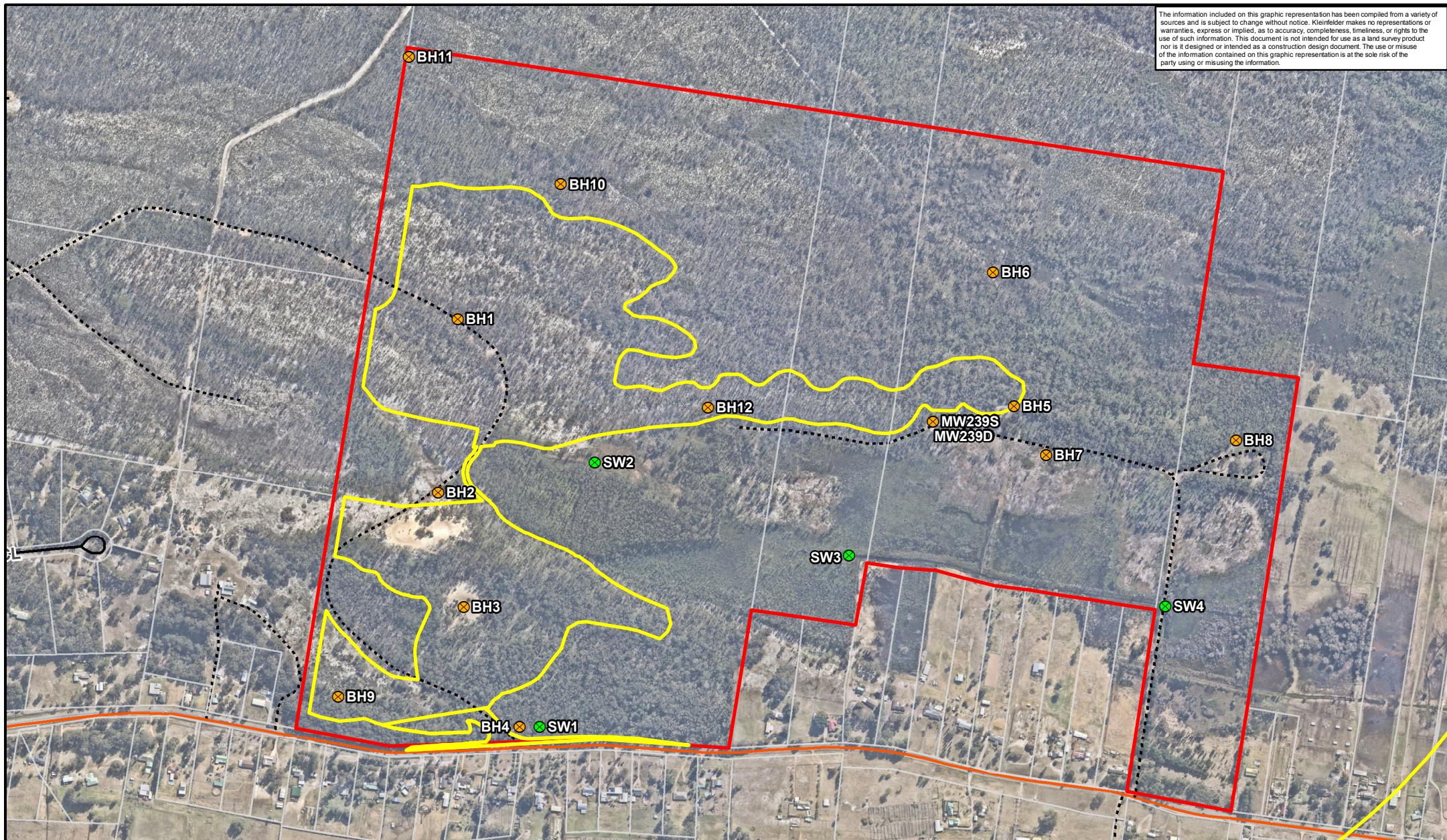
- Attachment: 1 Figures
- Attachment 2: Results tables and field records
- Attachment 3: Lab results
- Attachment 4: Data Trends



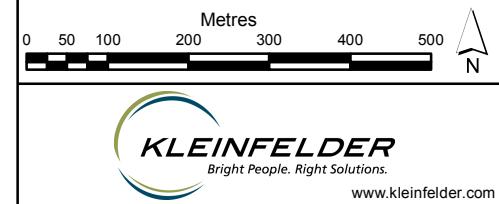
## ATTACHMENT: 1 FIGURES



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



- Groundwater Sample Site
- Subject Land Boundary
- Surface Water Sample Site
- 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

Williamtown Sand Syndicate  
Proposed Sand Quarry  
Cabbage Tree Road, Williamtown

FIGURE:  
**1**



## ATTACHMENT 2: RESULTS TABLES AND FIELD RECORDS





11

**Notes:**

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

pg/L - Micrograms per litre

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene  
1- Baseline Water Quality Summary Report, September 2020 (KLE 2020)

1- Baseline Water Quality Summary Report,  
\*\* 95% Level of protection in freshwater

Table GW2  
Groundwater Analytical Data - Metals  
Williamstown Sand Syndicate



Analyte		Metals															
		Arsenic**	Barium	Beryllium	Boron**	Cadmium**	Chromium* <sup>a1</sup>	Cobalt	Copper**	Iron	Lead**	Manganese*	Mercury** <sup>a2</sup>	Nickel**	Selenium**	Vanadium	Zinc**
LOR	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
Baseline Trigger Values (KLF 2020) <sup>3</sup>		0.003	0.035	-	-	-	0.004	-	0.013 (0.051 for BH4)	4.1 <sup>a3</sup> / 10 <sup>a4</sup>	-	0.136	-	0.022 (0.037 for BH11)	-	-	0.085
NHMRC ADWG 2018		0.01	-	0.06	4	0.002	0.05	-	2	-	0.01	0.5	0.001	0.02	0.01	-	-
Sample Name	Sample Date																
BH1	21-Feb-19	Blocked															
	15-Mar-19	< 0.001	<b>0.003</b>	< 0.001	< 0.05	< 0.0001	<b>0.004</b>	< 0.001	< 0.001	<b>13</b>	< 0.001	<b>0.014</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>1.27</b>
	23-Apr-19	< 0.001	<b>0.003</b>	< 0.001	< 0.05	< 0.0001	<b>0.004</b>	< 0.001	<b>0.002</b>	<b>10</b>	<b>0.001</b>	<b>0.015</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.363</b>
	16-May-19	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	< 0.001	<b>8.33</b>	< 0.001	<b>0.009</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.132</b>
	14-Jun-19	< 0.001	<b>0.001</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.001</b>	<b>6.31</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.074</b>
	16-Jul-19	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	<b>0.002</b>	<b>7.35</b>	< 0.001	<b>0.01</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.116</b>
	15-Aug-19	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	<b>0.002</b>	<b>7.96</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.023</b>
	16-Sep-19	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.004</b>	< 0.001	<b>0.001</b>	<b>8.84</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.034</b>
	15-Oct-19	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	<b>0.006</b>	<b>4.32</b>	< 0.001	<b>0.007</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.037</b>
	18-Nov-19	< 0.001	<b>0.001</b>	< 0.001	< 0.05	< 0.0001	<b>0.004</b>	< 0.001	< 0.001	<b>11</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.012</b>
	17-Dec-19	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	0.001	<b>8.48</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.028</b>
	16-Jan-20	< 0.001	<b>0.003</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.002</b>	<b>4.43</b>	< 0.001	<b>0.011</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.044</b>
	27-Feb-20	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.022</b>	<b>4.1</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	<b>0.075</b>
	26-Mar-20	< 0.001	<b>0.006</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	<b>0.021</b>	<b>7.37</b>	< 0.001	<b>0.009</b>	< 0.0001	<b>0.006</b>	< 0.01	< 0.01	<b>0.08</b>
	27-Apr-20	< 0.001	-	-	-	< 0.0001	-	<b>0.002</b>	<b>0.22</b>	< 0.001	-	< 0.0001	-	-	-	<b>0.035</b>	
	15-May-20	< 0.001	<b>0.006</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	<b>0.013</b>	-	< 0.001	<b>0.012</b>	< 0.0001	<b>0.006</b>	< 0.01	< 0.01	<b>0.065</b>	
	19-Jun-20	< 0.001	-	-	-	< 0.0001	<b>0.002</b>	-	<b>0.006</b>	<b>5.74</b>	< 0.001	<b>0.01</b>	< 0.0001	-	-	<b>0.06</b>	
	16-Jul-20	< 0.001	-	-	-	< 0.0001	<b>0.003</b>	-	<b>0.014</b>	<b>6.22</b>	< 0.001	<b>0.01</b>	< 0.0001	-	-	<b>0.08</b>	
	14-Aug-20	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.005</b>	<b>4.08</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.025</b>
	16-Sep-20	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.005</b>	<b>5.48</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.016</b>
	16-Oct-20	< 0.001	<b>0.006</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.001</b>	<b>5.55</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.017</b>
	16-Nov-20	< 0.001	<b>0.002</b>	< 0.001	< 0.05	< 0.0001	<b>0.003</b>	< 0.001	<b>0.001</b>	<b>7.05</b>	< 0.001	<b>0.012</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.045</b>
BH11	21-Feb-19	< 0.001	<b>0.008</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	<b>0.001</b>	< 0.001	<b>0.26</b>	< 0.001	<b>0.003</b>	< 0.0001	<b>0.005</b>	< 0.01	< 0.01	<b>0.031</b>
	15-Mar-19	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>1.49</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.037</b>	< 0.01	< 0.01	< 0.01	<b>0.016</b>
	23-Apr-19	< 0.001	<b>0.006</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.98</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.07</b>	< 0.01	< 0.01	< 0.01	<b>0.04</b>
	16-May-19	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.97</b>	< 0.001	<b>0.006</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	< 0.01	<b>0.024</b>
	14-Jun-19	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.98</b>	< 0.001	<b>0.005</b>	< 0.0001	<b>0.005</b>	< 0.001	<b>0.001</b>	< 0.01	<b>0.005</b>
	16-Jul-19	< 0.001	<b>0.001</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.47</b>	< 0.001	<b>0.003</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	< 0.01	<b>0.007</b>
	15-Aug-19	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.001</b>	<b>0.87</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.005</b>
	16-Sep-19	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.79</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.01	<b>0.012</b>
	15-Oct-19	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.74</b>	< 0.001	<b>0.006</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	< 0.01	<b>0.016</b>
	18-Nov-19	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.95</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.01	< 0.005
	17-Dec-19	< 0.001	<b>0.004</b>	< 0.001	<b>0.06</b>	< 0.0001	<b>0.002</b>	< 0.001	<b>1</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	< 0.01	<b>0.006</b>
	16-Jan-20	< 0.001	<b>0.005</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>1.08</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	< 0.01	<b>0.005</b>
	27-Feb-20	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.6</b>	< 0.001	<b>0.003</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.01	<b>0.027</b>
	26-Mar-20	< 0.001	<b>0.007</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.72</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	< 0.01	<b>0.051</b>
	16-Jul-20	< 0.001	-	-	-	< 0.0001	<b>0.001</b>	-	<b>0.001</b>	<b>1</b>	< 0.001	<b>0.007</b>	< 0.0001	-	-	-	<b>0.005</b>
	14-Aug-20	< 0.001	<b>0.012</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.004</b>	<b>0.75</b>	< 0.001	<b>0.004</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.017</b>
	16-Sep-20	< 0.001	<b>0.014</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.005</b>	<b>0.9</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.009</b>
	16-Oct-20	< 0.001	<b>0.007</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.84</b>	< 0.001	<b>0.011</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.01	<b>0.016</b>
	16-Nov-20	< 0.001	<b>0.007</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.14</b>	< 0.001	<b>0.076</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.01	<b>0.02</b>
BH12	14-Aug-20	< 0.001	<b>0.012</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	<b>0.001</b>	<b>0.08</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.022</b>
	16-Sep-20	< 0.001	<b>0.028</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.002</b>	<b>0.04</b>							

Table GW2  
Groundwater Analytical Data - Metals  
Williamstown Sand Syndicate



BH3	21-Feb-19	< 0.001	<b>0.003</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	< 0.001	< 0.001	<b>0.06</b>	< 0.001	<b>0.005</b>	< 0.0001	<b>0.053</b>	< 0.01	< 0.01	< 0.005		
	21-Feb-19	< 0.001	<b>0.014</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	<b>0.16</b>	< 0.001	<b>0.039</b>	< 0.0001	<b>0.018</b>	< 0.01	< 0.01	<b>0.014</b>				
	15-Mar-19	< 0.001	<b>0.014</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.001</b>	< 0.05	< 0.001	<b>0.014</b>	< 0.0001	<b>0.022</b>	< 0.01	< 0.01	<b>0.043</b>			
	23-Apr-19	< 0.001	<b>0.013</b>	< 0.001	<b>0.05</b>	< 0.0001	< 0.001	<b>0.002</b>	<b>0.99</b>	< 0.001	<b>0.045</b>	< 0.0001	<b>0.007</b>	< 0.01	< 0.01	<b>0.008</b>			
	16-May-19	< 0.001	<b>0.013</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.27</b>	< 0.001	<b>0.022</b>	< 0.0001	<b>0.022</b>	< 0.01	< 0.01	<b>0.011</b>			
	14-Jun-19	< 0.001	<b>0.012</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.038</b>	< 0.05	< 0.001	<b>0.014</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.005</b>		
	16-Jul-19	< 0.001	<b>0.013</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.046</b>	< 0.05	< 0.001	<b>0.019</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.007</b>		
	15-Aug-19	< 0.001	<b>0.013</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.026</b>	< 0.05	< 0.001	<b>0.018</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.007</b>		
	16-Sep-19	< 0.001	<b>0.012</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.051</b>	<b>0.19</b>	< 0.001	<b>0.026</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.005</b>		
	15-Oct-19	< 0.001	<b>0.01</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.011</b>	<b>0.31</b>	< 0.001	<b>0.136</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.014</b>		
	18-Nov-19	< 0.001	<b>0.011</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.005</b>	< 0.05	< 0.001	<b>0.013</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	< 0.005		
	17-Dec-19	< 0.001	<b>0.012</b>	< 0.001	<b>0.06</b>	< 0.0001	<b>0.001</b>	< 0.001	<b>0.008</b>	< 0.05	< 0.001	<b>0.014</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.005</b>		
	16-Jan-20	< 0.001	<b>0.014</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.006</b>	< 0.05	< 0.001	<b>0.014</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.009</b>		
BH4	27-Feb-20	< 0.001	<b>0.009</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	<b>0.006</b>	<b>0.09</b>	< 0.001	<b>0.013</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.009</b>		
	26-Mar-20	< 0.001	<b>0.01</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.002</b>	<b>0.2</b>	< 0.001	<b>0.014</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.024</b>		
	27-Apr-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.006</b>	< 0.001	< 0.001	-	< 0.0001	-	-	-	<b>0.018</b>		
	15-May-20	< 0.001	<b>0.012</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.052</b>	< 0.001	<b>0.019</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	<b>0.037</b>			
	19-Jun-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.079</b>	<b>0.14</b>	< 0.001	<b>0.016</b>	< 0.0001	-	-	-	<b>0.033</b>		
	16-Jul-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.069</b>	<b>0.06</b>	< 0.001	<b>0.01</b>	< 0.001	-	-	-	< 0.005		
	14-Aug-20	< 0.001	<b>0.008</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.005</b>	<b>0.18</b>	< 0.001	<b>0.008</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.005</b>		
	16-Sep-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.005</b>	< 0.001	< 0.0001	-	< 0.0001	-	-	-	<b>0.008</b>		
	22-Feb-19	< 0.001	<b>0.01</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	< 0.001	< 0.001	<b>1.4</b>	< 0.001	<b>0.005</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.008</b>		
	14-Aug-20	< 0.001	<b>0.15</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.006</b>	<b>0.08</b>	< 0.001	<b>0.003</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.01</b>		
BH5	22-Feb-19	< 0.001	<b>0.03</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	<b>1.03</b>	< 0.001	<b>0.014</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.019</b>		
	14-Mar-19	< 0.001	<b>0.027</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	<b>1.9</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.012</b>		
	23-Apr-19	< 0.001	<b>0.03</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.001</b>	<b>0.96</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.022</b>		
	16-May-19	< 0.001	<b>0.029</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	<b>2.57</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005		
	14-Jun-19	< 0.001	<b>0.027</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.001</b>	<b>2.86</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.008</b>		
	16-Jul-19	< 0.001	<b>0.026</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.002</b>	<b>2.41</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.005</b>		
	15-Aug-19	< 0.001	<b>0.026</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.001</b>	<b>2.19</b>	< 0.001	<b>0.008</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.007</b>		
	16-Sep-19	< 0.001	<b>0.034</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.008</b>	<b>2.08</b>	< 0.001	<b>0.012</b>	< 0.0001	<b>0.007</b>	< 0.01	< 0.01	<b>0.035</b>		
	15-Oct-19	< 0.001	<b>0.026</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.95</b>	< 0.001	<b>0.009</b>	< 0.0001	< 0.001	< 0.01	< 0.01	<b>0.006</b>			
	18-Nov-19	< 0.001	<b>0.03</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.58</b>	< 0.001	<b>0.009</b>	< 0.0001	<b>0.008</b>	< 0.001	< 0.01	< 0.01	<b>0.073</b>		
	17-Dec-19	< 0.001	<b>0.026</b>	< 0.001	<b>0.05</b>	< 0.0001	<b>0.001</b>	< 0.001	<b>0.003</b>	<b>1.78</b>	< 0.001	<b>0.007</b>	< 0.0001	<b>0.001</b>	< 0.01	< 0.01	<b>0.006</b>		
	16-Jan-20	< 0.001	<b>0.032</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>2.15</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005			
	27-Feb-20	< 0.001	<b>0.03</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.69</b>	< 0.001	<b>0.01</b>	< 0.0001	<b>0.004</b>	< 0.001	< 0.01	< 0.01	<b>0.019</b>		
	26-Mar-20	< 0.001	<b>0.028</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.51</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.01	<b>0.03</b>		
	27-Apr-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.002</b>	<b>1.14</b>	< 0.001	< 0.0001	-	-	-	-	<b>0.041</b>		
	15-May-20	< 0.001	<b>0.045</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.89</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.01	<b>0.007</b>		
	19-Jun-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.007</b>	<b>2.49</b>	< 0.001	<b>0.018</b>	< 0.0001	-	-	-	<b>0.053</b>		
	16-Jul-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.002</b>	<b>1.98</b>	< 0.001	<b>0.016</b>	< 0.0001	-	-	-	<b>0.036</b>		
	14-Aug-20	< 0.001	<b>0.05</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>2</b>	< 0.001	<b>0.014</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.005			
	16-Sep-20	< 0.001	<b>0.047</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.78</b>	< 0.001	<b>0.01</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.006			
	16-Oct-20	< 0.001	<b>0.04</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.84</b>	< 0.001	<b>0.011</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.007			
	16-Nov-20	< 0.001	<b>0.061</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>1.72</b>	< 0.001	<b>0.014</b>	< 0.0001	< 0.001	< 0.01	< 0.01	< 0.01	<b>0.01</b>		
BH7	22-Feb-19	< 0.001	<b>0.004</b>	< 0.001	< 0.05	< 0.0001	<b>0.002</b>	<b>0.003</b>	< 0.001	<b>1.8</b>	< 0.001	<b>0.026</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	<b>0.019</b>		
	14-Mar-19	< 0.001	<b>0.01</b>	< 0.001	< 0.05	< 0.0001	<b>0.001</b>	<b>0.003</b>	< 0.001	<b>1.8</b>	< 0.001	<b>0.02</b>	< 0.0001	<b>0.004</b>	< 0.01	< 0.01	<b>0.009</b>		
	23-Apr-19																		

Table GW2  
Groundwater Analytical Data - Metals  
Williamstown Sand Syndicate



26-Mar-20	<0.001	<b>0.005</b>	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<b>3.17</b>	<0.001	<b>0.012</b>	<0.0001	<0.001	<0.01	<0.01	<0.01	<0.005
27-Apr-20	<0.001	-	-	-	<0.0001	<b>0.002</b>	-	<b>0.002</b>	<b>3.32</b>	<0.001	-	<0.0001	-	-	-	<b>0.046</b>	
15-May-20	<b>0.001</b>	<b>0.009</b>	<0.001	<0.05	<0.0001	<b>0.001</b>	<0.001	<b>0.001</b>	<b>3.49</b>	<0.001	<b>0.015</b>	<0.0001	<b>0.006</b>	<0.01	<0.01	<b>0.04</b>	
19-Jun-20	<b>0.001</b>	-	-	-	<0.0002	<b>0.001</b>	-	<b>0.012</b>	<b>3.3</b>	<0.001	<b>0.031</b>	<0.0001	-	-	-	<b>0.057</b>	
16-Jul-20	<0.001	-	-	-	<0.0001	<b>0.001</b>	-	<b>0.002</b>	<b>2.87</b>	<0.001	<b>0.006</b>	<0.0001	-	-	-	<0.005	
14-Aug-20	<0.001	<b>0.02</b>	<0.001	<0.05	<0.0001	<b>0.001</b>	<0.001	<0.001	<b>3.14</b>	<0.001	<b>0.008</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.007</b>	
16-Sep-20	<0.001	<b>0.014</b>	<0.001	<0.05	<0.0001	<b>0.001</b>	<0.001	<b>0.035</b>	<b>3.35</b>	<b>0.001</b>	<b>0.009</b>	<0.0001	<b>0.009</b>	<0.01	<0.01	<b>0.039</b>	
16-Oct-20	<b>0.001</b>	<b>0.009</b>	<0.001	<0.05	<0.0001	<b>0.001</b>	<0.001	<0.001	<b>3.03</b>	<0.001	<b>0.007</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.012</b>	
16-Nov-20	<0.001	<b>0.013</b>	<0.001	<0.05	<0.0001	<0.0001	<0.001	<0.001	<b>3.48</b>	<0.001	<b>0.008</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<0.005	
BH9	14-Aug-20	-	-	-	<0.0001	<0.001	<0.001	<b>0.003</b>	<0.05	<0.001	<b>0.007</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.032</b>	
BH9A	16-Sep-20	<0.001	<b>0.028</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.002</b>	<b>0.004</b>	<b>0.14</b>	<0.001	<b>0.076</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.02</b>
BH10	16-Oct-20	<0.001	<b>0.001</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.001</b>	<b>0.06</b>	<0.001	<b>0.042</b>	<0.0001	<b>0.003</b>	<0.01	<0.01	<b>0.016</b>	
BH10	16-Nov-20	<0.001	<b>0.001</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.001</b>	<b>0.11</b>	<0.001	<b>0.03</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.011</b>	
Dry	21-Feb-19																
	15-Mar-19																
	23-Apr-19																
	16-May-19																
	14-Jun-19																
	16-Jul-19																
	15-Aug-19																
	16-Sep-19																
	15-Oct-19																
	18-Nov-19																
	17-Dec-19																
	16-Jan-20																
	27-Feb-20																
	26-Mar-20																
	27-Apr-20																
	15-May-20																
	16-Jun-20																
	16-Jul-20																
	14-Aug-20																
	16-Sep-20																
	16-Oct-20																
	16-Nov-20																
MW239S	22-Feb-19	<0.001	<b>0.007</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.11</b>	<0.001	<b>0.003</b>	<0.0001	<b>0.001</b>	<0.01	<0.01	<b>0.006</b>
MW239S	14-Mar-19	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.25</b>	<0.001	<b>0.005</b>	<0.0001	<b>0.005</b>	<0.01	<0.01	<b>0.008</b>
MW239S	23-Apr-19	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.01</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.004</b>	<0.01	<0.01	<b>0.007</b>
MW239S	16-May-19	<0.001	<b>0.005</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>0.87</b>	<0.001	<b>0.003</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<0.005
MW239S	14-Jun-19	<0.001	<b>0.005</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.002</b>	<b>0.8</b>	<0.001	<b>0.003</b>	<0.0001	<b>0.001</b>	<0.01	<0.01	<0.005
MW239S	16-Jul-19	<0.001	<b>0.006</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>0.87</b>	<0.001	<b>0.003</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<0.005
MW239S	15-Aug-19	<0.001	<b>0.006</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.0</b>	<0.001	<b>0.004</b>	<0.0001	<0.001	<0.01	<0.01	<0.005
MW239S	16-Sep-19	<0.001	<b>0.01</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.002</b>	<b>0.94</b>	<0.001	<b>0.006</b>	<0.0001	<b>0.006</b>	<0.01	<0.01	<b>0.032</b>
MW239S	15-Oct-19	<0.001	<b>0.005</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.003</b>	<b>0.68</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.011</b>
MW239S	18-Nov-19	<0.001	<b>0.01</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.1</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.008</b>	<0.01	<0.01	<b>0.03</b>
MW239S	17-Dec-19	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.003</b>	<0.001	<b>0.001</b>	<b>1.33</b>	<0.001	<b>0.003</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<0.005
MW239S	16-Jan-20	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.31</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.007</b>
MW239S	27-Feb-20	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.03</b>	<0.001	<b>0.002</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.019</b>
MW239S	26-Mar-20	<0.001	<b>0.008</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.001</b>	<b>0.97</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.003</b>	<0.01	<0.01	<b>0.032</b>
MW239S	27-Apr-20	<0.001	-	-	<0.0001	<b>0.002</b>	-	<b>0.002</b>	<b>1.14</b>	<0.001	-	<0.0001	-	-	-	<b>0.041</b>	
MW239S	15-May-20	<0.001	<b>0.011</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.006</b>	<b>1.17</b>	<0.001	<b>0.004</b>	<0.0001	<b>0.006</b>	<0.01	<0.01	<b>0.028</b>
MW239S	19-Jun-20	<0.001	-	-	-	<0.0001	<b>0.002</b>	-	<b>0.002</b>	<b>0.9</b>	<0.001	<b>0.004</b>	<0.0001	-	-	-	<b>0.057</b>
MW239S	16-Jul-20	<0.001	-	-	-	<0.0001	<b>0.002</b>	-	<b>0.01</b>	<b>0.55</b>	<b>0.001</b>	<b>0.006</b>	<0.0001	-	-	-	<b>0.053</b>
MW239S	14-Aug-20	<0.001	<b>0.017</b>	<0.001	<0.05	<0.0001	<b>0.001</b>	<0.001	<b>0.002</b>	<b>0.38</b>	<0.001	<b>0.006</b>	<0.0001	<b>0.001</b>	<0.01	<0.01	<b>0.006</b>
MW239S	16-Sep-20	<0.001	<b>0.016</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.002</b>	<b>0.51</b>	<0.001	<b>0.008</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.006</b>
MW239S	16-Oct-20	<0.001	<b>0.009</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<0.001	<b>1.17</b>	<0.001	<b>0.009</b>	<0.0001	<b>0.002</b>	<0.01	<0.01	<b>0.005</b>
MW239S	16-Nov-20	<0.001	<b>0.01</b>	<0.001	<0.05	<0.0001	<b>0.002</b>	<0.001	<b>0.001</b>	<b>0.3</b>	<0.001	<b>0.011</b>	<0.0001	<b>0.003</b>	<0.01	<0.01	<b>0.021</b>

<sup>1</sup> value for CR VI

<sup>2</sup> as inorganic

<sup>3</sup> Baseline Water Quality Summary Report, September 2020 (KLF 2020)

#### **Notes:**

$\times$  : Less than laboratory limit of  $m$

$\mu\text{g/L}$  - Micrograms per litre

\*\*\* 99% Level of protection in freshwater

<sup>1</sup> Baseline Summary Report Criteria (KLE 2020) - S

-- Not analysed

< - Less than laboratory limit of report

µg/L - Micrograms per litre  
\*\*\* 99% Level of protection in freshw

#### <sup>1</sup> Baseline Summary

Table GW4  
Groundwater Analytical Data - Inorganics  
Williamtown Sand Syndicate



Analyte		Anions and Cations															
		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	
LOR	1	1	1	1	1	1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	
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	
Baseline Trigger Values (KLF 2020) <sup>a</sup>	-	-	-	-	-	-	-	-	2	-	-	-	0.5	3	-	-	
NHMRC ADWG 2018	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-	-	
Sample Name	Sample Date																
BH1	21-Feb-19															Blocked	
	15-Mar-19	11	2.0	1.0	< 1.0	< 1.0	25	< 0.1	-	-	-	-	-	-	-	-	
	23-Apr-19	14	1.0	2.0	< 1.0	4.0	25	< 0.1	-	-	-	-	-	-	-	-	
	16-May-19	12	< 1.0	2.0	< 1.0	5.0	25	< 0.1	0.03	< 0.01	< 0.01	< 0.01	< 0.01	0.11	0.3	0.3	
	14-Jun-19	10	< 1.0	2.0	< 1.0	3.0	24	< 0.1	-	-	-	-	-	-	-	-	
	16-Jul-19	15	< 1.0	2.0	< 1.0	4.0	23	< 0.1	-	-	-	-	-	-	-	-	
	15-Aug-19	14	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	-	-	
	16-Sep-19	13	< 1.0	2.0	< 1.0	2.0	20	< 0.1	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.12	0.3	0.3	
	15-Oct-19	13	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	-	-	
	18-Nov-19	16	< 1.0	2.0	< 1.0	3.0	23	0.1	< 0.01	< 0.01	< 0.01	0.01	0.01	0.13	0.3	0.3	
	17-Dec-19	14	< 1	2	< 1	5	23	< 0.1	-	-	-	-	-	-	-	-	
	16-Jan-20	16	< 1	3	< 1	3	25	< 0.1	-	-	-	-	-	-	-	-	
	27-Feb-20	14	< 1	2	< 1	4	24	< 0.1	< 0.01	0.02	< 0.01	0.02	0.02	0.22	0.4	0.4	
	26-Mar-20	12	< 1	2	< 1	< 1	24	< 0.1	-	-	-	-	-	-	-	-	
	27-Apr-20	15	< 1	2	1	< 1	24	< 0.1	-	-	-	-	-	-	-	-	
	15-May-20	16	< 1	2	< 1	3	27	< 0.1	< 0.01	0.06	< 0.01	0.04	0.04	0.1	1	1	
	19-Jun-20	15	< 1	2	< 1	2	27	0.2	-	-	-	-	-	-	-	-	
	16-Jul-20	17	< 1	2	2	3	24	< 0.1	-	-	-	-	-	-	-	-	
	14-Aug-20	15	< 1	2	< 1	2	26	< 0.1	< 0.01	0.03	< 0.1	0.06	0.06	0.09	0.6	0.5	
	16-Sep-20	13	< 1.0	2.0	< 1.0	2.0	21	< 0.1	-	-	-	-	-	-	-	-	
	16-Oct-20	14	< 1.0	2.0	< 1.0	4.0	21	< 0.1	-	-	-	-	-	-	-	-	
	16-Nov-20	11	< 1.0	2.0	< 1.0	5.0	18	< 0.1	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.07	0.2	0.2	
BH11	21-Feb-19	48	< 1.0	10	< 1.0	24	80	0.1	< 0.01	0.03	< 0.01	0.04	0.04	0.06	0.06	1.8	1.8
	15-Mar-19	26	< 1.0	2.0	< 1.0	2.0	52	< 0.1	-	-	-	-	-	-	-	-	
	23-Apr-19	32	< 1.0	5.0	< 1.0	2.0	57	< 0.1	-	-	-	-	-	-	-	-	
	16-May-19	29	< 1.0	4.0	< 1.0	2.0	55	< 0.1	< 0.01	0.01	< 0.01	< 0.01	< 0.01	0.12	0.4	0.4	
	14-Jun-19	26	< 1.0	3.0	< 1.0	< 1.0	53	< 0.1	-	-	-	-	-	-	-	-	
	16-Jul-19	49	< 1.0	8.0	< 1.0	8.0	73	0.2	-	-	-	-	-	-	-	-	
	15-Aug-19	28	< 1.0	3.0	< 1.0	4.0	47	< 0.1	-	-	-	-	-	-	-	-	
	16-Sep-19	27	< 1.0	3.0	< 1.0	5.0	46	< 0.1	< 0.01	0.12	< 0.01	< 0.01	< 0.01	0.15	0.7	0.7	
	15-Oct-19	28	< 1.0	3.0	< 1.0	3.0	44	< 0.1	-	-	-	-	-	-	-	-	
	18-Nov-19	28	< 1.0	3.0	< 1.0	< 1.0	53	< 0.1	< 0.01	2.11	< 0.01	0.06	0.06	0.18	5.9	5.8	
	17-Dec-19	26	< 1	4	< 1	< 1	48	< 0.1	-	-	-	-	-	-	-	-	
	16-Jan-20	25	< 1	3	< 1	< 1	46	< 0.1	-	-	-	-	-	-	-	-	
	27-Feb-20	20	< 1	3	< 1	< 1	41	< 0.1	< 0.01	1.09	< 0.01	0.02	0.02	0.16	3.3	3.3	
	26-Mar-20	20	1	2	< 1	< 1	40	< 0.1	-	-	-	-	-	-	-	-	
	27-Apr-20	22	< 1	2	< 1	1	36	< 0.1	-	-	-	-	-	-	-	-	
	15-May-20	21	< 1	2	< 1	2	39	< 0.1	< 0.01	31.8	< 0.01	0.21	0.21	0.72	85.5	85.3	
	19-Jun-20	22	< 1	2	< 1	1	42	< 0.1	-	-	-	-	-	-	-	-	
	16-Jul-20	24	< 1	3	< 1	2	41	< 0.1	-	-	-	-	-	-	-	-	
	14-Aug-20	22	< 1	4	< 1	6	43	< 0.1	< 0.01	0.05	< 0.01	0.06	0.06	0.07	0.6	0.5	
	16-Sep-20	29	< 1.0	5.0	< 1.0	6.0	48	< 0.1	-	-	-	-	-	-	-	-	
	16-Oct-20	29	< 1.0	6.0	< 1.0	4.0	61	< 0.1	-	-	-	-	-	-	-	-	
	16-Nov-20	27	< 1.0	5.0	< 1.0	5.0	50	< 0.1	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.08	0.5	0.5	
BH12	14-Aug-20	20	4	4	< 1	14	36	< 0.1	< 0.01	0.75	0.01	0.01	0.02	< 0.01	3.9	3.9	
	16-Sep-20	24	< 1.0	7.0	1.0	22	38	< 0.1	-	-	-	-	-	-	-	-	
	16-Nov-20	22	< 1.0	4.0	1.0	11	41	< 0.1	< 0.01	< 0.01	< 0.01	0.02	0.02	< 0.01	0.2	0.2	
BH2	22-Feb-19	12	2.0	2.0	< 1.0	6.0	22	0.1	< 0.01	0.28	< 0.01	2.76	2.76	0.05	4.0	1.2	
	15-Mar-19	10	3.0	2.0	< 1.0	7.0	23	< 0.1	-	-	-	-	-	-	-	-	
	23-Apr-19	14	2.0	2.0	< 1.0	6.0	23	< 0.1	-	-	-	-	-	-	-	-	
	16-May-19	12	2.0	2.0	< 1.0	21	22	< 0.1	< 0.01	0.26	< 0.01	0.38	0.38	0.01	1.3	0.9	
	14-Jun-19	11	1.0	2.0	< 1.0	5.0	23	< 0.1	-	-	-	-	-	-	-	-	
	16-Jul-19	13	2.0	2.0	< 1.0	9.0	20	< 0.1	-	-	-	-	-	-	-	-	
	15-Aug-19	12	1.0	2.0	< 1.0	8.0	20	< 0.1	-	-	-	-	-	-	-	-	
	16-Sep-19	11	2.0	2.0	< 1.0	8.0	18	< 0.1	< 0.01	0.28	< 0.01	1.07	1.07	0.04	2.7	1.6	
	15-Oct-19	12	2.0	2.0	< 1.0	5.0	20	< 0.1	-	-	-	-	-	-	-	-	
	18-Nov-19	14	2.0	1.0	< 1.0	7.0	19	< 0.1	< 0.01	0.21	< 0.01	1.01	1.01	0.05	2.1	1.1	
	17-Dec-19	13	2	2	< 1	8	17	< 0.1	-	-	-	-	-	-	-	-	
	16-Jan-20	13	2	2	< 1	6	17	< 0.1	-	-	-	-	-	-	-	-	
	27-Feb-20	11	2	2	< 1	6	16	0.1	< 0.01	0.09	< 0.01	2.18	2.18	0.04	2.8	0.6	
	26-Mar-20	12	2	1	< 1	7	23	< 0.1	-	-	-	-	-	-	-	-	
	27-Apr-20	12	2	1	< 1	7	19	< 0.1	-	-	-	-	-	-	-	-	
	15-May-20	13	2	1	< 1	3	27	< 0.1	< 0.01	0.13	< 0.01	2.1	2.1	0.01	3.2	1.1	
	19-Jun-20	12	2	2	< 1	6	18	< 0.1	-	-	-	-	-	-	-	-	

Analyte		Alkalinity										Inorganics		pH		
		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*					
LOR Units		meq/L	meq/L	%	-	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	0.01	pH units	
Baseline Trigger Values (KLF 2020) <sup>4</sup>		-	-	-	-	-	-	-	-	-	125-2200	-	-	4-7		
NHMRC ADWG 2018		-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Name	Sample Date															
BH1	21-Feb-19															
	15-Mar-19	0.66	0.88	-	-	9.0	< 1.0	< 1.0	9.0	9.0	104	68	129	5.67		
	23-Apr-19	0.82	0.99	-	-	10	< 1.0	< 1.0	10	11	84	55	97	5.83		
	16-May-19	0.69	1.01	-	1.7	10	< 1.0	< 1.0	10	8.0	105	68	164	5.82		
	14-Jun-19	0.6	0.94	-	-	10	< 1.0	< 1.0	10	8.0	99	64	72	5.52		
	16-Jul-19	0.82	0.95	-	-	11	< 1.0	< 1.0	11	8.0	102	66	84	5.62		
	15-Aug-19	0.77	0.91	-	-	14	< 1.0	< 1.0	14	8.0	128	83	82	6.22		
	16-Sep-19	0.73	0.76	-	1.84	8.0	< 1.0	< 1.0	8.0	8.0	102	66	88	5.44		
	15-Oct-19	0.73	0.71	-	-	4.0	< 1.0	< 1.0	4.0	8.0	98	64	-	5.5		
	18-Nov-19	0.86	1.19	-	2.26	24	< 1.0	< 1.0	24	8.0	126	82	-	6.29		
	17-Dec-19	0.77	1.05	-	-	15	< 1	< 1	15	8	118	77	-	6.05		
	16-Jan-20	0.94	1.21	-	-	22	< 1	< 1	22	12	112	73	-	6.23		
	27-Feb-20	0.77	0.94	-	1.98	9	< 1	< 1	9	8	103	67	-	6.2		
	26-Mar-20	0.69	0.88	-	-	10	< 1	< 1	10	8	118	77	-	5.61		
	27-Apr-20	0.84	0.92	-	-	12	< 1	< 1	12	8	131	85	-	5.7		
	15-May-20	0.86	1.06	-	2.26	12	< 1	< 1	12	8	137	89	-	6.12		
	19-Jun-20	1.04	1.14	-	-	17	< 1.0	< 1.0	17	8	140	91	-	5.91		
	16-Jul-20	0.96	1.26	-	-	26	< 1.0	< 1.0	26	8	135	88	-	5.91		
	14-Aug-20	0.82	0.95	-	2.12	9	< 1	< 1	9	8	113	73	100	5.76		
	16-Sep-20	0.73	0.81	-	-	9.0	< 1.0	< 1.0	9.0	8.0	95	62	81	5.87		
	16-Oct-20	0.77	0.84	-	-	8.0	< 1.0	< 1.0	8.0	8.0	88	57	-	5.7		
	16-Nov-20	1.02	1.05	-	1.55	22	< 1.0	< 1.0	22	8.0	120	78	76	5.98		
BH11	21-Feb-19	2.91	2.76	-	3.21	< 1.0	< 1.0	< 1.0	41	346	278	-	-	4.67		
	15-Mar-19	1.3	1.51	-	-	< 1.0	< 1.0	< 1.0	8.0	186	121	144	-	4.82		
	23-Apr-19	1.8	1.65	-	-	< 1.0	< 1.0	< 1.0	20	150	98	135	-	4.99		
	16-May-19	1.59	1.59	-	3.0	< 1.0	< 1.0	< 1.0	16	188	122	216	-	4.91		
	14-Jun-19	1.38	1.5	-	-	< 1.0	< 1.0	< 1.0	12	175	114	107	-	4.84		
	16-Jul-19	2.79	2.22	-	-	< 1.0	< 1.0	< 1.0	33	318	207	192	-	4.68		
	15-Aug-19	1.46	1.41	-	-	< 1.0	< 1.0	< 1.0	12	197	128	135	-	4.88		
	16-Sep-19	1.42	1.4	-	3.18	< 1.0	< 1.0	< 1.0	12	195	127	140	-	4.66		
	15-Oct-19	1.46	1.3	-	-	< 1.0	< 1.0	< 1.0	12	194	126	-	-	4.92		
	18-Nov-19	1.46	1.5	-	3.3	< 1.0	< 1.0	< 1.0	12	193	125	-	-	5.12		
	17-Dec-19	1.46	1.39	-	-	2	< 1	< 1	2	16	196	127	-	5.03		
	16-Jan-20	1.33	1.34	-	-	2	< 1	< 1	2	12	168	109	-	5.09		
	27-Feb-20	1.12	1.16	-	2.36	< 1	< 1	< 1	12	165	107	-	-	4.35		
	26-Mar-20	1.08	1.13	-	-	< 1	< 1	< 1	11	156	101	-	-	5.14		
	27-Apr-20	1.12	1.24	-	-	10	< 1	< 1	10	16	151	98	-	6.14		
	15-May-20	1.08	1.2	-	-	10	< 1	< 1	10	16	151	98	-	6.14		
	19-Jun-20	1.12	1.2	-	-	< 1	< 1	< 1	< 1	8	168	109	-	4.9		
	16-Jul-20	1.29	1.32	-	-	6	< 1	< 1	6	12	184	120	-	4.91		
	14-Aug-20	1.29	1.38	-	2.27	2	< 1	< 1	2	16	172	112	119	4.89		
	16-Sep-20	1.67	1.48	-	-	< 1.0	< 1.0	< 1.0	20	223	145	111	-	4.61		
	16-Oct-20	1.76	1.8	-	-	< 1.0	< 1.0	< 1.0	25	218	142	-	-	4.8		
	16-Nov-20	1.58	1.51	-	2.51	< 1.0	< 1.0	< 1.0	20	217	141	146	-	4.81		
BH12	14-Aug-20	1.4	1.35	-	-	1.69	2	< 1	< 1	2	26	170	110	139	5.26	
	16-Sep-20	1.64	1.57	-	-	2.0	< 1.0	< 1.0	2.0	29	206	134	118	5.37		
	16-Nov-20	1.31	1.52	-	2.27	7.0	< 1.0	< 1.0	7.0	16	190	124	134	5.92		
BH2	22-Feb-19	0.79	0.74	-	-	1.44	< 1.0	< 1.0	< 1.0	13	91	128	-	4.87		
	15-Mar-19	0.75	0.79	-	-	< 1.0	< 1.0	< 1.0	16	101	66	90	-	4.71		
	23-Apr-19	0.87	0.77	-	-	< 1.0	< 1.0	< 1.0	13	70	46	84	-	4.82		
	16-May-19	0.79	1.06	-	1.44	< 1.0	< 1.0	< 1.0	13	94	61	144	-	4.85		
	14-Jun-19	0.69	0.75	-	-	< 1.0	< 1.0	< 1.0	11	91	59	51	-	4.76		
	16-Jul-19	0.83	0.75	-	-	< 1.0	< 1.0	< 1.0	13	90	58	63	-	4.84		
	15-Aug-19	0.74	0.73	-	-	< 1.0	< 1.0	< 1.0	11	110	72	61	-	5.2		
	16-Sep-19	0.74	0.67	-	1.32	< 1.0	< 1.0	< 1.0	13	96	62	60	-	4.72		
	15-Oct-19	0.79	0.67	-	-	< 1.0	< 1.0	< 1.0	13	102	66	-	-	5.06		
	18-Nov-19	0.79	0.68	-	2.02	< 1.0	< 1.0	< 1.0	13	102	66	-	-	5.47		
	17-Dec-19	0.83	0.69	-	-	2	< 1	< 1	2	13	106	69	-	5.43		
	16-Jan-20	0.83	0.72	-	-	6	< 1	< 1	6	13	102	66	-	5.61		
	27-Feb-20	0.74	0.6	-	1.32	1	< 1	< 1	1	13	98	64	-	5.23		
	26-Mar-20	0.7	0.79	-	-	10	< 1	< 1	10	9	113	73	-	5.18		
	27-Apr-20	0.7	0.72	-	-	2	< 1	< 1	2	9	109	71	-	5.25		
	15-May-20	0.75	0.72	-	1.87	3	< 1	< 1	3	9	108	70	-	5.31		
	19-Jun-20	0.79	0.64	-	-	2	< 1	< 1	2	13	107	70	-	5.13		

Analyte		Anions and Cations																
		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		
LOR	1	1	1	1	1	1	1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1		
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		
Baseline Trigger Values (KLF 2020) <sup>a</sup>	-	-	-	-	-	-	-	-	2	-	-	-	0.5	3	-	-		
NHMRCA DWG 2018	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-	-		
16-Jul-20	11	2	1	<1	6	16	<0.1	-	-	-	-	-	-	-	-	-		
14-Aug-20	10	2	1	<1	7	15	<0.1	<0.01	0.21	<0.01	2.31	2.31	0.02	3.9	1.6	-		
16-Sep-20	11	2.0	2.0	< 1.0	7.0	17	< 0.1	-	-	-	-	-	-	-	-	-		
16-Oct-20	11	2.0	2.0	< 1.0	6.0	16	< 0.1	-	-	-	-	-	-	-	-	-		
16-Nov-20	11	2.0	2.0	< 1.0	9.0	16	< 0.1	< 0.01	0.48	< 0.01	2.88	2.88	< 0.01	4.8	1.9	-		
BH3	21-Feb-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	-	
	21-Feb-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	-	
	15-Mar-19	9.0	2.0	< 1.0	< 1.0	5.0	18	< 0.1	-	-	-	-	-	-	-	-	-	
	23-Apr-19	10	2.0	1.0	1.0	3.0	19	< 0.1	-	-	-	-	-	-	-	-	-	
	16-May-19	9.0	2.0	1.0	1.0	22	19	< 0.1	< 0.01	0.97	< 0.01	0.29	0.29	< 0.01	1.0	0.7	-	
	14-Jun-19	6.0	1.0	1.0	< 1.0	4.0	18	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Jul-19	10	2.0	2.0	1.0	6.0	18	< 0.1	-	-	-	-	-	-	-	-	-	
	15-Aug-19	8.0	2.0	1.0	1.0	5.0	16	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Sep-19	11	2.0	2.0	< 1.0	8.0	19	< 0.1	< 0.01	0.4	< 0.01	0.24	0.24	0.02	0.6	0.4	-	
	15-Oct-19	10	1.0	1.0	< 1.0	4.0	18	< 0.1	-	-	-	-	-	-	-	-	-	
	18-Nov-19	11	1.0	1.0	< 1.0	6.0	18	< 0.1	< 0.01	0.08	< 0.01	0.29	0.29	< 0.01	0.3	< 0.1	-	
	17-Dec-19	9	1	1	1	6	16	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Jan-20	13	2	2	2	6	18	< 0.1	-	-	-	-	-	-	-	-	-	
	27-Feb-20	14	2	2	<1	9	26	<0.1	<0.01	0.18	<0.01	0.41	0.41	0.01	0.7	0.3	-	
	26-Mar-20	12	2	2	<1	10	27	<0.1	-	-	-	-	-	-	-	-	-	
	27-Apr-20	16	1	2	1	10	25	<0.1	-	-	-	-	-	-	-	-	-	
	15-May-20	21	1	3	<1	12	37	<0.1	<0.01	0.09	<0.01	0.12	0.12	<0.01	0.6	0.5	-	
	19-Jun-20	23	1	2	1	13	36	<0.1	-	-	-	-	-	-	-	-	-	
	16-Jul-20	35	<1	6	<1	21	50	<0.1	-	-	-	-	-	-	-	-	-	
	14-Aug-20	18	<1	2	<1	10	34	<0.1	<0.01	0.24	<0.01	0.16	0.16	0.02	0.8	0.6	-	
	16-Sep-20	20	<1.0	2.0	< 1.0	11	31	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Oct-20	19	1.0	3.0	< 1.0	10	34	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Nov-20	18	< 1.0	2.0	< 1.0	12	27	< 0.1	< 0.01	0.06	< 0.01	0.1	0.1	< 0.01	0.1	< 0.1	-	
BH5	22-Feb-19	42	< 1.0	6.0	1.0	19	69	0.2	< 0.01	0.34	< 0.01	< 0.01	< 0.01	< 0.01	0.09	3.0	3.0	-
	14-Aug-20	18	1.0	3.0	<1	30	32	<0.1	<0.01	0.09	<0.01	<0.01	<0.01	<0.01	0.05	0.8	0.8	-
	22-Feb-19	28	3.0	4.0	1.0	28	42	< 0.1	< 0.01	0.05	< 0.01	0.09	0.09	0.14	0.5	0.4	-	
	14-Mar-19	23	2.0	4.0	1.0	17	37	< 0.1	-	-	-	-	-	-	-	-	-	
	23-Apr-19	25	3.0	4.0	1.0	18	42	< 0.1	-	-	-	-	-	-	-	-	-	
	16-May-19	23	3.0	4.0	1.0	18	45	< 0.1	< 0.01	0.13	< 0.01	< 0.01	< 0.01	0.14	0.6	0.6	-	
	14-Jun-19	20	2.0	4.0	1.0	16	42	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Jul-19	23	2.0	4.0	1.0	20	35	< 0.1	-	-	-	-	-	-	-	-	-	
	15-Aug-19	23	2.0	3.0	1.0	21	38	< 0.1	-	-	-	-	-	-	-	-	-	
	16-Sep-19	25	3.0	3.0	1.0	21	38	< 0.1	< 0.01	0.15	< 0.01	0.07	0.07	0.19	0.8	0.7	-	
	15-Oct-19	25	2.0	4.0	1.0	13	41	< 0.1	-	-	-	-	-	-	-	-	-	
	18-Nov-19	27	3.0	3.0	1.0	18	45	< 0.1	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.23	0.4	0.4	-	
	17-Dec-19	26	2	4	1	16	42	<0.1	-	-	-	-	-	-	-	-	-	
	16-Jan-20	30	3	4	2	15	50	0.2	-	-	-	-	-	-	-	-	-	
	27-Feb-20	27	2	4	1	16	46	<0.1	<0.01	0.3	<0.01	0.03	0.03	0.27	1	1	-	
	26-Mar-20	26	2	4	1	18	48	<0.1	-	-	-	-	-	-	-	-	-	
	27-Apr-20	31	2	4	2	7	119	<0.1	-	-	-	-	-	-	-	-	-	
	15-May-20	42	2	5	2	15	73	<0.1	<0.01	0.42	<0.01	<0.01	<0.01	0.02	0.22	1.8	1.8	-
	19-Jun-20	67	4	7	2	13	127	<0.1	-	-	-	-	-	-	-	-	-	-
	16-Jul-20	54	4	6	2	16	102	<0.1	-	-	-	-	-	-	-	-	-	-
	14-Aug-20	50	4	5	2	17	92	<0.1	<0.01	0.22	<0.01	0.1	0.1	0.29	1.3	1.2	-	-
	16-Sep-20	36	2.0	4.0	1.0	16	55	<0.1	-	-	-	-	-	-	-	-	-	-
	16-Oct-20	36	2.0	5.0	1.0	12	64	<0.1	-	-	-	-	-	-	-	-	-	-
	16-Nov-20	37	3.0	5.0	2.0	23	61	<0.1	0.01	0.08	<0.01	0.01	0.01	0.22	0.3	0.3	-	-
BH7	22-Feb-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	-	-
	14-Mar-19	36	< 1.0	6.0	2.0	16	61	< 0.1	-	-	-	-	-	-	-	-	-	-
	23-Apr-19	38	< 1.0	6.0	2.0	17	62	< 0.1	-	-	-	-	-	-	-	-	-	-
	16-May-19	35	< 1.0	5.0	2.0	15	68	0.2	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.27	0.9	0.9	-	-
	14-Jun-19	31	< 1.0	4.0	2.0	11	56	0.1	-	-	-	-	-	-	-	-	-	-
	16-Jul-19	36	< 1.0	5.0	2.0	12	46	< 0.1	-	-	-	-	-	-	-	-	-	-
	15-Aug-19	32	< 1.0	4.0	2.0	15	49	0.1	-	-	-	-	-	-	-	-	-	-
	16-Sep-19	27	< 1.0	4.0	1.0	13	53	< 0.1	< 0.01	0.09	< 0.01	0.06	0.06	0.2	1.2	1.1	-	-
	15-Oct-19	34	< 1.0	5.0	2.0	12	53	< 0.1	-	-	-	-	-	-	-	-	-	-
	18-Nov-19	31	< 1.0	5.0	1.0	15	56	0.1	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.17	0.5	0.5	-	-
	17-Dec-19	26	<1	5	1	15	44	<0.1	-	-	-	-	-	-	-	-	-	-
	16-Jan-20	27	<1	4	1	13	46	0.2	-	-	-	-	-	-	-	-	-	-
	27-Feb-20	23	<1	4	1	11	42	<0.1	<0.01	0.06	<0.01	<0.01	<0.01	0.22	0.8	0.8	-	-

Analyte	Alkalinity										Inorganics			pH
	Total Cations	Total Anions	Ionic Balance	Sodium Adsorption Ratio	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Total Alkalinity as CaCO3	Total Hardness as CaCO3	Electrical Conductivity @ 25°C*	Total Dissolved Solids	Total Dissolved Solids		
LOR Units	0.01 meq/L	0.01 meq/L	0.01 %	- mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 μS/cm	1 mg/L	10 mg/L	10 mg/L	0.01 pH units
Baseline Trigger Values (KLF 2020) <sup>4</sup>	-	-	-	-	-	-	-	-	-	125-2200	-	-	-	4.7
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-Jul-20	<b>0.66</b>	<b>0.78</b>	-	-	<b>10</b>	<1	<1	<b>10</b>	<b>9</b>	<b>101</b>	<b>66</b>	-	-	<b>5.34</b>
14-Aug-20	<b>0.62</b>	<b>0.63</b>	-	1.44	<b>3</b>	<1	<1	<b>3</b>	<b>9</b>	<b>92</b>	<b>60</b>	<b>120</b>	-	<b>5.22</b>
16-Sep-20	<b>0.74</b>	<b>0.62</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<b>13</b>	<b>99</b>	<b>64</b>	<b>76</b>	<b>4.85</b>
16-Oct-20	<b>0.74</b>	<b>0.58</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<b>13</b>	<b>90</b>	<b>58</b>	-	<b>5.07</b>
16-Nov-20	<b>0.74</b>	<b>0.7</b>	-	1.32	<b>3.0</b>	< 1.0	< 1.0	< 1.0	<b>3.0</b>	<b>13</b>	<b>119</b>	<b>77</b>	<b>91</b>	<b>5.09</b>
BH3	21-Feb-19	<b>0.46</b>	<b>0.54</b>	-	<b>0.46</b>	<b>9.0</b>	< 1.0	< 1.0	<b>9.0</b>	<b>14</b>	<b>60</b>	<b>438</b>	-	<b>5.55</b>
BH4	21-Feb-19	<b>0.56</b>	<b>0.7</b>	-	<b>1.15</b>	<b>6.0</b>	< 1.0	< 1.0	<b>6.0</b>	<b>9.0</b>	<b>73</b>	<b>96</b>	-	<b>5.4</b>
	15-Mar-19	<b>0.49</b>	<b>0.61</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>5.0</b>	<b>77</b>	<b>50</b>	<b>70</b>	<b>5.12</b>
	23-Apr-19	<b>0.64</b>	<b>0.6</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>9.0</b>	<b>54</b>	<b>35</b>	<b>61</b>	<b>5.05</b>
	16-May-19	<b>0.6</b>	<b>0.99</b>	-	<b>1.3</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>9.0</b>	<b>73</b>	<b>47</b>	<b>100</b>	<b>4.99</b>
	14-Jun-19	<b>0.39</b>	<b>0.59</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>10</b>	<b>69</b>	<b>45</b>	<b>36</b>	<b>4.84</b>
	16-Jul-19	<b>0.72</b>	<b>0.63</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>13</b>	<b>75</b>	<b>49</b>	<b>42</b>	<b>4.96</b>
	15-Aug-19	<b>0.56</b>	<b>0.56</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>9.0</b>	<b>85</b>	<b>55</b>	<b>49</b>	<b>5.01</b>
	16-Sep-19	<b>0.74</b>	<b>0.7</b>	-	<b>1.32</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>13</b>	<b>95</b>	<b>62</b>	<b>58</b>	<b>4.83</b>
	15-Oct-19	<b>0.57</b>	<b>0.59</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>7.0</b>	<b>85</b>	<b>55</b>	-	<b>4.93</b>
	18-Nov-19	<b>0.61</b>	<b>0.63</b>	-	<b>1.86</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>7.0</b>	<b>86</b>	<b>56</b>	-	<b>5.34</b>
	17-Dec-19	<b>0.55</b>	<b>0.64</b>	-	-	<b>3</b>	<1	<1	<b>3</b>	<b>7</b>	<b>85</b>	<b>55</b>	-	<b>5.44</b>
	16-Jan-20	<b>0.88</b>	<b>0.71</b>	-	-	<b>4</b>	<1	<1	<b>4</b>	<b>13</b>	<b>85</b>	<b>55</b>	-	<b>5.5</b>
	27-Feb-20	<b>0.87</b>	<b>0.96</b>	-	<b>1.67</b>	<b>2</b>	<1	<1	<b>2</b>	<b>13</b>	<b>123</b>	<b>80</b>	-	<b>5.57</b>
	26-Mar-20	<b>0.79</b>	<b>1.01</b>	-	-	<b>2</b>	<1	<1	<b>2</b>	<b>13</b>	<b>126</b>	<b>82</b>	-	<b>5.36</b>
	27-Apr-20	<b>0.94</b>	<b>0.99</b>	-	-	<b>4</b>	<1	<1	<b>4</b>	<b>11</b>	<b>130</b>	<b>84</b>	-	<b>5.68</b>
	15-May-20	<b>1.21</b>	<b>1.33</b>	-	<b>2.97</b>	<b>3</b>	<1	<1	<b>3</b>	<b>8</b>	<b>438</b>	<b>101</b>	-	<b>5.04</b>
	19-Jun-20	<b>1.24</b>	<b>1.33</b>	-	-	<b>2</b>	<1	<1	<b>2</b>	<b>11</b>	<b>172</b>	<b>112</b>	-	<b>5.07</b>
	16-Jul-20	<b>2.02</b>	<b>2.01</b>	-	-	<b>8</b>	<1	<1	<b>8</b>	<b>25</b>	<b>257</b>	<b>167</b>	-	<b>5.22</b>
	14-Aug-20	<b>0.95</b>	<b>1.21</b>	-	2.54	<b>2</b>	<1	<1	<b>2</b>	<b>8</b>	<b>148</b>	<b>96</b>	<b>96</b>	<b>5.02</b>
	16-Sep-20	<b>1.03</b>	<b>1.1</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>8.0</b>	<b>148</b>	<b>96</b>	<b>74</b>	<b>4.66</b>
	16-Oct-20	<b>1.12</b>	<b>1.21</b>	-	-	<b>2.0</b>	< 1.0	< 1.0	<b>2.0</b>	<b>15</b>	<b>133</b>	<b>86</b>	-	<b>5.21</b>
	16-Nov-20	<b>0.95</b>	<b>1.03</b>	-	<b>2.54</b>	<b>1.0</b>	< 1.0	< 1.0	<b>1.0</b>	<b>8.0</b>	<b>146</b>	<b>95</b>	<b>90</b>	<b>4.98</b>
BH5	22-Feb-19	<b>2.35</b>	<b>2.34</b>	-	<b>3.59</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>25</b>	<b>250</b>	<b>211</b>	-	<b>4.87</b>
BH6	14-Aug-20	<b>1.08</b>	<b>1.53</b>	-	<b>2.03</b>	<1	<1	<1	<1	<b>15</b>	<b>180</b>	<b>117</b>	<b>100</b>	<b>4.49</b>
BH6	22-Feb-19	<b>1.72</b>	<b>1.77</b>	-	<b>2.49</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>24</b>	<b>177</b>	<b>144</b>	-	<b>4.37</b>
BH6	14-Mar-19	<b>1.46</b>	<b>1.44</b>	-	-	<b>2.0</b>	< 1.0	< 1.0	<b>2.0</b>	<b>21</b>	<b>179</b>	<b>116</b>	<b>146</b>	<b>4.95</b>
BH6	23-Apr-19	<b>1.59</b>	<b>1.56</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>24</b>	<b>136</b>	<b>88</b>	<b>115</b>	<b>4.64</b>
BH6	16-May-19	<b>1.5</b>	<b>1.64</b>	-	<b>2.04</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>24</b>	<b>175</b>	<b>114</b>	<b>214</b>	<b>4.88</b>
BH6	14-Jun-19	<b>1.32</b>	<b>1.52</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>21</b>	<b>174</b>	<b>113</b>	<b>90</b>	<b>4.82</b>
BH6	16-Jul-19	<b>1.46</b>	<b>1.4</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>21</b>	<b>161</b>	<b>105</b>	<b>82</b>	<b>4.73</b>
BH6	15-Aug-19	<b>1.37</b>	<b>1.51</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>17</b>	<b>201</b>	<b>131</b>	<b>104</b>	<b>4.87</b>
BH6	16-Sep-19	<b>1.51</b>	<b>1.55</b>	-	<b>2.44</b>	<b>2.0</b>	< 1.0	< 1.0	<b>2.0</b>	<b>20</b>	<b>197</b>	<b>128</b>	<b>124</b>	<b>4.68</b>
BH6	15-Oct-19	<b>1.54</b>	<b>1.43</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>21</b>	<b>202</b>	<b>131</b>	-	<b>5.17</b>
BH6	18-Nov-19	<b>1.6</b>	<b>1.64</b>	-	<b>2.64</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>204</b>	<b>133</b>	-	<b>5.32</b>
BH6	17-Dec-19	<b>1.58</b>	<b>1.62</b>	-	-	<b>5</b>	<1	<1	<b>5</b>	<b>21</b>	<b>207</b>	<b>134</b>	-	<b>5.58</b>
BH6	16-Jan-20	<b>1.83</b>	<b>1.86</b>	-	-	<b>7</b>	<1	<1	<b>7</b>	<b>24</b>	<b>218</b>	<b>142</b>	-	<b>5.51</b>
BH6	27-Feb-20	<b>1.63</b>	<b>1.63</b>	-	<b>2.54</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>21</b>	<b>220</b>	<b>143</b>	-	<b>4.72</b>
BH6	26-Mar-20	<b>1.58</b>	<b>1.73</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>21</b>	<b>222</b>	<b>144</b>	-	<b>5.13</b>
BH6	27-Apr-20	<b>1.83</b>	<b>1.94</b>	-	-	<b>5</b>	<1	<1	<b>5</b>	<b>44</b>	<b>264</b>	<b>172</b>	-	<b>5.72</b>
BH6	15-May-20	<b>2.39</b>	<b>2.43</b>	-	<b>3.61</b>	<b>3</b>	<1	<1	<b>3</b>	<b>26</b>	<b>310</b>	<b>202</b>	-	<b>5.11</b>
BH6	19-Jun-20	<b>3.53</b>	<b>3.89</b>	<b>4.6</b>	-	<b>2</b>	<1	<1	<b>2</b>	<b>39</b>	<b>462</b>	<b>300</b>	-	<b>5.16</b>
BH6	16-Jul-20	<b>3.09</b>	<b>3.37</b>	<b>4.28</b>	-	<b>8</b>	<1	<1	<b>8</b>	<b>35</b>	<b>407</b>	<b>264</b>	-	<b>5.12</b>
BH6	14-Aug-20	<b>2.84</b>	<b>3.03</b>	<b>3.27</b>	<b>3.93</b>	<b>4</b>	<1	<1	<b>4</b>	<b>30</b>	<b>353</b>	<b>229</b>	<b>205</b>	<b>5.26</b>
BH6	16-Sep-20	<b>2.02</b>	<b>1.9</b>	-	-	<b>1.0</b>	< 1.0	< 1.0	<b>1.0</b>	<b>21</b>	<b>273</b>	<b>177</b>	<b>121</b>	<b>4.98</b>
BH6	16-Oct-20	<b>2.1</b>	<b>2.14</b>	-	-	<b>4.0</b>	< 1.0	< 1.0	<b>4.0</b>	<b>26</b>	<b>249</b>	<b>162</b>	-	<b>5.3</b>
BH6	16-Nov-20	<b>2.22</b>	<b>2.2</b>	-	<b>3.04</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>28</b>	<b>321</b>	<b>209</b>	<b>205</b>	<b>4.45</b>
BH7	22-Feb-19	<b>1.94</b>	<b>2.06</b>	-	<b>3.16</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>213</b>	<b>196</b>	-	<b>4.76</b>
BH7	14-Mar-19	<b>2.11</b>	<b>2.05</b>	<b>1.37</b>	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>25</b>	<b>271</b>	<b>176</b>	<b>212</b>	<b>4.73</b>
BH7	23-Apr-19	<b>2.2</b>	<b>2.1</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>25</b>	<b>205</b>	<b>133</b>	<b>185</b>	<b>4.51</b>
BH7	16-May-19	<b>1.98</b>	<b>2.23</b>	-	<b>3.26</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>235</b>	<b>153</b>	<b>310</b>	<b>4.87</b>
BH7	14-Jun-19	<b>1.73</b>	<b>1.81</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>16</b>	<b>213</b>	<b>138</b>	<b>145</b>	<b>4.91</b>
BH7	16-Jul-19	<b>2.03</b>	<b>1.55</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>202</b>	<b>131</b>	<b>164</b>	<b>5.0</b>
BH7	15-Aug-19	<b>1.77</b>	<b>1.85</b>	-	-	<b>8.0</b>	< 1.0	< 1.0	<b>8.0</b>	<b>16</b>	<b>232</b>	<b>151</b>	<b>168</b>	<b>5.53</b>
BH7	16-Sep-19	<b>1.53</b>	<b>1.86</b>	-	<b>2.79</b>	<b>5.0</b>	< 1.0	< 1.0	<b>5.0</b>	<b>16</b>	<b>222</b>	<b>144</b>	<b>181</b>	<b>5.07</b>
BH7	15-Oct-19	<b>1.94</b>	<b>1.74</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>252</b>	<b>164</b>	-	<b>4.95</b>
BH7	18-Nov-19	<b>1.78</b>	<b>1.89</b>	-	<b>2.89</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>20</b>	<b>239</b>	<b>155</b>	-	<b>4.97</b>
BH7	17-Dec-19	<b>1.57</b>	<b>1.59</b>	-	-	<b>2.0</b>	&							

Table GW4  
Groundwater Analytical Data - Inorganics  
Williamstown Sand Syndicate



Analyte	Anions and Cations														
	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
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
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
Baseline Trigger Values (KLF 2020) <sup>a</sup>	-	-	-	-	-	-	-	-	2	-	-	-	0.5	3	-
NHMRC ADWG 2018	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-
26-Mar-20	25	<1	4	1	18	44	<0.1	-	-	-	-	-	-	-	-
27-Apr-20	28	<1	2	2	<1	42	<0.1	-	-	-	-	-	-	-	-
15-May-20	27	<1	3	2	5	47	<0.1	<0.01	0.03	0.01	<0.01	0.01	0.26	1.1	1.1
19-Jun-20	27	<1	3	2	1	44	<0.1	-	-	-	-	-	-	-	-
16-Jul-20	26	<1	3	2	20	44	<0.1	-	-	-	-	-	-	-	-
14-Aug-20	30	<1	4	2	4	60	0.1	<0.01	0.09	<0.01	0.01	0.01	0.3	1.2	1.2
16-Sep-20	33	<1.0	5.0	2.0	12	62	0.1	-	-	-	-	-	-	-	-
16-Oct-20	34	<1.0	5.0	2.0	9.0	64	<0.1	-	-	-	-	-	-	-	-
16-Nov-20	30	<1.0	5.0	2.0	9.0	54	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	0.3	0.6	0.6
21-Feb-19	52	<1.0	6.0	<1.0	11	90	<0.1	<0.01	1.97	<0.01	<0.01	<0.01	0.5	2.4	2.4
14-Mar-19	45	<1.0	6.0	<1.0	6.0	76	<0.1	-	-	-	-	-	-	-	-
23-Apr-19	53	<1.0	7.0	<1.0	8.0	89	<0.1	-	-	-	-	-	-	-	-
16-May-19	47	<1.0	4.0	<1.0	6.0	81	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	0.12	0.4	0.4
14-Jun-19	47	<1.0	5.0	<1.0	4.0	89	<0.1	-	-	-	-	-	-	-	-
16-Jul-19	57	<1.0	5.0	<1.0	70	121	0.1	-	-	-	-	-	-	-	-
15-Aug-19	42	<1.0	3.0	<1.0	4.0	63	<0.1	-	-	-	-	-	-	-	-
16-Sep-19	46	<1.0	3.0	<1.0	4.0	70	<0.1	<0.01	0.43	<0.01	<0.01	<0.01	0.13	1.1	1.1
15-Oct-19	45	<1.0	4.0	<1.0	4.0	70	<0.1	-	-	-	-	-	-	-	-
18-Nov-19	49	<1.0	4.0	<1.0	8.0	80	<0.1	<0.01	0.58	<0.01	0.01	0.01	0.17	1.3	1.3
17-Dec-19	50	<1	4	<1	10	75	<0.1	-	-	-	-	-	-	-	-
16-Jan-20	49	<1	4	<1	13	78	<0.1	-	-	-	-	-	-	-	-
27-Feb-20	34	<1	3	<1	14	54	<0.1	<0.01	0.14	<0.01	<0.01	<0.01	0.05	0.6	0.6
26-Mar-20	30	<1	3	<1	16	50	<0.1	-	-	-	-	-	-	-	-
27-Apr-20	28	<1	4	<1	13	50	<0.1	-	-	-	-	-	-	-	-
15-May-20	32	<1	4	<1	14	59	<0.1	<0.01	0.18	<0.01	0.02	0.02	0.05	0.8	0.8
19-Jun-20	48	<1	5	<1	9	74	<0.1	-	-	-	-	-	-	-	-
16-Jul-20	50	<1	5	<1	10	76	<0.1	-	-	-	-	-	-	-	-
14-Aug-20	55	<1	4	<1	9	102	<0.1	<0.01	0.1	<0.01	0.01	0.01	0.14	0.7	0.7
16-Sep-20	58	<1.0	4.0	<1.0	9.0	109	<0.1	-	-	-	-	-	-	-	-
16-Oct-20	43	<1.0	4.0	<1.0	12	70	<0.1	-	-	-	-	-	-	-	-
16-Nov-20	48	<1.0	6.0	<1.0	10	76	<0.1	<0.01	0.14	<0.01	<0.01	<0.01	0.13	0.6	0.6
BH9	14-Aug-20	10	1	<1	7	17	<0.1	<0.01	0.07	<0.01	0.21	0.21	<0.01	1	0.8
BH9A	16-Sep-20	35	5.0	5.0	1.0	41	38	<0.1	-	-	-	-	-	-	-
BH9A	16-Oct-20	32	3.0	6.0	1.0	33	48	<0.1	-	-	-	-	-	-	-
BH9A	16-Nov-20	23	2.0	4.0	1.0	23	35	<0.1	<0.01	0.11	<0.01	2.35	2.35	<0.01	2.8
MW239S	22-Feb-19	61	<1.0	6.0	<1.0	6.0	104	<0.1	<0.01	0.56	<0.01	<0.01	<0.01	0.18	3.9
MW239S	14-Mar-19	64	<1.0	6.0	<1.0	2.0	126	<0.1	-	-	-	-	-	-	-
MW239S	23-Apr-19	64	<1.0	7.0	1.0	9.0	97	<0.1	-	-	-	-	-	-	-
MW239S	16-May-19	52	<1.0	6.0	<1.0	13	88	<0.1	<0.01	0.43	<0.01	<0.01	<0.01	0.09	1.7
MW239S	14-Jun-19	50	<1.0	6.0	<1.0	13	87	<0.1	-	-	-	-	-	-	-
MW239S	16-Jul-19	52	<1.0	7.0	1.0	16	73	<0.1	-	-	-	-	-	-	-
MW239S	15-Aug-19	54	<1.0	7.0	<1.0	11	88	<0.1	-	-	-	-	-	-	-
MW239S	16-Sep-19	55	<1.0	6.0	1.0	14	85	<0.1	<0.01	0.32	<0.01	<0.01	<0.01	0.1	1.4
MW239S	15-Oct-19	58	<1.0	6.0	<1.0	8.0	108	<0.1	-	-	-	-	-	-	-
MW239S	18-Nov-19	63	<1.0	6.0	1.0	8.0	118	<0.1	<0.01	0.23	<0.01	<0.01	<0.01	0.17	1.2
MW239S	17-Dec-19	65	<1	8	<1	6	127	<0.1	-	-	-	-	-	-	-
MW239S	16-Jan-20	67	<1	8	<1	7	120	<0.1	-	-	-	-	-	-	-
MW239S	27-Feb-20	64	<1	7	<1	11	126	<0.1	<0.01	1.05	<0.01	0.02	0.02	0.14	4.5
MW239S	26-Mar-20	66	<1	6	<1	5	133	<0.1	-	-	-	-	-	-	-
MW239S	27-Apr-20	64	<1	6	<1	7	119	<0.1	-	-	-	-	-	-	-
MW239S	15-May-20	67	<1	6	<1	2	39	<0.1	<0.01	0.57	<0.01	<0.01	<0.01	0.15	3
MW239S	19-Jun-20	70	<1	8	1	22	125	<0.1	-	-	-	-	-	-	-
MW239S	16-Jul-20	65	<1	9	1	27	110	<0.1	-	-	-	-	-	-	-
MW239S	14-Aug-20	62	<1	9	1	33	102	<0.1	<0.01	0.38	0.01	<0.01	0.01	0.04	0.6
MW239S	16-Sep-20	53	<1.0	8.0	1.0	36	86	0.1	-	-	-	-	-	-	-
MW239S	16-Oct-20	76	<1.0	9.0	1.0	17	148	<0.1	-	-	-	-	-	-	-
MW239S	16-Nov-20	68	<1.0	9.0	2.0	37	125	<0.1	<0.01	0.59	<0.01	<0.01	<0.01	0.01	2.6

**Notes:**

- Not analysed
- < - Less than laboratory limit of reporting
- LOR - Laboratory limit of reporting
- mg/L - Milligrams per litre
- µS/cm - Microsiemens per centimeter

Table GW4  
Groundwater Analytical Data - Inorganics  
Williamstown Sand Syndicate



Analyte	Alkalinity								Inorganics			pH		
	Total Cations	Total Anions	Ionic Balance	Sodium Adsorption Ratio	Bicarbonate Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Hydroxide Alkalinity as CaCO3	Total Alkalinity as CaCO3	Total Hardness as CaCO3	Electrical Conductivity @ 25°C*	Total Dissolved Solids	Total Dissolved Solids		
LOR Units	0.01 meq/L	0.01 meq/L	0.01 %	- mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 µS/cm	1 mg/L	10 mg/L	0.01 pH units	
Baseline Trigger Values (KLF 2020)*	-	-	-	-	-	-	-	-	-	125-2200	-	-	4.7	
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	-	-	-	-	
26-Mar-20	<b>1.44</b>	<b>1.24</b>	-	-	<1	<1	<1	<1	<b>16</b>	<b>199</b>	<b>129</b>	-	<b>4.92</b>	
27-Apr-20	<b>1.43</b>	<b>1.26</b>	-	-	<b>4</b>	<1	<1	<b>4</b>	<b>8</b>	<b>207</b>	<b>134</b>	-	<b>5.16</b>	
15-May-20	<b>1.47</b>	<b>1.51</b>	-	<b>3.18</b>	<b>4</b>	<1	<1	<b>4</b>	<b>12</b>	<b>244</b>	<b>159</b>	-	<b>5.17</b>	
19-Jun-20	<b>1.47</b>	<b>1.34</b>	-	-	<b>4</b>	<1	<1	<b>4</b>	<b>12</b>	<b>192</b>	<b>125</b>	-	<b>5.16</b>	
16-Jul-20	<b>1.43</b>	<b>1.35</b>	-	-	<b>7</b>	<1	<1	<b>7</b>	<b>12</b>	<b>196</b>	<b>127</b>	-	<b>5.21</b>	
14-Aug-20	<b>1.68</b>	<b>1.84</b>	-	<b>3.1</b>	<b>3</b>	<1	<1	<b>3</b>	<b>16</b>	<b>233</b>	<b>151</b>	<b>169</b>	<b>5.18</b>	
16-Sep-20	<b>1.9</b>	<b>2.0</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>20</b>	<b>248</b>	<b>161</b>	<b>140</b>	<b>4.81</b>	
16-Oct-20	<b>1.94</b>	<b>1.99</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>20</b>	<b>243</b>	<b>158</b>	-	<b>4.87</b>	
16-Nov-20	<b>1.77</b>	<b>1.71</b>	-	<b>2.79</b>	<1.0	<1.0	<1.0	<1.0	<b>20</b>	<b>245</b>	<b>159</b>	<b>168</b>	<b>4.57</b>	
21-Feb-19	<b>2.76</b>	<b>2.77</b>	-	<b>4.44</b>	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>352</b>	<b>258</b>	-	<b>4.46</b>	
14-Mar-19	<b>2.45</b>	<b>2.27</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>319</b>	<b>207</b>	<b>253</b>	<b>4.77</b>	
23-Apr-19	<b>2.88</b>	<b>2.68</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>29</b>	<b>264</b>	<b>172</b>	<b>223</b>	<b>4.76</b>	
16-May-19	<b>2.37</b>	<b>2.43</b>	-	<b>4.86</b>	<b>1.0</b>	<1.0	<1.0	<b>1.0</b>	<b>16</b>	<b>302</b>	<b>196</b>	<b>354</b>	<b>4.9</b>	
14-Jun-19	<b>2.46</b>	<b>2.59</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>20</b>	<b>315</b>	<b>205</b>	<b>194</b>	<b>4.82</b>	
16-Jul-19	<b>2.89</b>	<b>4.87</b>	<b>26</b>	-	<1.0	<1.0	<1.0	<1.0	<b>20</b>	<b>353</b>	<b>229</b>	<b>226</b>	<b>4.78</b>	
15-Aug-19	<b>2.07</b>	<b>1.86</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>12</b>	<b>260</b>	<b>169</b>	<b>140</b>	<b>5.0</b>	
16-Sep-19	<b>2.25</b>	<b>2.06</b>	-	<b>5.43</b>	<1.0	<1.0	<1.0	<1.0	<b>12</b>	<b>293</b>	<b>190</b>	<b>206</b>	<b>4.85</b>	
15-Oct-19	<b>2.29</b>	<b>2.06</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>16</b>	<b>303</b>	<b>197</b>	-	<b>5.02</b>	
18-Nov-19	<b>2.46</b>	<b>2.42</b>	-	<b>5.06</b>	<1.0	<1.0	<1.0	<1.0	<b>16</b>	<b>316</b>	<b>205</b>	-	<b>5.12</b>	
17-Dec-19	<b>2.5</b>	<b>2.36</b>	-	-	<b>2</b>	<1	<1	<b>2</b>	<b>16</b>	<b>328</b>	<b>213</b>	-	<b>5.02</b>	
16-Jan-20	<b>2.46</b>	<b>6.61</b>	-	-	<b>7</b>	<1	<1	<b>7</b>	<b>16</b>	<b>318</b>	<b>207</b>	-	<b>5.55</b>	
27-Feb-20	<b>1.72</b>	<b>1.81</b>	-	<b>4.01</b>	<1.0	<1.0	<1.0	<1.0	<b>12</b>	<b>250</b>	<b>162</b>	-	<b>4.57</b>	
26-Mar-20	<b>1.55</b>	<b>1.74</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>12</b>	<b>221</b>	<b>144</b>	-	<b>4.76</b>	
27-Apr-20	<b>1.55</b>	<b>1.68</b>	-	-	<1	<1	<1	<1	<b>16</b>	<b>242</b>	<b>157</b>	-	<b>4.84</b>	
15-May-20	<b>1.72</b>	<b>2</b>	-	<b>3.31</b>	<b>2</b>	<1	<1	<b>2</b>	<b>16</b>	<b>250</b>	<b>162</b>	-	<b>4.93</b>	
19-Jun-20	<b>2.5</b>	<b>2.29</b>	-	-	<b>1</b>	<1	<1	<b>1</b>	<b>20</b>	<b>318</b>	<b>207</b>	-	<b>4.99</b>	
16-Jul-20	<b>2.59</b>	<b>2.49</b>	-	-	<b>7</b>	<1	<1	<b>7</b>	<b>20</b>	<b>342</b>	<b>222</b>	-	<b>5.03</b>	
14-Aug-20	<b>2.89</b>	<b>3.1</b>	<b>3.58</b>	<b>5.68</b>	<b>2</b>	<1	<1	<b>2</b>	<b>16</b>	<b>367</b>	<b>238</b>	<b>236</b>	<b>5.16</b>	
16-Sep-20	<b>3.1</b>	<b>3.26</b>	<b>2.57</b>	-	<1.0	<1.0	<1.0	<1.0	<b>16</b>	<b>391</b>	<b>254</b>	<b>216</b>	<b>4.79</b>	
16-Oct-20	<b>2.2</b>	<b>2.22</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>16</b>	<b>268</b>	<b>174</b>	-	<b>5.01</b>	
16-Nov-20	<b>2.58</b>	<b>2.35</b>	-	<b>4.1</b>	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>341</b>	<b>222</b>	<b>212</b>	<b>4.75</b>	
BH9	14-Aug-20	<b>0.57</b>	<b>0.66</b>	-	<b>1.69</b>	<b>2</b>	<1	<1	<b>2</b>	<b>7</b>	<b>80</b>	<b>52</b>	<b>63</b>	<b>5.17</b>
BH9A	16-Sep-20	<b>2.21</b>	<b>2.06</b>	-	-	<b>7.0</b>	<1.0	<1.0	<b>7.0</b>	<b>33</b>	<b>276</b>	<b>179</b>	<b>310</b>	<b>5.78</b>
	16-Oct-20	<b>2.06</b>	<b>2.06</b>	-	-	<b>1.0</b>	<1.0	<1.0	<b>1.0</b>	<b>32</b>	<b>237</b>	<b>154</b>	-	<b>5.15</b>
	16-Nov-20	<b>1.46</b>	<b>1.51</b>	-	<b>2.16</b>	<b>2.0</b>	<1.0	<1.0	<b>2.0</b>	<b>21</b>	<b>195</b>	<b>127</b>	<b>142</b>	<b>4.93</b>
MW239S	22-Feb-19	<b>3.15</b>	<b>3.06</b>	<b>1.43</b>	<b>5.21</b>	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>329</b>	<b>234</b>	-	<b>4.89</b>
	14-Mar-19	<b>3.28</b>	<b>3.64</b>	<b>5.18</b>	-	<b>2.0</b>	<1.0	<1.0	<b>2.0</b>	<b>25</b>	<b>410</b>	<b>266</b>	<b>232</b>	<b>5.02</b>
	23-Apr-19	<b>3.38</b>	<b>2.92</b>	<b>7.32</b>	-	<1.0	<1.0	<1.0	<b>29</b>	<b>294</b>	<b>191</b>	<b>208</b>	<b>4.92</b>	
	16-May-19	<b>2.76</b>	<b>2.75</b>	-	<b>4.44</b>	<1.0	<1.0	<1.0	<b>25</b>	<b>327</b>	<b>212</b>	<b>320</b>	<b>4.87</b>	
	14-Jun-19	<b>2.67</b>	<b>2.86</b>	-	-	<b>7.0</b>	<1.0	<1.0	<b>7.0</b>	<b>25</b>	<b>334</b>	<b>217</b>	<b>220</b>	<b>5.39</b>
	16-Jul-19	<b>2.86</b>	<b>2.39</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>29</b>	<b>353</b>	<b>229</b>	<b>188</b>	<b>4.85</b>
	15-Aug-19	<b>2.92</b>	<b>2.71</b>	-	-	<1.0	<1.0	<1.0	<1.0	<b>29</b>	<b>359</b>	<b>233</b>	<b>195</b>	<b>4.83</b>
	16-Sep-19	<b>2.91</b>	<b>2.69</b>	-	<b>4.7</b>	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>373</b>	<b>242</b>	<b>224</b>	<b>4.66</b>
	15-Oct-19	<b>3.02</b>	<b>3.21</b>	<b>3.15</b>	-	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>404</b>	<b>263</b>	-	<b>4.86</b>
	18-Nov-19	<b>3.26</b>	<b>3.5</b>	<b>3.48</b>	<b>5.38</b>	<1.0	<1.0	<1.0	<1.0	<b>25</b>	<b>419</b>	<b>272</b>	-	<b>4.76</b>
	17-Dec-19	<b>3.48</b>	<b>3.75</b>	<b>3.62</b>	-	<b>2</b>	<1	<1	<b>2</b>	<b>33</b>	<b>439</b>	<b>285</b>	-	<b>5.01</b>
	16-Jan-20	<b>3.57</b>	<b>3.57</b>	<b>0.03</b>	-	<b>2</b>	<1	<1	<b>2</b>	<b>33</b>	<b>423</b>	<b>275</b>	-	<b>5.02</b>
	27-Feb-20	<b>3.36</b>	<b>3.78</b>	<b>5.93</b>	<b>5.08</b>	<1.0	<1.0	<1.0	<1.0	<b>29</b>	<b>475</b>	<b>309</b>	-	<b>4.45</b>
	26-Mar-20	<b>3.36</b>	<b>3.86</b>	<b>6.8</b>	-	<1.0	<1.0	<1.0	<1.0	<b>30</b>	<b>420</b>	<b>273</b>	-	<b>4.98</b>
	27-Apr-20	<b>3.28</b>	<b>3.56</b>	<b>4.16</b>	-	<b>3</b>	<1	<1	<b>3</b>	<b>25</b>	<b>453</b>	<b>294</b>	-	<b>5.13</b>
	15-May-20	<b>3.41</b>	<b>3.89</b>	<b>6.58</b>	<b>5.64</b>	<b>2</b>	<1	<1	<b>2</b>	<b>25</b>	<b>438</b>	<b>285</b>	-	<b>4.92</b>
	19-Jun-20	<b>3.73</b>	<b>3.98</b>	<b>3.31</b>	-	<1.0	<1	<1	<1.0	<b>33</b>	<b>456</b>	<b>296</b>	-	<b>4.76</b>
	16-Jul-20	<b>3.59</b>	<b>3.8</b>	<b>2.86</b>	-	<b>7</b>	<1	<1	<b>7</b>	<b>37</b>	<b>451</b>	<b>293</b>	-	<b>5.32</b>
	14-Aug-20	<b>3.46</b>	<b>3.56</b>	<b>1.44</b>	<b>4.36</b>	<1	<1	<1	<1	<b>37</b>	<b>455</b>	<b>296</b>	<b>276</b>	<b>4.71</b>
	16-Sep-20	<b>2.99</b>	<b>3.24</b>	<b>3.95</b>	-	<b>3.0</b>	<1.0	<1.0	<b>3.0</b>	<b>33</b>	<b>390</b>	<b>254</b>	<b>244</b>	<b>5.2</b>
	16-Oct-20	<b>4.14</b>	<b>4.57</b>	<b>4.99</b>	-	<b>2.0</b>	<1.0	<1.0	<b>2.0</b>	<b>37</b>	<b>458</b>	<b>298</b>	-	<b>4.73</b>
	16-Nov-20	<b>4.21</b>	<b>4.3</b>	<b>1.0</b>	<b>4.78</b>	<1.0	<1.0	<1.0	<1.0	<b>37</b>	<b>489</b>	<b>318</b>	<b>294</b>	<b>4.55</b>

**Notes:**

- - Not analysed
- < - Less than laboratory limit of report
- LOR - Laboratory limit of reporting
- mg/L - Milligrams per litre
- µS/cm - Microsiemens per centimeter

Table GW4  
Groundwater Analytical Data - Inorganics  
Williamtown Sand Syndicate



Analyte	Anions and Cations														
	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
LOR	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0.1</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.1</b>	<b>0.1</b>	
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
Baseline Trigger Values (KLF 2020) <sup>a</sup>	-	-	-	-	-	-	-	-	2	-	-	-	0.5	3	-
NHMRC ADWG 2018	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-

**Bold** indicates a detection above the laboratory limit of reporting

<sup>a</sup> Baseline Water Quality Summary Report, September 2020 (KLF 2020)

Table GW4  
Groundwater Analytical Data - Inorganics  
Williamtown Sand Syndicate



Analyte	Alkalinity										Inorganics	Total Dissolved Solids	pH
	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*			
LOR	<b>0.01</b>	<b>0.01</b>	-	<b>0.01</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>10</b>	<b>0.01</b>	
Units	meq/L	meq/L	%	-	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	pH units
Baseline Trigger Values (KLF 2020) <sup>4</sup>	-	-	-	-	-	-	-	-	-	125-2200	-	-	4-7
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	-	-	-	-	-

**Bold** indicates a detection above the la

<sup>4</sup> Baseline Water Quality Summary Rep

Table SW1  
Surface Water Analytical Data - BTEXN  
Williamstown Sand Syndicate

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**		C <sub>6</sub> - C <sub>9</sub>	C <sub>10</sub> -C <sub>14</sub> - Silica Cleanup	C <sub>15</sub> -C <sub>28</sub> - Silica Cleanup	C <sub>29</sub> -C <sub>36</sub> - Silica Cleanup	C <sub>10</sub> -C <sub>36</sub> Sum - Silica Cleanup	C <sub>6</sub> - C <sub>10</sub>	C <sub>6</sub> - C <sub>10</sub> minus BTEX (F1)	>C <sub>10</sub> -C <sub>16</sub> - Silica Cleanup	F2 - Silica Cleanup	>C <sub>16</sub> -C <sub>34</sub> - Silica Cleanup	>C <sub>34</sub> -C <sub>40</sub> - Silica Cleanup	>C <sub>10</sub> -C <sub>40</sub> - Silica Cleanup
LOR		1	2	2	2	2	2	5	1	20	50	100	50	50	20	20	100	100	100	100	100
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
Baseline Trigger Values (KLF, 2020)		-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	100	-	100	100	-
NHMRC ADWG 2018		1	800	300	-	350	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Name	Sample Date																				
SW1	22-Feb-19																				
	14-Mar-19																				
	23-Apr-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-May-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	14-Jun-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Jul-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	15-Aug-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Sep-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	15-Oct-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	18-Nov-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	17-Dec-19																				
	16-Jan-20																				
	27-Feb-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	26-Mar-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	27-Apr-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	15-May-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	19-Jun-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Jul-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	14-Aug-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Sep-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Oct-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Nov-20	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
SW2	22-Feb-19																				
	14-Mar-19																				
	23-Apr-19																				
	16-May-19																				
	14-Jun-19																				
	16-Jul-19																				
	15-Aug-19																				
	16-Sep-19																				
	15-Oct-19																				
	18-Nov-19																				
	17-Dec-19																				
	16-Jan-20																				
	27-Feb-20																				
	26-Mar-20																				
	27-Apr-20																				
	15-May-20																				
	19-Jun-20																				
	16-Jul-20																				
	14-Aug-20																				
	16-Sep-20																				
	16-Oct-20																				
	16-Nov-20																				
SW3	22-Feb-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	14-Mar-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	23-Apr-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-May-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	14-Jun-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Jul-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	15-Aug-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	< 100	< 100	< 100
	16-Sep-19	< 1.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 5.0	< 1.0	< 20	< 50	< 100	< 50	< 50	< 20	< 20	< 100	< 100	&		

Table SW1  
Surface Water Analytical Data - BTEXN  
Williamtown Sand Syndicate



## **Notes:**

- - Not analysed

< - Less than laboratory limit of reporting

$\mu\text{g/L}$  - Micrograms per litre

BTEXN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

1- Baseline Water Quality Summary Report, September 2020 (KLF 2020)

\*\* 95% Level of protection in freshwater

Table SW2  
Surface Water Analytical Data - Metals  
Williamstown Sand Syndicate



Table SW2  
Surface Water Analytical Data - Metals  
Williamtown Sand Syndicate

27-Feb-20	<b>0.002</b>	<b>0.051</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.006</b>	<b>0.008</b>	<b>6</b>	<0.001	<b>0.054</b>	<0.0001	<b>0.01</b>	<0.01	<0.01	<b>0.049</b>
26-Mar-20	<b>0.001</b>	<b>0.041</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.001</b>	<b>0.013</b>	<b>4.01</b>	<0.001	<b>0.035</b>	<0.0001	<b>0.006</b>	<0.01	<0.01	<b>0.033</b>
27-Apr-20	<b>0.001</b>	-	-	-	<0.0001	<0.001	-	<b>0.006</b>	<b>4.01</b>	0.003	-	<0.0001	-	-	<b>0.031</b>	
15-May-20	< 0.001	<b>0.039</b>	<0.001	<0.05	<0.0001	<0.001	<b>0.001</b>	<b>0.02</b>	<b>0.87</b>	<0.001	<b>0.036</b>	<0.0001	<b>0.007</b>	<0.01	<0.01	<b>0.037</b>
19-Jun-20	<0.001	-	-	-	0.0001	<0.001	-	<b>0.015</b>	<b>2.9</b>	<b>0.001</b>	<b>0.04</b>	<0.0001	-	-	<b>0.092</b>	
16-Jul-20	<0.001	-	-	-	<b>0.0001</b>	<b>0.001</b>	-	<b>0.006</b>	<b>1.6</b>	<0.001	<b>0.036</b>	<0.0001	-	-	<b>0.043</b>	
14-Aug-20	< 0.001	<b>0.024</b>	< 0.001	< 0.05	<0.0001	<0.001	<b>0.004</b>	<b>0.001</b>	<b>4.28</b>	< 0.001	<b>0.034</b>	<0.0001	<b>0.005</b>	<0.01	<0.01	<b>0.025</b>
16-Sep-20	< 0.001	<b>0.034</b>	< 0.001	< 0.05	<0.0001	<0.001	<b>0.007</b>	<b>0.007</b>	<b>3.49</b>	< 0.001	<b>0.029</b>	<0.0001	<b>0.007</b>	< 0.01	< 0.01	<b>0.031</b>
16-Oct-20	< 0.001	<b>0.028</b>	< 0.001	< 0.05	<0.0001	<0.001	<b>0.004</b>	<b>0.003</b>	<b>7.09</b>	< 0.001	<b>0.027</b>	<0.0001	<b>0.004</b>	< 0.01	< 0.01	<b>0.019</b>
16-Nov-20	< 0.001	<b>0.029</b>	< 0.001	< 0.05	<0.0001	<0.001	<b>0.009</b>	<b>0.002</b>	<b>4.79</b>	< 0.001	<b>0.032</b>	<0.0001	<b>0.009</b>	< 0.01	< 0.01	<b>0.03</b>
22-Feb-19																
14-Mar-19																
23-Apr-19	< 0.001	<b>0.059</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.003</b>	<b>0.003</b>	<b>2.09</b>	< 0.001	<b>0.037</b>	< 0.0001	<b>0.005</b>	< 0.01	< 0.01	<b>0.03</b>
16-May-19	< 0.001	<b>0.047</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	< 0.001	<b>1.12</b>	< 0.001	<b>0.03</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.019</b>
14-Jun-19	< 0.001	<b>0.041</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.003</b>	<b>0.79</b>	< 0.001	<b>0.034</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.014</b>
16-Jul-19	< 0.001	<b>0.044</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.002</b>	<b>0.96</b>	< 0.001	<b>0.043</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.014</b>
15-Aug-19	< 0.001	<b>0.04</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.001</b>	<b>0.001</b>	<b>0.57</b>	< 0.001	<b>0.032</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	<b>0.009</b>
16-Sep-19	< 0.001	<b>0.046</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.02</b>	<b>0.7</b>	<b>0.001</b>	<b>0.039</b>	< 0.0001	<b>0.017</b>	< 0.01	< 0.01	<b>0.085</b>
15-Oct-19	< 0.001	<b>0.037</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.004</b>	<b>0.66</b>	< 0.001	<b>0.031</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.018</b>
18-Nov-19	< 0.001	<b>0.035</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	< 0.001	<b>6.32</b>	< 0.001	<b>0.032</b>	< 0.0001	<b>0.002</b>	< 0.01	< 0.01	< 0.005
17-Dec-19																
16-Jan-20																
27-Feb-20	< 0.001	<b>0.054</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.018</b>	<b>2.52</b>	< 0.001	<b>0.05</b>	< 0.0001	<b>0.009</b>	< 0.01	< 0.01	<b>0.06</b>
26-Mar-20	< 0.001	<b>0.046</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.001</b>	<b>0.007</b>	<b>1.97</b>	< 0.001	<b>0.039</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.034</b>
27-Apr-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.017</b>	<b>1.82</b>	< 0.001	-	< 0.0001	-	-	<b>1.82</b>	
15-May-20	< 0.001	<b>0.039</b>	< 0.001	< 0.05	< 0.0001	< 0.001	< 0.001	<b>0.033</b>	<b>0.62</b>	< 0.001	<b>0.038</b>	< 0.0001	<b>0.005</b>	< 0.01	< 0.01	<b>0.038</b>
19-Jun-20	< 0.001	-	-	-	< 0.0001	< 0.001	-	<b>0.015</b>	<b>1.03</b>	<b>0.001</b>	<b>0.06</b>	< 0.0001	-	-	<b>0.063</b>	
16-Jul-20	< 0.001	-	-	-	< 0.0001	<b>0.001</b>	-	<b>0.008</b>	<b>0.8</b>	< 0.001	<b>0.059</b>	< 0.0001	-	-	<b>0.043</b>	
14-Aug-20	< 0.001	<b>0.043</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.007</b>	< 0.001	<b>0.95</b>	< 0.001	<b>0.087</b>	< 0.0001	<b>0.007</b>	< 0.01	< 0.01	<b>0.04</b>
16-Sep-20	< 0.001	<b>0.041</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.004</b>	<b>0.005</b>	<b>0.97</b>	< 0.001	<b>0.053</b>	< 0.0001	<b>0.005</b>	< 0.01	< 0.01	<b>0.02</b>
16-Oct-20	< 0.001	<b>0.03</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.002</b>	<b>0.001</b>	<b>2.26</b>	< 0.001	<b>0.042</b>	< 0.0001	<b>0.003</b>	< 0.01	< 0.01	<b>0.007</b>
16-Nov-20	< 0.001	<b>0.031</b>	< 0.001	< 0.05	< 0.0001	< 0.001	<b>0.004</b>	<b>0.001</b>	<b>1.93</b>	< 0.001	<b>0.074</b>	< 0.0001	<b>0.005</b>	< 0.01	< 0.01	<b>0.016</b>

**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

<sup>1</sup> value for CR VI

<sup>2</sup> as inorganioic

## Notes:

#### **Notes:**

< - Less than laboratory limit of reporting

$\mu\text{g/L}$  - Micrograms per litre

\*\*\* 99% Level of protection in freshwater

<sup>1</sup> Criteria is LOR

#### <sup>4</sup> Recreation wat

< 0.02 < 0.02 < 0.05 < 0.02 < 0.05 < 0.05 < 0.05 < 0.02 < 0.02 < 0.05 < 0.05 < 0.05 < 0.05 < 0.01 < 0.01

**DRY** < 0.02 < 0.02 < 0.03 < 0.02 < 0.03 < 0.03 < 0.03 < 0.03 < 0.02 < 0.02 < 0.03 < 0.03 < 0.03 < 0.03 < 0.01 < 0.01 < 0.01

**DRY** < 0.02 < 0.02 < 0.05 < 0.02 < 0.05 < 0.05 < 0.05 < 0.05 < 0.05 < 0.02 < 0.02 < 0.05 < 0.05 < 0.05 < 0.01 < 0.01 < 0.01

Table SW4  
Groundwater Analytical Data - Inorganics  
Williamstown Sand Syndicate

Analyte	Anions and Cations																	Alkalinity						Inorganics					
	Sodium	Calcium	Magnesium	Potassium	Sulphate	Chloride	Fluoride	Reactive phosphorus as P	Total Phosphorus	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N	Ammonia as N	Total Nitrogen as N	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*	Total Dissolved Solids	Total Dissolved Solids	pH	
LOR Units	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	0.1 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.01 mg/L	0.1 mg/L	0.01 meq/L	0.01 meq/L	%	0.01 mg/L	1 mg/L	1 mg/L	1 mg/L	1 mg/L	1 µS/cm	1 mg/L	10 mg/L	0.01 pH units			
Baseline Trigger Values (KLF 2020) <sup>1</sup>	-	-	-	-	-	-	-	-	0.13	-	-	-	-	0.25	1.8	-	-	-	-	-	-	-	-	125-2200	-	-	4.7		
NHMRC ADWG 2018	-	-	-	-	-	-	-	-	1.5	-	-	3	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Sample Name	Sample Date																												
SW1	22-Feb-19																		Dry										
	14-Mar-19																												
	23-Apr-19	94	34	52	6.0	310	95	0.5	-	-	-	-	-	-	-	-	10	9.13	5.6	-	< 1.0	< 1.0	< 1.0	299	893	580	707	4.01	
	16-May-19	86	24	42	6.0	324	112	0.3	< 0.01	0.13	< 0.01	< 0.01	< 0.01	< 0.01	1.8	1.8	8.94	9.9	5.13	2.45	< 1.0	< 1.0	< 1.0	233	947	616	715	4.6	
	14-Jun-19	77	20	34	5.0	182	112	0.4	-	-	-	-	-	-	-	-	7.27	6.95	2.28	-	< 1.0	< 1.0	< 1.0	190	847	550	512	4.5	
	16-Jul-19	90	20	35	4.0	240	130	0.4	-	-	-	-	-	-	-	-	7.9	8.66	4.64	-	< 1.0	< 1.0	< 1.0	194	876	569	568	4.42	
	15-Aug-19	97	18	32	4.0	212	134	0.4	-	-	-	-	-	-	-	-	7.85	8.19	2.12	-	< 1.0	< 1.0	< 1.0	177	813	528	548	4.53	
	16-Sep-19	117	21	39	4.0	244	193	0.7	< 0.01	0.05	< 0.01	0.02	0.02	< 0.01	1.2	1.2	9.45	11	5.38	3.49	< 1.0	< 1.0	< 1.0	213	1,080	702	689	4.32	
	15-Oct-19	124	16	31	3.0	127	191	0.6	-	-	-	-	-	-	-	-	8.82	8.03	4.68	-	< 1.0	< 1.0	< 1.0	168	1,050	682	-	5.32	
	18-Nov-19	142	14	30	4.0	165	234	0.5	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.03	1.1	1.1	9.45	10	3.03	4.91	< 1.0	< 1.0	< 1.0	158	1,090	708	-	5.06	
	17-Dec-19																		Dry										
	16-Jan-20																												
	27-Feb-20	56	34	10	8.0	73	64	0.4	< 0.01	0.17	< 0.05	< 0.05	< 0.05	0.16	2.4	2.4	5.16	4.58	5.91	2.17	63	< 1.0	< 1.0	63	126	550	358	-	6.83
	26-Mar-20	12	27	2	4.0	6.0	11	< 0.1	-	-	-	-	-	-	-	-	2.14	1.45	-	-	51	< 1.0	< 1.0	51	76	234	152	-	7.09
	27-Apr-20	12	13	1	5.0	18	12	0.3	-	-	-	-	-	-	-	-	1.38	1.51	-	-	40	< 1.0	< 1.0	40	36	163	106	-	6.94
	15-May-20	9.0	18	1.0	3.0	29	8.0	< 0.1	0.05	0.17	0.02	0.33	0.35	0.07	1.4	1.0	1.45	1.63	0.56	40	-	-	-	40	49	178	116	-	7.06
	19-Jun-20	7.0	21	1.0	2.0	8.0	7.0	< 0.1	-	-	-	-	-	-	-	-	1.48	1.52	-	-	58	< 1.0	< 1.0	58	56	159	103	-	6.68
	16-Jul-20	7.0	16	1.0	2.0	6.0	7.0	< 0.1	-	-	-	-	-	-	-	-	1.24	1.34	-	-	51	< 1.0	< 1.0	51	44	133	86	-	6.89
	14-Aug-20	6.0	8.0	2.0	2.0	< 10	8.0	< 0.1	< 0.01	0.04	0.01	0.01	0.02	< 0.1	0.7	0.7	0.88	0.64	0.49	21	< 1	21	28	82	53	98	62.1	-	
	16-Sep-20	9.0	16	3.0	3.0	< 1.0	< 1.0	0.1	-	-	-	-	-	-	-	-	1.51	1.1	-	-	55	< 1.0	< 1.0	55	52	137	89	152	6.5
	16-Oct-20	12	40	4.0	4.0	< 1.0	16	0.2	-	-	-	-	-	-	-	-	2.95	2.69	-	-	112	< 1.0	< 1.0	112	116	268	174	-	7.29
	16-Nov-20	8.0	13	2.0	3.0	< 1.0	10	< 0.1	< 0.01	0.03	< 0.01	0.04	0.04	< 0.01	0.6	0.6	1.24	1.12	-	-	54	42	< 1.0	< 1.0	42	41	127	82	127
SW2	23-Apr-19																Dry												
	16-May-19																												
	14-Jun-19																												
	16-Jul-19																												
	15-Aug-19																												
	16-Sep-19																												
	15-Oct-19																												
	18-Nov-19																												
	27-Feb-20																Dry												
	26-Mar-20																												
	27-Apr-20																												
	15-May-20																												
	19-Jun-20																												
	16-Jul-20																												
	14-Aug-20																												
	16-Sep-20																												
	15-Oct-20																												
	18-Nov-20																												
SW3	22-Feb-19	40	4.0	4.0	1.0	16	82	< 0.1	< 0.01	0.06	< 0.01	< 0.01	< 0.01	0.16	1.0	1.0	2.55	2.87	-	3.38	11	< 1.0	< 1.0	11	26	262	228	-	6.21
	14-Mar-19	45	6.0	6.0	2.0	44	64	< 0.1	-	-	-	-	-	-	-	-	2.8	2.8	-	-	4.0	< 1.0	< 1.0	4.0	40	344	224	279	5.42
	23-Apr-19	37	8.0	6.0	1.0	42	53	< 0.1	-	-	-	-	-	-	-	-	2.53	2.37	-	-	< 1.0	< 1.0	< 1.0	45	220	143	190	5.2	
	16-May-19	35	7.0	5.0	< 1.0	34	54	< 0.1	< 0.01	0.17	< 0.01	< 0.01	< 0.01	< 0.01	0.1	0.1	2.28	2.25	-	2.47	1.0	< 1.0	< 1.0	1.0	38	271	176	300	5.24
	14-Jun-19	32	7.0	6.0	< 1.0	41	55	< 0.1	-	-	-	-	-	-	-	-	2.24	2.4	-	-	< 1.0	< 1.0	< 1.0	42	300	195	170	4.58	
	16-Jul-19	46	8.0	12	< 1.0	104	57	0.2	-	-	-	-	-	-	-	-	3.39	3.77	5.38	-	< 1.0	< 1.0	< 1.0	69	451	293	246	4.47	
	15-Aug-19	38	6.0	7.0	< 1.0	54	56	0.1	-	-	-	-	-	-	-	-	2.53	2.7	-	-	< 1.0	< 1.0	< 1.0	44	338	220	192	4.47	
	16-Sep-19	42	7.0	8.0	< 1.0	48	57	0.1	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.1	0.1	0.1	2.83	2.61	-	2.57									

**Table SW4**  
 Groundwater Analytical Data - Inorganics  
 Williamstown Sand Syndicate

16-Sep-19	<b>45</b>	<b>7.0</b>	<b>6.0</b>	< 1.0	<b>45</b>	<b>58</b>	<b>0.1</b>	< 0.01	<b>0.01</b>	< 0.01	< 0.01	< 0.01	< 0.01	<b>0.1</b>	<b>0.1</b>	<b>2.8</b>	<b>2.57</b>	-	<b>3.01</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>42</b>	<b>360</b>	<b>234</b>	<b>208</b>	<b>4.35</b>	
15-Oct-19	<b>44</b>	<b>6.0</b>	<b>6.0</b>	< 1.0	<b>38</b>	<b>57</b>	<b>0.1</b>	-	-	-	-	-	-	-	-	<b>2.71</b>	<b>2.4</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>40</b>	<b>365</b>	<b>237</b>	-	<b>4.48</b>	
18-Nov-19	<b>41</b>	<b>4.0</b>	<b>5.0</b>	< 1.0	<b>41</b>	<b>64</b>	<b>0.2</b>	< 0.01	< 0.01	< 0.01	<b>0.02</b>	<b>0.02</b>	< 0.01	<b>0.2</b>	<b>0.2</b>	<b>2.76</b>	<b>2.66</b>	-	<b>3.22</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>30</b>	<b>348</b>	<b>226</b>	-	<b>4.48</b>	
17-Dec-19																													
SW4																													
16-Jan-20																													
27-Feb-20	<b>44</b>	<b>9.0</b>	<b>6.0</b>	<b>1.0</b>	<b>68</b>	<b>59</b>	<0.1	< 0.01	< 0.01	< 0.01	<b>0.01</b>	<b>0.01</b>	< 0.01	<b>0.2</b>	<b>0.2</b>	<b>2.88</b>	<b>3.08</b>	-	<b>2.79</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>47</b>	<b>479</b>	<b>311</b>	-	<b>3.82</b>	
26-Mar-20	<b>40</b>	<b>5.0</b>	<b>4.0</b>	1.0	<b>46</b>	<b>57</b>	<0.1	-	-	-	-	-	-	-	-	<b>2.34</b>	<b>2.56</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>29</b>	<b>346</b>	<b>245</b>	-	<b>5.29</b>	
27-Apr-20	<b>38</b>	<b>5.0</b>	<b>4.0</b>	1.0	<b>38</b>	<b>51</b>	<b>0.1</b>	-	-	-	-	-	-	-	-	<b>2.26</b>	<b>2.29</b>	-	-	<b>3.0</b>	< 1.0	< 1.0	<b>3.0</b>	<b>29</b>	<b>336</b>	<b>218</b>	-	<b>5.54</b>	
15-May-20	<b>41</b>	<b>5.0</b>	<b>4.0</b>	<b>2.0</b>	<b>41</b>	<b>61</b>	<0.1	<0.01	<0.01	<0.01	<b>0.01</b>	<b>0.01</b>	<0.01	<b>0.2</b>	<b>0.2</b>	<b>2.41</b>	<b>2.57</b>	-	<b>3.31</b>	<1.0	<1.0	<1.0	<1.0	<b>29</b>	<b>327</b>	<b>212</b>	-	<b>4.67</b>	
19-Jun-20	<b>59</b>	<b>12</b>	<b>9.0</b>	<b>1.0</b>	<b>84</b>	<b>69</b>	<b>0.3</b>	-	-	-	-	-	-	-	-	<b>3.93</b>	<b>3.7</b>	<b>3.1</b>	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>67</b>	<b>464</b>	<b>302</b>	-	<b>4.5</b>	
16-Jul-20	<b>53</b>	<b>11</b>	<b>8.0</b>	<b>2.0</b>	<b>82</b>	<b>59</b>	<b>0.3</b>	-	-	-	-	-	-	-	-	<b>3.56</b>	<b>3.37</b>	<b>2.77</b>	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>60</b>	<b>439</b>	<b>285</b>	-	<b>4.58</b>	
14-Aug-20	<b>47</b>	<b>10</b>	<b>10</b>	<b>2.0</b>	<b>82</b>	<b>70</b>	<b>0.3</b>	<0.01	<0.01	<0.01	<b>0.02</b>	<b>0.02</b>	<b>0.01</b>	<b>0.4</b>	<b>0.4</b>	<b>3.42</b>	<b>3.68</b>	<b>3.72</b>	<b>2.51</b>	<1	<1	<1	<1	<b>66</b>	<b>450</b>	<b>292</b>	<b>266</b>	<b>4.24</b>	
16-Sep-20	<b>45</b>	<b>6.0</b>	<b>7.0</b>	< 1.0	<b>58</b>	<b>59</b>	<b>0.1</b>	-	-	-	-	-	-	-	-	<b>2.83</b>	<b>2.87</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>44</b>	<b>421</b>	<b>274</b>	<b>228</b>	<b>4.16</b>	
16-Oct-20	<b>43</b>	<b>5.0</b>	<b>5.0</b>	< 1.0	<b>40</b>	<b>67</b>	<b>0.1</b>	-	-	-	-	-	-	-	-	<b>2.53</b>	<b>2.72</b>	-	-	< 1.0	< 1.0	< 1.0	< 1.0	<b>33</b>	<b>355</b>	<b>231</b>	-	<b>3.94</b>	
16-Nov-20	<b>37</b>	<b>8.0</b>	<b>6.0</b>	<b>2.0</b>	<b>42</b>	<b>54</b>	<b>0.2</b>	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<b>0.1</b>	<b>0.1</b>	<b>2.55</b>	<b>2.4</b>	-	<b>2.41</b>	< 1.0	< 1.0	< 1.0	< 1.0	<b>45</b>	<b>338</b>	<b>220</b>	<b>196</b>	<b>4.21</b>

**Notes:**

- Not analysed

&lt; - 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

<sup>1</sup> Baseline Water Quality Summary Report, September 2020 (KLF 2020)

Notes

not analysed

Less than laboratory limit of reporting

- Not calculated
- Micrograms per litre

XN - Benzene, toluene, ethylbenzene, xylenes, naphthalene

### **Notes:**

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

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

mg/l - Milligrams per litre

Mg/L - Milligrams per litre  
Half the laboratory limit of reporting

**Notes:**

< - Less than laboratory limit of reporting

NC - Not calculated

Table QC3  
Quality Control Sample Analysis - PFAS  
Williamstown Sand Syndicate

**Notes:**  
< - Less than laboratory limit of reporting  
NC - Not calculated

20193820.001

Project Number:	Date:	Site Address:
20193820	16/06/2020	WSS

Site Name:	Field Manager:	Weather Observations
Williamtown Sands Syndicate	T. Hill	Hot / sunny - 40°C

Well ID	Sample Time	Field Measurements										Well condition and water appearance
		Total Well Depth (mbTOC)	Sample Depth (mbTOC)	Turbidity (NTU)	Temp (°C)	DO (mg/L)	EC (µS/cm)	TDS (mg/L)	pH	Redox (mV)		
BH2	11:45	5.328		10	29.50	5.84	346	224	4.91	297.2	Sediment thick, brown, slight odor +	
BH1	1:55	6.075	8.16	1594.3	24.23	3.22	348	227	5.43	131.3	clear, no odor.	
BH11	2:15	3.405		1760	23.40	3.45	541	351	4.77	6.6	clear, odour sulphur.	
BH12	3:00	6.459		836	24.90	4.77	525	342	5.02	-0034.6	light brown, slight odour.	
BH5	3:30	6.345		—	21.33	4.53	356	232	4.70	-29.0	sia odour sulphur - clear	
BH6	4:00	0.259		1827	24.95	3.55	226	145	4.07	5.5	clear slight odor	
BH7	4:15	1.225		2515	22.80	3.30	792	519	4.42	-104	clear sulphur odor	
BH8	4:30	1.782		1500	22.70	1.83	1035	675	4.64	-116.1	clear sulphur odor	
SW4	10:05			1135	20.30	01.54	1239	801	5.66	256.0	very full, muddy sheen, slight odor.	
SW3	11:05	5.79		1826	20.1000.41	1218	796	4.78	398.5	very full, little odor, no sheen.		
SW1	12:00			-0	22.90	2.60	481	301	6.91	114.0	very full, clear, no odor	
RH9A	12:40	8.760		-0	29.6	3.51	686	438	5.73	304.3	Sediment, no odor, brown.	
BH4	14:45			—	24.40	3.76	382	248	4.64	+164.4	clear, sulphur odor	
MWS955	15:05	0.998		2487	22.40	3.45	1443	934	4.55	-83.8	light brown, sulphur odor	
MWB		1.23										

BH10 dry  
SW2 dry



QA/QC SAMPLE REGISTER

Project Number:	Site Name:	Site Address:
2019-39820	WSS	Williamstown

Date:	Field Manager:
16-11-2020	T.Hill

**COMMENTS:**

Digitized by srujanika@gmail.com



## ATTACHMENT 3: LAB RESULTS



## CERTIFICATE OF ANALYSIS

Work Order	<b>ES2040542</b>	Page	: 1 of 22
Client	<b>KLEINFELDER AUSTRALIA PTY LTD</b>	Laboratory	: Environmental Division Sydney
Contact	: Tayla Hill	Contact	: Shirley LeCornu
Address	: 95 Mitchell Rd Cardiff 2285	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Nov-2020 17:35
Order number	: ----	Date Analysis Commenced	: 17-Nov-2020
C-O-C number	: ----	Issue Date	: 25-Nov-2020 11:51
Sampler	: Taya Hill		
Site	: WSS-Cabbage Tree Rd water monitoring		
Quote number	: ME/114/19 ALS Compass		
No. of samples received	: 18		
No. of samples analysed	: 17		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. 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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



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

## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- ED041G: LOR raised for Sulfate on sample 11 due to sample matrix.
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EA015 TDS, result has been confirmed for sample 12 by re-analysis.
- 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.
- 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.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. 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. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH1	BH2	BH4	BH6	BH7		
Compound	CAS Number	LOR	Unit	Sampling date / time	16-Nov-2020 00:00				
					Result	Result	Result	Result	Result
<b>EA005P: pH by PC Titrator</b>									
pH Value	---	0.01	pH Unit		5.98	5.09	4.98	4.45	4.57
<b>EA006: Sodium Adsorption Ratio (SAR)</b>									
^ Sodium Adsorption Ratio	---	0.01	-		1.55	1.32	2.54	3.04	2.79
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	---	1	µS/cm		120	119	146	321	245
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	---	10	mg/L		76	91	90	205	168
<b>EA016: Calculated TDS (from Electrical Conductivity)</b>									
Total Dissolved Solids (Calc.)	---	1	mg/L		78	77	95	209	159
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	---	5	mg/L		41	952	15	12	6
<b>EA065: Total Hardness as CaCO<sub>3</sub></b>									
Total Hardness as CaCO <sub>3</sub>	---	1	mg/L		8	13	8	28	20
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		22	3	1	<1	<1
Total Alkalinity as CaCO <sub>3</sub>	---	1	mg/L		22	3	1	<1	<1
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		5	9	12	23	9
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		18	16	27	61	54
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		<1	2	<1	3	<1
Magnesium	7439-95-4	1	mg/L		2	2	2	5	5
Sodium	7440-23-5	1	mg/L		11	11	18	37	30
Potassium	7440-09-7	1	mg/L		<1	<1	<1	2	2
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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		0.002	0.005	0.008	0.061	0.006
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH1	BH2	BH4	BH6	BH7	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-001	ES2040542-002	ES2040542-003	ES2040542-004	ES2040542-005
<b>EG020F: Dissolved Metals by ICP-MS - Continued</b>								
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.003
Chromium	7440-47-3	0.001	mg/L	0.003	<0.001	<0.001	<0.001	0.002
Copper	7440-50-8	0.001	mg/L	0.001	0.020	0.005	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.012	0.015	0.008	0.014	0.023
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	0.003
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	0.045	0.018	0.005	0.010	0.006
Iron	7439-89-6	0.05	mg/L	7.05	0.36	0.18	1.72	1.72
<b>EG035F: Dissolved Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	0.1
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	0.07	<0.01	<0.01	0.22	0.30
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	2.88	0.10	0.01	<0.01
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	2.88	0.10	0.01	<0.01
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	---	0.1	mg/L	0.2	1.9	<0.1	0.3	0.6
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	---	0.1	mg/L	0.2	4.8	0.1	0.3	0.6
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	---	0.01	mg/L	0.02	0.48	0.06	0.08	<0.01
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01
<b>EN055: Ionic Balance</b>								
ø Total Anions	---	0.01	meq/L	1.05	0.70	1.03	2.20	1.71
ø Total Cations	---	0.01	meq/L	1.02	----	----	----	----

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH1	BH2	BH4	BH6	BH7	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-001	ES2040542-002	ES2040542-003	ES2040542-004	ES2040542-005
<b>EN055: Ionic Balance - Continued</b>								
Ø Total Cations	---	0.01	meq/L	---	0.74	0.95	2.22	1.77
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup</b>								
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
<b>EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup</b>								
>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
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	<20
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
<b>EP080: BTEXN</b>								
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
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1	BH2	BH4	BH6	BH7
Compound	CAS Number	LOR	Unit	Sampling date / time	16-Nov-2020 00:00				
				Result	Result	Result	Result	Result	Result
<b>EP231A: Perfluoroalkyl Sulfonic Acids - Continued</b>									
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	---	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDODA)	307-55-1	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05	<0.05
<b>EP231C: Perfluoroalkyl Sulfonamides</b>									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05	<0.05

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH1	BH2	BH4	BH6	BH7	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-001	ES2040542-002	ES2040542-003	ES2040542-004	ES2040542-005
<b>EP231C: Perfluoroalkyl Sulfonamides - Continued</b>								
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	---	<0.02	<0.02	<0.02	<0.02
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	---	<0.05	<0.05	<0.05	<0.05
<b>EP231P: PFAS Sums</b>								
Sum of PFAS	---	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
Sum of PFAS (WA DER List)	---	0.01	µg/L	---	<0.01	<0.01	<0.01	<0.01
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	2	%	121	117	108	119	115
Toluene-D8	2037-26-5	2	%	108	106	99.2	106	116
4-Bromofluorobenzene	460-00-4	2	%	115	110	105	110	110
<b>EP231S: PFAS Surrogate</b>								
13C4-PFOS	---	0.02	%	---	98.6	100	106	95.5
13C8-PFOA	---	0.02	%	---	106	106	117	118

## **Analytical Results**

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH8	BH9a	BH11	BH12	MW239S	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-006	ES2040542-007	ES2040542-008	ES2040542-009	ES2040542-010
<b>EG020F: Dissolved Metals by ICP-MS - Continued</b>								
Cobalt	7440-48-4	0.001	mg/L	<0.001	<b>0.001</b>	<0.001	----	<0.001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<b>0.001</b>	<b>0.002</b>	<b>0.002</b>
Copper	7440-50-8	0.001	mg/L	<0.001	<b>0.001</b>	<0.001	<b>0.002</b>	<b>0.001</b>
Manganese	7439-96-5	0.001	mg/L	<b>0.008</b>	<b>0.030</b>	<b>0.011</b>	----	<b>0.011</b>
Nickel	7440-02-0	0.001	mg/L	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.002</b>	<b>0.003</b>
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
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01
Zinc	7440-66-6	0.005	mg/L	<0.005	<b>0.011</b>	<b>0.016</b>	<b>0.017</b>	<b>0.021</b>
Iron	7439-89-6	0.05	mg/L	<b>3.48</b>	<b>0.11</b>	<b>0.84</b>	----	<b>0.30</b>
<b>EG035F: Dissolved Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	<b>0.13</b>	<0.01	<b>0.08</b>	<0.01	<b>0.01</b>
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<b>2.35</b>	<0.01	<b>0.02</b>	<0.01
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	<b>2.35</b>	<0.01	<b>0.02</b>	<0.01
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	---	0.1	mg/L	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>	<b>0.2</b>	<b>2.6</b>
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	---	0.1	mg/L	<b>0.6</b>	<b>2.8</b>	<b>0.5</b>	<b>0.2</b>	<b>2.6</b>
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	---	0.01	mg/L	<b>0.14</b>	<b>0.11</b>	<b>0.06</b>	<0.01	<b>0.59</b>
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EN055: Ionic Balance</b>								
ø Total Anions	---	0.01	meq/L	<b>2.35</b>	<b>1.51</b>	<b>1.51</b>	<b>1.52</b>	<b>4.30</b>
ø Total Cations	---	0.01	meq/L	----	----	----	----	<b>4.21</b>

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH8	BH9a	BH11	BH12	MW239S	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-006	ES2040542-007	ES2040542-008	ES2040542-009	ES2040542-010
<b>EN055: Ionic Balance - Continued</b>								
Ø Total Cations	---	0.01	meq/L	2.58	1.46	1.58	1.31	---
Ø Ionic Balance	---	0.01	%	---	---	---	---	1.00
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup</b>								
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
<b>EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup</b>								
>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
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	<20
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
<b>EP080: BTEXN</b>								
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
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
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

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH8	BH9a	BH11	BH12	MW239S	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-006	ES2040542-007	ES2040542-008	ES2040542-009	ES2040542-010
<b>EP231A: Perfluoroalkyl Sulfonic Acids - Continued</b>								
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
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>								
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
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	---	<0.05	---	<0.05
<b>EP231C: Perfluoroalkyl Sulfonamides</b>								
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

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	BH8	BH9a	BH11	BH12	MW239S	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-006	ES2040542-007	ES2040542-008	ES2040542-009	ES2040542-010
<b>EP231C: Perfluoroalkyl Sulfonamides - Continued</b>								
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	---	<0.02	---	<0.02
N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	---	<0.02	---	<0.02
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
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
<b>EP231P: PFAS Sums</b>								
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	2	%	114	116	113	115	119
Toluene-D8	2037-26-5	2	%	115	104	104	108	109
4-Bromofluorobenzene	460-00-4	2	%	109	108	107	113	116
<b>EP231S: PFAS Surrogate</b>								
13C4-PFOS	----	0.02	%	97.7	---	76.9	---	97.8
13C8-PFOA	----	0.02	%	112	---	119	---	113

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	SW1	SW3	SW4	QW34	QW36		
Compound	CAS Number	LOR	Unit	Sampling date / time	16-Nov-2020 00:00				
					Result	Result	Result	Result	Result
<b>EA005P: pH by PC Titrator</b>									
pH Value	---	0.01	pH Unit		6.50	3.95	4.21	4.94	---
<b>EA006: Sodium Adsorption Ratio (SAR)</b>									
^ Sodium Adsorption Ratio	---	0.01	-		0.54	2.92	2.41	2.68	---
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	---	1	µS/cm		127	460	338	339	---
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	---	10	mg/L		---	201	---	---	---
Total Dissolved Solids @180°C	---	10	mg/L		127	---	196	190	---
<b>EA016: Calculated TDS (from Electrical Conductivity)</b>									
Total Dissolved Solids (Calc.)	---	1	mg/L		82	299	220	220	---
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	---	5	mg/L		<5	<5	6	10	---
<b>EA065: Total Hardness as CaCO<sub>3</sub></b>									
Total Hardness as CaCO <sub>3</sub>	---	1	mg/L		41	26	45	38	---
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L		<1	<1	<1	<1	---
Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L		<1	<1	<1	<1	---
Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L		42	<1	<1	<1	---
Total Alkalinity as CaCO <sub>3</sub>	---	1	mg/L		42	<1	<1	<1	---
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA</b>									
Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L		<10	67	42	52	---
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L		10	53	54	62	---
<b>ED093F: Dissolved Major Cations</b>									
Calcium	7440-70-2	1	mg/L		13	2	8	7	---
Magnesium	7439-95-4	1	mg/L		2	5	6	5	---
Sodium	7440-23-5	1	mg/L		8	34	37	38	---
Potassium	7440-09-7	1	mg/L		3	<1	2	2	---
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	---
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	---
Barium	7440-39-3	0.001	mg/L		0.020	0.029	0.031	0.031	---
Beryllium	7440-41-7	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	---

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	SW1	SW3	SW4	QW34	QW36	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-011	ES2040542-012	ES2040542-013	ES2040542-014	ES2040542-015
<b>EG020F: Dissolved Metals by ICP-MS - Continued</b>								
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	---
Cobalt	7440-48-4	0.001	mg/L	<0.001	<b>0.009</b>	<b>0.004</b>	<b>0.004</b>	---
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	---
Copper	7440-50-8	0.001	mg/L	<b>0.005</b>	<b>0.002</b>	<b>0.001</b>	<0.001	---
Manganese	7439-96-5	0.001	mg/L	<b>0.017</b>	<b>0.032</b>	<b>0.074</b>	<b>0.071</b>	---
Nickel	7440-02-0	0.001	mg/L	<0.001	<b>0.009</b>	<b>0.005</b>	<b>0.005</b>	---
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	---
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
Zinc	7440-66-6	0.005	mg/L	<b>0.030</b>	<b>0.030</b>	<b>0.016</b>	<b>0.016</b>	---
Iron	7439-89-6	0.05	mg/L	<b>0.18</b>	<b>4.79</b>	<b>1.93</b>	<b>1.77</b>	---
<b>EG035F: Dissolved Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	---
<b>EK040P: Fluoride by PC Titrator</b>								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<b>0.2</b>	<b>0.4</b>	---
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N	14797-55-8	0.01	mg/L	<b>0.04</b>	<0.01	<0.01	<0.01	---
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N	---	0.01	mg/L	<b>0.04</b>	<0.01	<0.01	<0.01	---
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	---	0.1	mg/L	<b>0.6</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	---
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	---	0.1	mg/L	<b>0.6</b>	<b>0.3</b>	<b>0.1</b>	<b>0.2</b>	---
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	---	0.01	mg/L	<b>0.03</b>	<0.01	<0.01	<0.01	---
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	---
<b>EN055: Ionic Balance</b>								
ø Total Anions	---	0.01	meq/L	<b>1.12</b>	<b>2.89</b>	<b>2.40</b>	<b>2.83</b>	---

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	SW1	SW3	SW4	QW34	QW36	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-011	ES2040542-012	ES2040542-013	ES2040542-014	ES2040542-015
<b>EN055: Ionic Balance - Continued</b>								
Ø Total Cations	---	0.01	meq/L	---	2.60	---	2.64	---
Ø Total Cations	---	0.01	meq/L	1.24	---	2.55	---	---
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup</b>								
C10 - C14 Fraction	---	50	µg/L	<50	<50	<50	<50	---
C15 - C28 Fraction	---	100	µg/L	<100	<100	<100	<100	---
C29 - C36 Fraction	---	50	µg/L	<50	<50	<50	<50	---
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<50	<50	<50	---
<b>EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup</b>								
>C10 - C16 Fraction	---	100	µg/L	<100	<100	<100	<100	---
>C16 - C34 Fraction	---	100	µg/L	<100	<100	<100	<100	---
>C34 - C40 Fraction	---	100	µg/L	<100	<100	<100	<100	---
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	<100	<100	---
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<100	<100	<100	---
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	---	20	µg/L	<20	<20	<20	<20	---
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	---
^ C6 - C10 Fraction minus BTEX	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	---
<b>EP080: BTEXN</b>								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	---
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	---
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	---
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	---
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	---
^ Total Xylenes	---	2	µg/L	<2	<2	<2	<2	---
^ Sum of BTEX	---	1	µg/L	<1	<1	<1	<1	---
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	---
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	SW1	SW3	SW4	QW34	QW36	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-011	ES2040542-012	ES2040542-013	ES2040542-014	ES2040542-015
<b>EP231A: Perfluoroalkyl Sulfonic Acids - Continued</b>								
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.02	0.02	<0.01
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorododecanoic acid (PFDODA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
<b>EP231C: Perfluoroalkyl Sulfonamides</b>								
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	SW1	SW3	SW4	QW34	QW36	
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00				
			Unit	ES2040542-011	ES2040542-012	ES2040542-013	ES2040542-014	ES2040542-015
<b>EP231C: Perfluoroalkyl Sulfonamides - Continued</b>								
N-Methyl perfluoroctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
N-Ethyl perfluoroctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	<0.02	<0.02
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
<b>EP231P: PFAS Sums</b>								
Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.02	0.02	<0.01
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	<0.01	<0.01	0.02	0.02	<0.01
Sum of PFAS (WA DER List)	----	0.01	µg/L	<0.01	<0.01	0.02	0.02	<0.01
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	2	%	112	116	114	118	----
Toluene-D8	2037-26-5	2	%	103	104	105	108	----
4-Bromofluorobenzene	460-00-4	2	%	108	108	107	110	----
<b>EP231S: PFAS Surrogate</b>								
13C4-PFOS	----	0.02	%	95.7	104	95.6	99.1	104
13C8-PFOA	----	0.02	%	111	117	112	114	112

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	QW38	QW39	---	---	---	---
Compound	CAS Number	LOR	Unit	Sampling date / time	16-Nov-2020 00:00	16-Nov-2020 00:00	---	---
					ES2040542-016	ES2040542-017	-----	-----
				Result		Result	---	---
<b>EG020F: Dissolved Metals by ICP-MS</b>								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	---	---	---
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	---	---	---
Barium	7440-39-3	0.001	mg/L	<0.001	<0.001	---	---	---
Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	---	---	---
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	---	---	---
Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	---	---	---
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	---	---	---
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	---	---	---
Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	---	---	---
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	---	---	---
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	---	---	---
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	---	---	---
Vanadium	7440-62-2	0.01	mg/L	<0.01	<0.01	---	---	---
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	---	---	---
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	---	---	---
<b>EG035F: Dissolved Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	---	---	---
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup</b>								
C10 - C14 Fraction	---	50	µg/L	<50	<50	---	---	---
C15 - C28 Fraction	---	100	µg/L	<100	<100	---	---	---
C29 - C36 Fraction	---	50	µg/L	<50	<50	---	---	---
^ C10 - C36 Fraction (sum)	---	50	µg/L	<50	<50	---	---	---
<b>EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup</b>								
>C10 - C16 Fraction	---	100	µg/L	<100	<100	---	---	---
>C16 - C34 Fraction	---	100	µg/L	<100	<100	---	---	---
>C34 - C40 Fraction	---	100	µg/L	<100	<100	---	---	---
^ >C10 - C40 Fraction (sum)	---	100	µg/L	<100	<100	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)	---	100	µg/L	<100	<100	---	---	---
<b>EP080/071: Total Petroleum Hydrocarbons</b>								
C6 - C9 Fraction	---	20	µg/L	<20	<20	---	---	---
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	---	---	---

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	QW38	QW39	---	---	---	---
Compound	CAS Number	LOR	Sampling date / time	16-Nov-2020 00:00	16-Nov-2020 00:00	---	---	---
			Unit	ES2040542-016	ES2040542-017	-----	-----	-----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>								
<sup>^</sup> C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	---	---	---
<b>EP080: BTEXN</b>								
Benzene	71-43-2	1	µg/L	<1	<1	---	---	---
Toluene	108-88-3	2	µg/L	<2	<2	---	---	---
Ethylbenzene	100-41-4	2	µg/L	<2	<2	---	---	---
meta- & para-Xylene	108-38-3	106-42-3	2	µg/L	<2	---	---	---
ortho-Xylene		95-47-6	2	µg/L	<2	---	---	---
<sup>^</sup> Total Xylenes		----	2	µg/L	<2	---	---	---
<sup>^</sup> Sum of BTEX		----	1	µg/L	<1	---	---	---
Naphthalene	91-20-3	5	µg/L	<5	<5	---	---	---
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	---	---	---
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	---	---	---
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>								
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	---	---	---
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluoroctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	---	---	---
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	---	---	---

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID	QW38	QW39	---	---	---	---
		Sampling date / time	16-Nov-2020 00:00	16-Nov-2020 00:00	---	---	---	---
Compound	CAS Number	LOR	Unit	ES2040542-016	ES2040542-017	-----	-----	-----
				Result	Result	---	---	---
<b>EP231B: Perfluoroalkyl Carboxylic Acids - Continued</b>								
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	---	---	---
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	---	---	---
<b>EP231C: Perfluoroalkyl Sulfonamides</b>								
Perfluorooctane sulfonamide (FOUSA)	754-91-6	0.02	µg/L	<0.02	<0.02	---	---	---
N-Methyl perfluorooctane sulfonamide (MeFOUSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	---	---	---
N-Ethyl perfluorooctane sulfonamide (EtFOUSA)	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	---	---	---
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
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	---	---	---
<b>EP231P: PFAS Sums</b>								
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	---	---	---

## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	QW38	QW39	---	---	---
			Sampling date / time	16-Nov-2020 00:00	16-Nov-2020 00:00	---	---	---
Compound	CAS Number	LOR	Unit	ES2040542-016	ES2040542-017	-----	-----	-----
				Result	Result	---	---	---
<b>EP231P: PFAS Sums - Continued</b>								
Sum of PFAS (WA DER List)	---	0.01	µg/L	<0.01	<0.01	---	---	---
<b>EP080S: TPH(V)/BTEX Surrogates</b>								
1,2-Dichloroethane-D4	17060-07-0	2	%	120	113	---	---	---
Toluene-D8	2037-26-5	2	%	105	104	---	---	---
4-Bromofluorobenzene	460-00-4	2	%	109	108	---	---	---
<b>EP231S: PFAS Surrogate</b>								
13C4-PFOS	---	0.02	%	94.5	98.3	---	---	---
13C8-PFOA	---	0.02	%	108	104	---	---	---

## Surrogate Control Limits

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

## QUALITY CONTROL REPORT

Work Order	<b>: ES2040542</b>	Page	<b>: 1 of 16</b>
Client	<b>: KLEINFELDER AUSTRALIA PTY LTD</b>	Laboratory	<b>: Environmental Division Sydney</b>
Contact	<b>: Tayla Hill</b>	Contact	<b>: Shirley LeCornu</b>
Address	<b>: 95 Mitchell Rd Cardiff 2285</b>	Address	<b>: 277-289 Woodpark Road Smithfield NSW Australia 2164</b>
Telephone	<b>: ----</b>	Telephone	<b>: +6138549 9630</b>
Project	<b>: 20193820</b>	Date Samples Received	<b>: 16-Nov-2020</b>
Order number	<b>: ----</b>	Date Analysis Commenced	<b>: 17-Nov-2020</b>
C-O-C number	<b>: ----</b>	Issue Date	<b>: 25-Nov-2020</b>
Sampler	<b>: Tayla Hill</b>		
Site	<b>: WSS-Cabbage Tree Rd water monitoring</b>		
Quote number	<b>: ME/114/19 ALS Compass</b>		
No. of samples received	<b>: 18</b>		
No. of samples analysed	<b>: 17</b>		



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, unless the sampling was conducted by ALS. 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.

<b>Signatories</b>	<b>Position</b>	<b>Accreditation Category</b>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW

## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EA005P: pH by PC Titrator (QC Lot: 3368819)</b>									
ES2040542-001	BH1	EA005-P: pH Value	---	0.01	pH Unit	5.98	5.67	5.32	0% - 20%
ES2040542-011	SW1	EA005-P: pH Value	---	0.01	pH Unit	6.50	6.71	3.18	0% - 20%
<b>EA005P: pH by PC Titrator (QC Lot: 3373559)</b>									
ES2040542-009	BH12	EA005-P: pH Value	---	0.01	pH Unit	5.92	5.49	7.54	0% - 20%
ES2040899-004	Anonymous	EA005-P: pH Value	---	0.01	pH Unit	5.98	5.96	0.335	0% - 20%
<b>EA010P: Conductivity by PC Titrator (QC Lot: 3368820)</b>									
ES2040542-001	BH1	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	120	115	3.96	0% - 20%
ES2040542-011	SW1	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	127	128	0.793	0% - 20%
<b>EA010P: Conductivity by PC Titrator (QC Lot: 3373558)</b>									
ES2040542-009	BH12	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	190	189	0.538	0% - 20%
ES2040899-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	202	202	0.00	0% - 20%
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3377778)</b>									
ES2040542-001	BH1	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	76	76	0.00	No Limit
ES2040542-011	SW1	EA015H: Total Dissolved Solids @180°C	---	10	mg/L	127	146	14.1	0% - 50%
<b>EA025: Total Suspended Solids dried at 104 ± 2 °C (QC Lot: 3377779)</b>									
ES2040542-001	BH1	EA025H: Suspended Solids (SS)	---	5	mg/L	41	42	3.02	No Limit
ES2040542-011	SW1	EA025H: Suspended Solids (SS)	---	5	mg/L	<5	<5	0.00	No Limit
<b>ED037P: Alkalinity by PC Titrator (QC Lot: 3368818)</b>									
ES2040542-001	BH1	ED037-P: Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L	22	23	0.00	0% - 20%
		ED037-P: Total Alkalinity as CaCO <sub>3</sub>	---	1	mg/L	22	23	0.00	0% - 20%
ES2040542-011	SW1	ED037-P: Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L	<1	<1	0.00	No Limit

**Sub-Matrix: WATER**

		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>ED037P: Alkalinity by PC Titrator (QC Lot: 3368818) - continued</b>									
ES2040542-011	SW1	ED037-P: Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L	42	44	6.24	0% - 20%
		ED037-P: Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L	42	44	6.24	0% - 20%
<b>ED037P: Alkalinity by PC Titrator (QC Lot: 3373557)</b>									
ES2040542-009	BH12	ED037-P: Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L	7	3	75.4	No Limit
		ED037-P: Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L	7	3	75.4	No Limit
ES2040899-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO <sub>3</sub>	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO <sub>3</sub>	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO <sub>3</sub>	71-52-3	1	mg/L	6	6	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO <sub>3</sub>	----	1	mg/L	6	6	0.00	No Limit
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA (QC Lot: 3368831)</b>									
ES2040542-011	SW1	ED041G: Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L	<10	<10	0.00	No Limit
ES2040741-001	Anonymous	ED041G: Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L	7	8	0.00	No Limit
<b>ED041G: Sulfate (Turbidimetric) as SO<sub>4</sub> 2- by DA (QC Lot: 3372348)</b>									
ES2040001-001	Anonymous	ED041G: Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L	170	169	0.708	0% - 20%
ES2040001-010	Anonymous	ED041G: Sulfate as SO <sub>4</sub> - Turbidimetric	14808-79-8	1	mg/L	231	232	0.00	0% - 20%
<b>ED045G: Chloride by Discrete Analyser (QC Lot: 3368832)</b>									
ES2040542-011	SW1	ED045G: Chloride	16887-00-6	1	mg/L	10	9	0.00	No Limit
ES2040741-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	9	8	0.00	No Limit
<b>ED045G: Chloride by Discrete Analyser (QC Lot: 3372349)</b>									
ES2040001-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	269	252	6.74	0% - 20%
ES2040001-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	513	527	2.58	0% - 20%
<b>ED093F: Dissolved Major Cations (QC Lot: 3375108)</b>									
ES2040184-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	<1	<1	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	5	5	0.00	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.00	No Limit
ES2040579-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	509	513	0.850	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	160	159	0.742	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	171	170	0.756	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.00	No Limit
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 3375107)</b>									
ES2040184-002	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	0.013	0.012	0.00	0% - 50%
		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

**Sub-Matrix: WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 3375107) - continued</b>										
ES2040184-002										
Anonymous		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	0.013	0.013	0.00	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	0.13	0.13	0.00	No Limit	
ES2040579-001										
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	0.013	0.013	0.00	0% - 50%	
		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	<0.001	<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	0.651	0.651	0.00	0% - 20%	
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.012	0.012	0.00	0% - 50%	
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.009	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	0.21	0.21	0.00	No Limit	
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 3376526)</b>										
ES2040616-001										
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	0.043	0.048	9.77	0% - 20%	
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		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	<0.05	<0.05	0.00	No Limit	

**Sub-Matrix: WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EG020F: Dissolved Metals by ICP-MS (QC Lot: 3376526) - continued</b>									
ES2040616-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Barium	7440-39-3	0.001	mg/L	0.044	0.049	11.1	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	<0.001	0.00	No Limit
		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	<0.05	<0.05	0.00	No Limit
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 3375106)</b>									
ES2040542-001	BH1	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2040542-008	BH11	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
<b>EG035F: Dissolved Mercury by FIMS (QC Lot: 3376527)</b>									
ES2040542-017	QW39	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2040715-001	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
<b>EK040P: Fluoride by PC Titrator (QC Lot: 3368817)</b>									
ES2040542-001	BH1	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES2040542-011	SW1	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	0.1	0.00	No Limit
<b>EK040P: Fluoride by PC Titrator (QC Lot: 3373556)</b>									
ES2040542-009	BH12	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
ES2040899-004	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
<b>EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3372870)</b>									
ES2039789-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2040388-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
<b>EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3372872)</b>									
ES2040542-011	SW1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2040585-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3372347)</b>									
ES2040001-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
ES2040001-010	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3372351)</b>									
ES2040757-012	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.00	No Limit
ES2040895-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit

**Sub-Matrix: WATER**

		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3372869)</b>									
ES2039789-001	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2040388-001	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3372871)</b>									
ES2040542-011	SW1	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	0.04	<0.01	120	No Limit
ES2040585-001	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3372874)</b>									
ES2040063-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	3.7	2.9	24.1	No Limit
ES2039789-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	0.3	0.2	0.00	No Limit
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3372876)</b>									
ES2040585-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	2.0	2.0	0.00	0% - 50%
ES2040542-010	MW239S	EK061G: Total Kjeldahl Nitrogen as N	---	0.1	mg/L	2.6	2.6	0.00	No Limit
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3372875)</b>									
ES2040063-001	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	0.23	0.26	11.5	No Limit
ES2039789-001	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	<0.01	<0.01	0.00	No Limit
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3372877)</b>									
ES2040585-001	Anonymous	EK067G: Total Phosphorus as P	---	0.01	mg/L	0.16	0.14	10.7	No Limit
ES2040542-010	MW239S	EK067G: Total Phosphorus as P	---	0.01	mg/L	0.59	0.62	4.86	0% - 50%
<b>EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3372350)</b>									
ES2040542-001	BH1	EP080: C6 - C9 Fraction	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2040757-012	Anonymous	EP080: C6 - C9 Fraction	14265-44-2	0.01	mg/L	13.2	13.0	1.41	0% - 20%
<b>EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3371352)</b>									
ES2040542-001	BH1	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.00	No Limit
ES2040542-011	SW1	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.00	No Limit
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3371352)</b>									
ES2040542-001	BH1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES2040542-011	SW1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
<b>EP080: BTEXN (QC Lot: 3371352)</b>									
ES2040542-001	BH1	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	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		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
ES2040542-011	SW1	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

**Sub-Matrix: WATER**

		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EP080: BTEXN (QC Lot: 3371352) - continued</b>									
ES2040542-011	SW1	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
<b>EP231A: Perfluoroalkyl Sulfonic Acids (QC Lot: 3370527)</b>									
EP2012594-001	Anonymous	EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
<b>EP231B: Perfluoroalkyl Carboxylic Acids (QC Lot: 3370527)</b>									
EP2012594-001	Anonymous	EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	0.00	No Limit
<b>EP231C: Perfluoroalkyl Sulfonamides (QC Lot: 3370527)</b>									
EP2012594-001	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	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
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3370527)</b>									
EP2012594-001	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit

**Sub-Matrix: WATER**

		Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids (QC Lot: 3370527) - continued</b>									
EP2012594-001	Anonymous	EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	0.00	No Limit
<b>EP231P: PFAS Sums (QC Lot: 3370527)</b>									
EP2012594-001	Anonymous	EP231X: Sum of PFAS	----	0.01	µg/L	<0.01	<0.01	0.00	No Limit

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

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

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High	
<b>EA005P: pH by PC Titrator (QCLot: 3368819)</b>									
EA005-P: pH Value	---	---	pH Unit	---	---	4 pH Unit 7 pH Unit	100 100	98.0 98.0	102 102
<b>EA005P: pH by PC Titrator (QCLot: 3373559)</b>									
EA005-P: pH Value	---	---	pH Unit	---	---	4 pH Unit 7 pH Unit	100 100	98.0 98.0	102 102
<b>EA010P: Conductivity by PC Titrator (QCLot: 3368820)</b>									
EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	2100 µS/cm	109	95.0	113	
<b>EA010P: Conductivity by PC Titrator (QCLot: 3373558)</b>									
EA010-P: Electrical Conductivity @ 25°C	---	1	µS/cm	<1	2100 µS/cm	108	95.0	113	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3377778)</b>									
EA015H: Total Dissolved Solids @180°C	---	10	mg/L	<10 <10	2000 mg/L 293 mg/L	94.4 115	87.0 66.0	109 126	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3377779)</b>									
EA025H: Suspended Solids (SS)	---	5	mg/L	<5 <5	150 mg/L 1000 mg/L	96.7 95.4	83.0 82.0	129 110	
<b>ED037P: Alkalinity by PC Titrator (QCLot: 3368818)</b>									
ED037-P: Total Alkalinity as CaCO3	---	---	mg/L	---	200 mg/L 50 mg/L	105 126	81.0 70.0	111 130	
<b>ED037P: Alkalinity by PC Titrator (QCLot: 3373557)</b>									
ED037-P: Total Alkalinity as CaCO3	---	---	mg/L	---	200 mg/L 50 mg/L	97.7 122	81.0 70.0	111 130	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3368831)</b>									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1 <1	25 mg/L 500 mg/L	105 100	82.0 82.0	122 122	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3372348)</b>									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1 <1	25 mg/L 500 mg/L	103 97.4	82.0 82.0	122 122	
<b>ED045G: Chloride by Discrete Analyser (QCLot: 3368832)</b>									
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	50 mg/L 1000 mg/L	86.6 97.2	80.9 80.9	127 127	
<b>ED045G: Chloride by Discrete Analyser (QCLot: 3372349)</b>									
ED045G: Chloride	16887-00-6	1	mg/L	<1 <1	50 mg/L 1000 mg/L	100 106	80.9 80.9	127 127	

**Sub-Matrix: WATER**

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
<b>ED093F: Dissolved Major Cations (QCLot: 3375108)</b>								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.5	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	97.2	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.2	85.0	113
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 3375107)</b>								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.0	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	98.0	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	96.0	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.3	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	96.0	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.1	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.0	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.6	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.0	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	101	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	92.9	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.4	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	95.6	85.0	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.7	82.0	112
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 3376526)</b>								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	85.0	85.0	114
EG020A-F: Beryllium	7440-41-7	0.001	mg/L	<0.001	0.1 mg/L	104	85.0	115
EG020A-F: Barium	7440-39-3	0.001	mg/L	<0.001	0.1 mg/L	85.2	82.0	110
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	85.1	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	85.0	85.0	111
EG020A-F: Cobalt	7440-48-4	0.001	mg/L	<0.001	0.1 mg/L	82.9	82.0	112
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	83.2	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	87.8	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	83.3	82.0	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.3	82.0	112
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	89.8	85.0	115
EG020A-F: Vanadium	7440-62-2	0.01	mg/L	<0.01	0.1 mg/L	84.1	83.0	109
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	83.7	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	98.3	85.0	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	85.2	82.0	112
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 3375106)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	102	83.0	105

Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Result	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report		
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					LCS	Low	High	
<b>EG035F: Dissolved Mercury by FIMS (QCLot: 3376527)</b>								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	103	83.0	105
<b>EK040P: Fluoride by PC Titrator (QCLot: 3368817)</b>								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	101	82.0	116
<b>EK040P: Fluoride by PC Titrator (QCLot: 3373556)</b>								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	96.0	82.0	116
<b>EK055G: Ammonia as N by Discrete Analyser (QCLot: 3372870)</b>								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	99.9	90.0	114
<b>EK055G: Ammonia as N by Discrete Analyser (QCLot: 3372872)</b>								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	106	90.0	114
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 3372347)</b>								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	82.0	114
<b>EK057G: Nitrite as N by Discrete Analyser (QCLot: 3372351)</b>								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	82.0	114
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3372869)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	91.0	113
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3372871)</b>								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	91.0	113
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3372874)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	94.0	69.0	101
				<0.1	1 mg/L	93.9	70.0	118
				<0.1	5 mg/L	98.3	70.0	130
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3372876)</b>								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	93.6	69.0	101
				<0.1	1 mg/L	90.4	70.0	118
				<0.1	5 mg/L	98.9	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3372875)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.0	71.0	101
				<0.01	0.442 mg/L	96.2	72.0	108
				<0.01	1 mg/L	99.7	70.0	130
<b>EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3372877)</b>								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.9	71.0	101
				<0.01	0.442 mg/L	95.6	72.0	108
				<0.01	1 mg/L	102	70.0	130
<b>EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3372350)</b>								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	101	85.0	117
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 3369786)</b>								
EP071SG: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	56.3	55.8	112



**Sub-Matrix: WATER**

<b>Method: Compound</b>	<b>CAS Number</b>	<b>LOR</b>	<b>Unit</b>	<b>Result</b>	<b>Method Blank (MB) Report</b>	<b>Laboratory Control Spike (LCS) Report</b>		
					<b>Spike Concentration</b>	<b>Spike Recovery (%)</b>	<b>Recovery Limits (%)</b>	
					<b>LCS</b>	<b>Low</b>	<b>High</b>	
<b>EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3370527) - continued</b>								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	101	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	99.4	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	98.9	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	91.4	66.0	145
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	116	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	102	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	103	61.0	135
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3370527)</b>								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	102	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	120	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	118	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	101	71.4	144

**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**

<b>Laboratory sample ID</b>	<b>Sample ID</b>	<b>Method: Compound</b>	<b>CAS Number</b>	<b>Matrix Spike (MS) Report</b>			
				<b>Spike</b>	<b>Spike Recovery(%)</b>	<b>Recovery Limits (%)</b>	
				<b>Concentration</b>	<b>MS</b>	<b>Low</b>	<b>High</b>
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3368831)</b>							
ES2040741-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	102	70.0	130
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3372348)</b>							
ES2040001-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
<b>ED045G: Chloride by Discrete Analyser (QCLot: 3368832)</b>							
ES2040741-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	73.5	70.0	130
<b>ED045G: Chloride by Discrete Analyser (QCLot: 3372349)</b>							
ES2040001-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	# Not Determined	70.0	130
<b>EG020F: Dissolved Metals by ICP-MS (QCLot: 3375107)</b>							
ES2040542-002	BH2	EG020A-F: Arsenic	7440-38-2	1 mg/L	91.4	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	95.7	70.0	130

Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike	Spike Recovery(%)	Recovery Limits (%)	
EG020F: Dissolved Metals by ICP-MS (QCLot: 3375107) - continued				Concentration	MS	Low	High
ES2040542-002	BH2	EG020A-F: Barium	7440-39-3	1 mg/L	91.2	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	94.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	89.5	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	92.3	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	88.4	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	88.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.9	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	92.0	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	90.5	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.8	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3376526)							
ES2040543-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	83.1	70.0	130
		EG020A-F: Beryllium	7440-41-7	1 mg/L	101	70.0	130
		EG020A-F: Barium	7440-39-3	1 mg/L	85.2	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	87.1	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	86.8	70.0	130
		EG020A-F: Cobalt	7440-48-4	1 mg/L	84.4	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	85.0	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	89.2	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	86.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	82.9	70.0	130
		EG020A-F: Vanadium	7440-62-2	1 mg/L	85.5	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	86.9	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3375106)							
ES2040184-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	88.5	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3376527)							
ES2040542-016	QW38	EG035F: Mercury	7439-97-6	0.01 mg/L	102	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3368817)							
ES2040045-001	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	100	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3373556)							
ES2040542-009	BH12	EK040P: Fluoride	16984-48-8	5 mg/L	84.8	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3372870)							
ES2039789-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	91.3	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3372872)							
ES2040542-011	SW1	EK055G: Ammonia as N	7664-41-7	1 mg/L	85.3	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3372347)							

**Sub-Matrix: WATER**

				Matrix Spike (MS) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Spike	Spike Recovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3372347) - continued							
ES2040001-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	88.0	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3372351)							
ES2040542-010	MW239S	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	93.7	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3372869)							
ES2039789-001	Anonymous	EK059G: Nitrite + Nitrate as N	---	0.5 mg/L	96.6	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3372871)							
ES2040542-011	SW1	EK059G: Nitrite + Nitrate as N	---	0.5 mg/L	78.6	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3372874)							
ES2039789-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	---	5 mg/L	93.2	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3372876)							
ES2040542-011	SW1	EK061G: Total Kjeldahl Nitrogen as N	---	5 mg/L	96.0	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3372875)							
ES2039789-002	Anonymous	EK067G: Total Phosphorus as P	---	1 mg/L	91.1	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3372877)							
ES2040542-011	SW1	EK067G: Total Phosphorus as P	---	1 mg/L	96.1	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3372350)							
ES2040542-010	MW239S	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	84.9	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3371352)							
ES2040542-001	BH1	EP080: C6 - C9 Fraction	----	325 µg/L	103	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3371352)							
ES2040542-001	BH1	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	97.6	70.0	130
EP080: BTEXN (QCLot: 3371352)							
ES2040542-001	BH1	EP080: Benzene	71-43-2	25 µg/L	102	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	97.6	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	98.8	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	96.2	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	100	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	91.3	70.0	130
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3370527)							
EP2012594-002	Anonymous	EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.25 µg/L	99.2	72.0	130
		EP231X: Perfluoropentane sulfonic acid (PPPeS)	2706-91-4	0.25 µg/L	113	71.0	127
		EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.25 µg/L	103	68.0	131
		EP231X: Perfluoroheptane sulfonic acid (PFHps)	375-92-8	0.25 µg/L	100	69.0	134
		EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.25 µg/L	113	65.0	140

**Sub-Matrix: WATER**

				<b>Matrix Spike (MS) Report</b>			
<b>Laboratory sample ID</b>	<b>Sample ID</b>	<b>Method: Compound</b>	<b>CAS Number</b>	<b>Spike</b>	<b>Spike Recovery(%)</b>	<b>Recovery Limits (%)</b>	
				<b>Concentration</b>	<b>MS</b>	<b>Low</b>	<b>High</b>
<b>EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 3370527) - continued</b>							
EP2012594-002	Anonymous	EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.25 µg/L	98.2	53.0	142
<b>EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 3370527)</b>							
EP2012594-002	Anonymous	EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	1.25 µg/L	91.8	73.0	129
		EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.25 µg/L	110	72.0	129
		EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.25 µg/L	120	72.0	129
		EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.25 µg/L	116	72.0	130
		EP231X: Perfluoroctanoic acid (PFOA)	335-67-1	0.25 µg/L	118	71.0	133
		EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.25 µg/L	111	69.0	130
		EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.25 µg/L	112	71.0	129
		EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.25 µg/L	126	69.0	133
		EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.25 µg/L	111	72.0	134
		EP231X: Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.25 µg/L	114	65.0	144
		EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.625 µg/L	97.2	71.0	132
<b>EP231C: Perfluoroalkyl Sulfonamides (QCLot: 3370527)</b>							
EP2012594-002	Anonymous	EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.25 µg/L	105	67.0	137
		EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.625 µg/L	105	68.0	141
		EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.625 µg/L	105	62.6	147
		EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.625 µg/L	117	66.0	145
		EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.625 µg/L	125	57.6	145
		EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.25 µg/L	106	65.0	136
		EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.25 µg/L	110	61.0	135
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 3370527)</b>							
EP2012594-002	Anonymous	EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.25 µg/L	102	63.0	143
		EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.25 µg/L	117	64.0	140
		EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.25 µg/L	110	67.0	138
		EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.25 µg/L	81.2	71.4	144

## QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2040542	Page	: 1 of 16
Client	: KLEINFELDER AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: Tayla Hill	Telephone	: +6138549 9630
Project	: 20193820	Date Samples Received	: 16-Nov-2020
Site	: WSS-Cabbage Tree Rd water monitoring	Issue Date	: 25-Nov-2020
Sampler	: Tayla Hill	No. of samples received	: 18
Order number	: ----	No. of samples analysed	: 17

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
<b>Matrix Spike (MS) Recoveries</b>							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2040001--001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	ES2040001--001	Anonymous	Chloride	16887-00-6	Not Determined	---	MS recovery not determined, background level greater than or equal to 4x spike level.

### Outliers : Analysis Holding Time Compliance

Matrix: WATER

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
<b>EA005P: pH by PC Titrator</b>							
Clear Plastic Bottle - Natural	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	---	---	---	17-Nov-2020	16-Nov-2020
Clear Plastic Bottle - Natural	BH12,	QW34	---	---	---	19-Nov-2020	16-Nov-2020
<b>EK057G: Nitrite as N by Discrete Analyser</b>							
Clear Plastic Bottle - Natural	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	---	---	---	19-Nov-2020	18-Nov-2020
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>							
Clear Plastic Bottle - Natural	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	---	---	---	19-Nov-2020	18-Nov-2020

### Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
<b>Laboratory Duplicates (DUP)</b>					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	1	20	5.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>					
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

### Analysis Holding Time Compliance

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

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

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

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

Matrix: WATER

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

Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>EA005P: pH by PC Titrator</b>									
Clear Plastic Bottle - Natural (EA005-P)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	----	----	---	17-Nov-2020	16-Nov-2020	✗
Clear Plastic Bottle - Natural (EA005-P)	BH12,	QW34	16-Nov-2020	----	----	---	19-Nov-2020	16-Nov-2020	✗
<b>EA006: Sodium Adsorption Ratio (SAR)</b>									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	----	----	---	20-Nov-2020	14-Dec-2020	✓

Matrix: WATER			Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.						
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>EA010P: Conductivity by PC Titrator</b>									
Clear Plastic Bottle - Natural (EA010-P)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	---	---	---	17-Nov-2020	14-Dec-2020	✓
Clear Plastic Bottle - Natural (EA010-P)	BH12,	QW34	16-Nov-2020	---	---	---	19-Nov-2020	14-Dec-2020	✓
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Clear Plastic Bottle - Natural (EA015H)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	23-Nov-2020	23-Nov-2020	✓
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Clear Plastic Bottle - Natural (EA025H)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	23-Nov-2020	23-Nov-2020	✓
<b>EA065: Total Hardness as CaCO<sub>3</sub></b>									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	20-Nov-2020	14-Dec-2020	✓

Matrix: WATER			Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.						
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>ED037P: Alkalinity by PC Titrator</b>									
Clear Plastic Bottle - Natural (ED037-P)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	---	---	---	17-Nov-2020	30-Nov-2020	✓
Clear Plastic Bottle - Natural (ED037-P)	BH12,	QW34	16-Nov-2020	---	---	---	19-Nov-2020	30-Nov-2020	✓
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Clear Plastic Bottle - Natural (ED041G)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	---	---	---	17-Nov-2020	14-Dec-2020	✓
Clear Plastic Bottle - Natural (ED041G)	BH12,	QW34	16-Nov-2020	---	---	---	19-Nov-2020	14-Dec-2020	✓
<b>ED045G: Chloride by Discrete Analyser</b>									
Clear Plastic Bottle - Natural (ED045G)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	---	---	---	17-Nov-2020	14-Dec-2020	✓
Clear Plastic Bottle - Natural (ED045G)	BH12,	QW34	16-Nov-2020	---	---	---	19-Nov-2020	14-Dec-2020	✓
<b>ED093F: Dissolved Major Cations</b>									
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	20-Nov-2020	14-Dec-2020	✓

Matrix: WATER			Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.						
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	20-Nov-2020	15-May-2021	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)	QW38,	QW39	16-Nov-2020	---	---	---	21-Nov-2020	15-May-2021	✓
<b>EG035F: Dissolved Mercury by FIMS</b>									
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	---	---	---	23-Nov-2020	14-Dec-2020	✓
<b>EK040P: Fluoride by PC Titrator</b>									
Clear Plastic Bottle - Natural (EK040P)	BH1, BH4, BH7, BH9a, MW239S, SW3,	BH2, BH6, BH8, BH11, SW1, SW4	16-Nov-2020	---	---	---	17-Nov-2020	14-Dec-2020	✓
Clear Plastic Bottle - Natural (EK040P)	BH12,	QW34	16-Nov-2020	---	---	---	19-Nov-2020	14-Dec-2020	✓
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Clear Plastic Bottle - Sulfuric Acid (EK055G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	---	---	---	19-Nov-2020	14-Dec-2020	✓

Matrix: WATER			Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.				
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis	
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis
<b>EK057G: Nitrite as N by Discrete Analyser</b>							
Clear Plastic Bottle - Natural (EK057G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	----	----	---	19-Nov-2020 18-Nov-2020
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK059G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	----	----	---	19-Nov-2020 14-Dec-2020
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK061G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	19-Nov-2020 14-Dec-2020	✓	19-Nov-2020 14-Dec-2020	✓
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>							
Clear Plastic Bottle - Sulfuric Acid (EK067G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	19-Nov-2020 14-Dec-2020	✓	19-Nov-2020 14-Dec-2020	✓

Matrix: WATER									Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.					
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis								
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation						
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>														
Clear Plastic Bottle - Natural (EK071G)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34	16-Nov-2020	----	----	---	19-Nov-2020	18-Nov-2020	✗					
<b>EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup</b>														
Amber Glass Bottle - Unpreserved (EP071SG)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	19-Nov-2020	23-Nov-2020	✓	23-Nov-2020	29-Dec-2020	✓					
<b>EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup</b>														
Amber Glass Bottle - Unpreserved (EP071SG)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	19-Nov-2020	23-Nov-2020	✓	23-Nov-2020	29-Dec-2020	✓					
<b>EP080/071: Total Petroleum Hydrocarbons</b>														
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	21-Nov-2020	30-Nov-2020	✓	21-Nov-2020	30-Nov-2020	✓					

Matrix: WATER		Evaluation: ✗ = Holding time breach ; ✓ = Within holding time.						
Method	Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>								
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	21-Nov-2020	30-Nov-2020	✓	21-Nov-2020	30-Nov-2020
<b>EP080: BTEXN</b>								
Amber VOC Vial - Sulfuric Acid (EP080)	BH1, BH4, BH7, BH9a, BH12, SW1, SW4, QW38,	BH2, BH6, BH8, BH11, MW239S, SW3, QW34, QW39	16-Nov-2020	21-Nov-2020	30-Nov-2020	✓	21-Nov-2020	30-Nov-2020
<b>EP231A: Perfluoroalkyl Sulfonic Acids</b>								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, MW239S, SW3, QW34, QW38,	BH4, BH7, BH11, SW1, SW4, QW36, QW39	16-Nov-2020	19-Nov-2020	15-May-2021	✓	20-Nov-2020	15-May-2021
<b>EP231B: Perfluoroalkyl Carboxylic Acids</b>								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, MW239S, SW3, QW34, QW38,	BH4, BH7, BH11, SW1, SW4, QW36, QW39	16-Nov-2020	19-Nov-2020	15-May-2021	✓	20-Nov-2020	15-May-2021

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
<b>EP231C: Perfluoroalkyl Sulfonamides</b>								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, MW239S, SW3, QW34, QW38,	BH4, BH7, BH11, SW1, SW4, QW36, QW39	16-Nov-2020	19-Nov-2020	15-May-2021	✓	20-Nov-2020	15-May-2021
<b>EP231D: (n:2) Fluorotelomer Sulfonic Acids</b>								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, MW239S, SW3, QW34, QW38,	BH4, BH7, BH11, SW1, SW4, QW36, QW39	16-Nov-2020	19-Nov-2020	15-May-2021	✓	20-Nov-2020	15-May-2021
<b>EP231P: PFAS Sums</b>								
HDPE (no PTFE) (EP231X)	BH2, BH6, BH8, MW239S, SW3, QW34, QW38,	BH4, BH7, BH11, SW1, SW4, QW36, QW39	16-Nov-2020	19-Nov-2020	15-May-2021	✓	20-Nov-2020	15-May-2021

## Quality Control Parameter Frequency Compliance

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

Matrix: WATER

Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification
			QC	Regular	Actual	Expected	
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity by PC Titrator		ED037-P	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser		EK055G	4	31	12.90	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator		EA010-P	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	4	31	12.90	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	4	34	11.76	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	20	5.00	10.00	✗ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser		EK071G	2	20	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	4	40	10.00	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
Total Kjeldahl Nitrogen as N By Discrete Analyser		EK061G	4	34	11.76	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser		EK067G	4	38	10.53	10.00	✓ NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	16	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
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity by PC Titrator		ED037-P	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser		EK055G	2	31	6.45	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser		ED045G	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator		EA010-P	2	40	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS		EG035F	2	31	6.45	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A		EG020A-F	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator		EK040P	2	40	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved		ED093F	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser		EK059G	2	39	5.13	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser		EK057G	2	34	5.88	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS		EP231X	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator		EA005-P	4	39	10.26	10.00	✓ NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser		EK071G	1	20	5.00	5.00	✓ NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser		ED041G	4	40	10.00	10.00	✓ NEPM 2013 B3 & ALS QC Standard

Matrix: WATER Evaluation: ✗ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
<b>Laboratory Control Samples (LCS) - Continued</b>							
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
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	6	34	17.65	15.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	6	38	15.79	15.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	EP071SG	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
<b>Method Blanks (MB)</b>							
Ammonia as N by Discrete analyser	EK055G	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	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
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	EP071SG	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
<b>Matrix Spikes (MS)</b>							
Ammonia as N by Discrete analyser	EK055G	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	31	6.45	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: WATER      Evaluation: ✘ = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Analytical Methods	Method	Count		Rate (%)		Quality Control Specification	
			QC	Regular	Actual	Expected		
<b>Matrix Spikes (MS) - Continued</b>								
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup		EP071SG	0	16	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 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 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 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 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 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) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM 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 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 seal method 2 017-1-L
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 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 Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM 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.

<b>Analytical Methods</b>	<b>Method</b>	<b>Matrix</b>	<b>Method Descriptions</b>
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl <sub>2</sub> )(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 <sub>2</sub> which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM 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 Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO <sub>2</sub> +NO <sub>3</sub> ) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO <sub>4</sub> DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
TRH - Total Recoverable Hydrocarbons - Silica Gel Cleanup	EP071SG	WATER	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM Schedule B(3).
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 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 Schedule B(3)

Analytical Methods			
	Method	Matrix	Method Descriptions
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Preparation Methods			
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 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 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 purging.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.

Client:		Site, COC and Contact Data:	
Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200		Sampler Name: Tayla Hill Contact Number: 403646501 Contact e-mail: thi@kleinfelder.com	
Date / Time:  16.11.20 Temp. (°C) 30 Notes: ice present / no ice seals intact / no seal		Date / Time:  17.11.20 Temp. (°C) 27.3°C Notes: ice present / no ice seals intact / no seal	
Date QA level: LAB minimum unless specified:		P/M e-mail: toverton@kleinfelder.com & dkousbroek@kleinfelder.com	
Chain of Custody:		Received by (print): K. Patterson (sign)	
Relinquished by (print): Tayla Hill (sign)		Received by: H.J. (sign)	
Date / Time:  16.11.20 Temp. (°C) 30 Notes: ice present / no ice seals intact / no seal		Date / Time:  17.11.20 Temp. (°C) 27.3°C Notes: ice present / no ice seals intact / no seal	
Notes:		P/M e-mail: dkousbroek@kleinfelder.com & toverton@kleinfelder.com	

Laboratory:  
ALS  
5/585 Mainland Rd  
Mayfield West,  
Newcastle NSW 2304  
Phone: (02) 4014 2500

Send Results to:  
toverton@kleinfelder.com & dkousbroek@kleinfelder.com

95 Mitchell Road  
Cardiff, NSW 2285  
**LAB OF ORIGIN:**  
**NEWCASTLE**

newcastle@kleinfelder.com

Phone: 02 4949 5200

Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Organic Analytes		Metals	Other Analyses	Comments
									W-05 SG TRH/BTEX	metre(s) bottle			
1 BH1				16/11/2020				X	X				
2 BH2				16/11/2020				X	X				
3 BH4				16/11/2020				X	X				
4 BH6				16/11/2020				X	X				
5 BH7				16/11/2020				X	X				
6 BH8				16/11/2020				X	X				
7 BH9				16/11/2020				X	X				
8 BH10				16/11/2020				X	X				
9 BH12				16/11/2020				X	X				
10 MM239S				16/11/2020				X	X				
11 SW1				16/11/2020				X	X				
12 SW3				16/11/2020				X	X				
13 SW4				16/11/2020				X	X				
14 SW34				16/11/2020				X	X				
15 QW35				16/11/2020				X	X				
QW36				16/11/2020				X	X				
QW37				16/11/2020									
QW38				16/11/2020				X	X				
QW39				16/11/2020				X	X				

Environmental Division  
Sydney  
Work Order Reference  
**ES2040542**

Telephone: +61 2 8784 8655

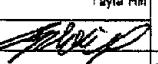
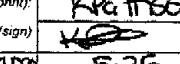
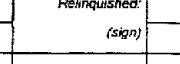
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**Send to Eurofins**

W-05 SG - TRIBUTYNE & Metals Silica Gel Clean Up													
Additional metals analysis to make up NEPM 15													

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

16.11.20

Client: Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200			SITE, COC AND CONTACT DATA										Laboratory: ALS 5/585 Maitland Rd Mayfield West, Newcastle NSW 2304 Phone: (02) 4014 2500					
			Site Name:	WSS - Cabbage Tree Rd water monitoring			Sampler Name:	Tayla Hill										
			QUOTE NUMBER	ME/114/19			Contact Number:	408646501										
			Job No.:	20193820			Contact e-mail:	thill@kleinfelder.com										
			Required TAT:	24 hrs	48 hrs	3 days	5 days	7 days	PM name (if not sampler)	Tom Overton & Dan Kousbroek								
Data QA level:	LAB minimum unless specified.			PM e-mail:	toverton@kleinfelder.com & dkousbroek@kleinfelder.com													
CHAIN OF CUSTODY																		
Relinquished by (print): (sign) 			Tayla Hill	Received by (print): (sign) 	Relinquished: (sign) 	Received by: (sign)	Send Results to: dkousbroek@kleinfelder.com & toverton@kleinfelder.com 95 Mitchell Road Cardiff, NSW 2285 newcastle@kleinfelder.com Phone: 02 4949 5200											
Date / Time:			Date / Time: 16/11/2020	5:35pm	Date / Time:	Date / Time:												
Notes:			Temp. (°C) 3.0		Temp. (°C)													
Notes: ice			ice present / no ice		ice present / no ice													
			seals intact / no seal		seals intact / no seal													
1	BH1	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Organic Analytes			Metals		Other Analytes			Comments
										Was SG TRIBBLE	Was SG BOTTLE	Was SG BOTTLE	W03 Metals NEPM 15	Iron (dissolved)	NH4+ - 24 hr Ganephate Water Suite	TDS	TSS	
2	BH2				16/11/2020				X	X	X	X	X	X	X			
3	BH4				16/11/2020				X	X	X	X	X	X	X			
4	BH6				16/11/2020				X	X	X	X	X	X	X			
5	BH7				16/11/2020				X	X	X	X	X	X	X			
6	BH8				16/11/2020				X	X	X	X	X	X	X			
7	BH9a				16/11/2020				X	X	X	X	X	X	X			
8	BH11				16/11/2020				X	X	X	X	X	X	X			
9	BH12				16/11/2020				X	X	X	X	X	X	X			
10	MW239S				16/11/2020				X	X	X	X	X	X	X			
11	SW1				16/11/2020				X	X	X	X	X	X	X			
12	SW3				16/11/2020				X	X	X	X	X	X	X			
13	SW4				16/11/2020				X	X	X	X	X	X	X			
14	QW34				16/11/2020				X	X	X	X	X	X	X			
15	QW35				16/11/2020				X	X	X	X	X	X	X	Send to Eurofins		
16	QW36				16/11/2020											X		
17	QW37				16/11/2020											X		
18	QW38				16/11/2020				X	X	X	X	X	X	X			
19	QW39				16/11/2020				X	X	X	X	X	X	X			

W-05 SG - TRH/BTEXN/ 8 Metals Silica Gel Clean Up

Additional metals analysis to make up NEPM 15

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

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

Additionally Iron (Fe) to analysed

10am 16/11/2020

Environmental Division  
 Sydney  
 Work Order Reference  
**ES2040542**



Telephone : +61 2 8784 6555

18 BH5

on hold - hold BH5

Client: Kleinfelder Australia Pty Ltd 95 Mitchell Road Cardiff, NSW 2285 Phone: 02 4949 5200	SITE, COC AND CONTACT DATA										Laboratory: ALS 5/585 Maitland Rd Mayfield West, Newcastle NSW 2304 Phone: (02) 4014 2500						
	Site Name:	WSS - Cabbage Tree Rd water monitoring			Sampler Name:	Tayla Hill											
	QUOTE NUMBER	ME/114/19			Contact Number:	408646501											
	Job No.:	20193820			Contact e-mail:	thill@kleinfelder.com											
	Required TAT:	24 hrs	48 hrs	3 days	5 days	7 days	PM name (if not sampler):	Tom Overton & Dan Kousbroek									
	Data QA level:	LAB minimum unless specified			PM e-mail:	toverton@kleinfelder.com & dkousbroek@kleinfelder.com											
CHAIN OF CUSTODY																	
Relinquished by (print): (sign)	Tayla Hill	Received by (print): (sign)	K. Patterson	Relinquished: (sign)	Received by: (sign)	Send Results to: dkousbroek@kleinfelder.com & toverton@kleinfelder.com											
Date / Time:  Notes:	16/11/2020	Date / Time: 5:35pm		Date / Time: 	Date / Time: 	95 Mitchell Road Cardiff, NSW 2285											
	Temp. (°C) 30	Temp. (°C)				newcastle@kleinfelder.com Phone: 02 4949 5200											
	Notes: ice	ice present / no ice seals intact / no seal		Notes:	Notes:	ice present / no ice seals intact / no seal											
Sample ID	Lab ID	Sample Point	Sample Type	Date	Start Depth	End Depth	Units	# Containers	Organic Analytes			Metals		Other Analytes			Comments
									W-05 SG TRH/BTEXN/ 8 Metals Silica Gel Clean Up	NH4+-General Water Suite	Iron (dissolved)	Ni (ppm) NH4+-General Water Suite	TDS	TSS	EP231X PIFAS (28 analyses, standard level)		
BH1				16/11/2020				X	X	X	X	X	X	X			
BH2				16/11/2020				X	X	X	X	X	X	X			
BH4				16/11/2020				X	X	X	X	X	X	X			
BH6				16/11/2020				X	X	X	X	X	X	X			
BH7				16/11/2020				X	X	X	X	X	X	X			
BH8				16/11/2020				X	X	X	X	X	X	X			
BH9a				16/11/2020				X	X	X	X	X	X	X			
BH11				16/11/2020				X	X	X	X	X	X	X			
BH12				16/11/2020				X	X								
MW239S				16/11/2020				X	X	X	X	X	X	X			
SW1				16/11/2020				X	X	X	X	X	X	X			
SW3				16/11/2020				X	X	X	X	X	X	X			
SW4				16/11/2020				X	X	X	X	X	X	X			
QW34				16/11/2020				X	X	X	X	X	X	X			
QW35				16/11/2020				X	X	X	X	X	X	X	Send to Eurofins		
QW36				16/11/2020											X		
QW37				16/11/2020											X		
QW38				16/11/2020				X	X	X	X	X	X	X			
QW39				16/11/2020				X	X	X	X	X	X	X			

W-05 SG - TRH/BTEXN/ 8 Metals Silica Gel Clean Up  
Additional metals analysis to make up NEPM 15

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

Additionally Iron (Fe) to analaysed

Telephone: +61 2 8784 8555

Environmental Division Sydney  
Work Order Reference  
**ES2040542**



Comments

BH5

16/11/2020

Revd Eurofins #758129

10-5

18/11/2020

**Australia**

Melbourne	Sydney	Brisbane	Perth	Newcastle
6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448

**New Zealand**

Auckland	Christchurch
35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290

## Sample Receipt Advice

<b>Company name:</b>	Kleinfelder Aust Pty Ltd (NEWCASTLE)
<b>Contact name:</b>	Tom Overton
<b>Project name:</b>	WSS - CABBAGE TREE RD WATER MONITORING
<b>Project ID:</b>	20193820
<b>Turnaround time:</b>	5 Day
<b>Date/Time received</b>	Nov 18, 2020 5:20 PM
<b>Eurofins reference</b>	758129

## Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✗ All samples have been received as described on the above COC.
- ✗ COC has been completed correctly.
- ✗ Attempt to chill was evident.
- ✗ Appropriately preserved sample containers have been used.
- ✗ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✗ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

## Notes

## Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

**Andrew Black on phone : (+61) 2 9900 8490 or by email: [AndrewBlack@eurofins.com](mailto:AndrewBlack@eurofins.com)**

Results will be delivered electronically via email to Tom Overton - [toverton@kleinfelder.com](mailto:toverton@kleinfelder.com).

*Note: A copy of these results will also be delivered to the general Kleinfelder Aust Pty Ltd (NEWCASTLE) email address.*

**Australia**

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	<b>Sydney</b> Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	<b>Perth</b> 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	<b>Newcastle</b> 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448
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**New Zealand**

<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
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**Company Name:** Kleinfelder Aust Pty Ltd (NEWCASTLE)**Address:**  
95 Mitchell Rd  
Cardiff  
NSW 2285**Project Name:** WSS - CABBAGE TREE RD WATER MONITORING  
**Project ID:** 20193820**Order No.:**

758129

**Report #:** 02 4949 5200  
**Phone:**  
**Fax:****Received:**

Nov 18, 2020 2:25 PM

**Due:** Nov 25, 2020

5 Day

**Priority:** Tom Overton**Contact Name:****Eurofins Analytical Services Manager :** Andrew Black**Sample Detail**

Melbourne Laboratory - NATA Site # 1254 &amp; 14271

X X X X X X X X X X X X

Sydney Laboratory - NATA Site # 18217

X X X X X X X X X X X X

Brisbane Laboratory - NATA Site # 20794

X

Perth Laboratory - NATA Site # 23736

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Mayfield Laboratory

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External Laboratory

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## Environment Testing

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



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 18217**

Accredited for compliance with ISO/IEC 17025 – Testing  
 The results of the tests, calibrations and/or  
 measurements included in this document are traceable  
 to Australian/national standards.

**Attention:** Tom Overton

**Report** 758129-W  
**Project name** WSS - CABBAGE TREE RD WATER MONITORING  
**Project ID** 20193820  
**Received Date** Nov 18, 2020

Client Sample ID			QW35	QW37
Sample Matrix			Water	Water
Eurofins Sample No.			S20-No34956	S20-No34957
Date Sampled			Nov 16, 2020	Nov 16, 2020
Test/Reference	LOR	Unit		
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				
Naphthalene <sup>N02</sup>	0.01	mg/L	< 0.01	-
<b>BTEX</b>				
Benzene	0.001	mg/L	< 0.001	-
Toluene	0.001	mg/L	< 0.001	-
Ethylbenzene	0.001	mg/L	< 0.001	-
m&p-Xylenes	0.002	mg/L	< 0.002	-
o-Xylene	0.001	mg/L	< 0.001	-
Xylenes - Total*	0.003	mg/L	< 0.003	-
4-Bromofluorobenzene (surr.)	1	%	93	-
<b>TRH - 2013 NEPM Fractions (after silica gel clean-up)</b>				
TRH >C10-C16 (after silica gel clean-up)	0.05	mg/L	< 0.05	-
TRH >C16-C34 (after silica gel clean-up)	0.1	mg/L	< 0.1	-
TRH >C34-C40 (after silica gel clean-up)	0.1	mg/L	< 0.1	-
<b>TRH - 1999 NEPM Fractions (after silica gel clean-up)</b>				
TRH C10-C36 (Total) (after silica gel clean-up)	0.1	mg/L	< 0.1	-
TRH C10-C14 (after silica gel clean-up)	0.05	mg/L	< 0.05	-
TRH C15-C28 (after silica gel clean-up)	0.1	mg/L	< 0.1	-
TRH C29-C36 (after silica gel clean-up)	0.1	mg/L	< 0.1	-
Ammonia (as N)	0.01	mg/L	0.02	-
Chloride	1	mg/L	93	-
Chromium (hexavalent)	0.005	mg/L	< 0.005	-
Chromium (trivalent filtered)	0.005	mg/L	< 0.005	-
Conductivity (at 25°C)	10	uS/cm	350	-
Fluoride (Total)	0.5	mg/L	< 0.5	-
Nitrate & Nitrite (as N)	0.05	mg/L	< 0.05	-
Nitrate (as N)	0.02	mg/L	< 0.02	-
Nitrite (as N)	0.02	mg/L	< 0.02	-
pH (at 25 °C)	0.1	pH Units	4.0	-
Phosphate total (as P)	0.01	mg/L	0.02	-
Phosphorus reactive (as P)	0.01	mg/L	0.04	-
Sulphate (as SO <sub>4</sub> )	5	mg/L	53	-
Total Dissolved Solids Dried at 180°C ± 2°C	10	mg/L	210	-
Total Kjeldahl Nitrogen (as N)	0.2	mg/L	0.9	-
Total Nitrogen (as N)*	0.2	mg/L	0.9	-

Client Sample ID			QW35 Water S20-No34956	QW37 Water S20-No34957
Sample Matrix				
Eurofins Sample No.				
Date Sampled				
Test/Reference	LOR	Unit		
Total Suspended Solids Dried at 103–105°C	1	mg/L	3.0	-
Hardness mg equivalent CaCO <sub>3</sub> /L	5	mg/L	280	-
<b>Alkalinity (speciated)</b>				
Bicarbonate Alkalinity (as CaCO <sub>3</sub> )	20	mg/L	< 20	-
Carbonate Alkalinity (as CaCO <sub>3</sub> )	10	mg/L	< 10	-
Hydroxide Alkalinity (as CaCO <sub>3</sub> )	20	mg/L	< 20	-
Total Alkalinity (as CaCO <sub>3</sub> )	20	mg/L	< 20	-
<b>Heavy Metals</b>				
Arsenic (filtered)	0.001	mg/L	< 0.001	-
Barium (filtered)	0.02	mg/L	0.03	-
Beryllium (filtered)	0.001	mg/L	< 0.001	-
Boron (filtered)	0.05	mg/L	< 0.05	-
Cadmium (filtered)	0.0002	mg/L	< 0.0002	-
Chromium (filtered)	0.001	mg/L	< 0.001	-
Cobalt (filtered)	0.001	mg/L	0.004	-
Copper (filtered)	0.001	mg/L	< 0.001	-
Iron (filtered)	0.05	mg/L	2.2	-
Lead (filtered)	0.001	mg/L	< 0.001	-
Manganese (filtered)	0.005	mg/L	0.074	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	-
Nickel (filtered)	0.001	mg/L	0.005	-
Vanadium (filtered)	0.005	mg/L	< 0.005	-
Zinc (filtered)	0.005	mg/L	0.015	-
<b>Alkali Metals</b>				
Calcium	0.5	mg/L	97	-
Magnesium	0.5	mg/L	8.0	-
Potassium	0.5	mg/L	5.2	-
Sodium	0.5	mg/L	49	-
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>				
Perfluorobutanoic acid (PFBA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
Perfluoropentanoic acid (PFPeA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorohexanoic acid (PFHxA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluoroheptanoic acid (PFHpA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorooctanoic acid (PFOA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorononanoic acid (PFNA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorodecanoic acid (PFDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluoroundecanoic acid (PFUnDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorododecanoic acid (PFDoDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorotridecanoic acid (PFTrDA) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorotetradecanoic acid (PFTeDA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
13C4-PFBA (surr.)	1	%	128	154
13C5-PFPeA (surr.)	1	%	147	191
13C5-PFHxA (surr.)	1	%	137	142
13C4-PFHpA (surr.)	1	%	137	154
13C8-PFOA (surr.)	1	%	134	152
13C5-PFNA (surr.)	1	%	157	157
13C6-PFDA (surr.)	1	%	130	128
13C2-PFUnDA (surr.)	1	%	116	111
13C2-PFDoDA (surr.)	1	%	101	91
13C2-PFTeDA (surr.)	1	%	79	79

Client Sample ID			QW35 Water S20-No34956	QW37 Water S20-No34957
Sample Matrix				
Eurofins Sample No.				
Date Sampled				
Test/Reference	LOR	Unit		
<b>Perfluoroalkyl sulfonamido substances</b>				
Perfluorooctane sulfonamide (FOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
13C8-FOSA (surr.)	1	%	92	99
D3-N-MeFOSA (surr.)	1	%	100	107
D5-N-EtFOSA (surr.)	1	%	104	110
D7-N-MeFOSE (surr.)	1	%	172	174
D9-N-EtFOSE (surr.)	1	%	164	168
D5-N-EtFOSAA (surr.)	1	%	63	79
D3-N-MeFOSAA (surr.)	1	%	47	58
<b>Perfluoroalkyl sulfonic acids (PFASs)</b>				
Perfluorobutanesulfonic acid (PFBS) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorononanesulfonic acid (PFNS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluoropropanesulfonic acid (PFPrS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluoropentanesulfonic acid (PFPeS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorohexamersulfonic acid (PFHxS) <sup>N11</sup>	0.01	ug/L	N <sup>09</sup> 0.01	< 0.01
Perfluoroheptanesulfonic acid (PFHpS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
Perfluorooctanesulfonic acid (PFOS) <sup>N11</sup>	0.01	ug/L	N <sup>09</sup> 0.01	< 0.01
Perfluorodecanesulfonic acid (PFDS) <sup>N15</sup>	0.01	ug/L	< 0.01	< 0.01
13C3-PFBS (surr.)	1	%	77	75
18O2-PFHxS (surr.)	1	%	131	129
13C8-PFOS (surr.)	1	%	129	120
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTASs)</b>				
1H.1H.2H.2H-perfluorohexamersulfonic acid (4:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA) <sup>N11</sup>	0.05	ug/L	< 0.05	< 0.05
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA) <sup>N11</sup>	0.01	ug/L	< 0.01	< 0.01
13C2-4:2 FTSA (surr.)	1	%	165	170
13C2-6:2 FTSA (surr.)	1	%	INT	145
13C2-8:2 FTSA (surr.)	1	%	129	101
13C2-10:2 FTSA (surr.)	1	%	70	63
<b>PFASs Summations</b>				
Sum (PFHxS + PFOS)*	0.01	ug/L	0.02	< 0.01
Sum of US EPA PFAS (PFOS + PFOA)*	0.01	ug/L	0.01	< 0.01
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	0.01	ug/L	0.02	< 0.01
Sum of WA DWER PFAS (n=10)*	0.05	ug/L	< 0.05	< 0.05
Sum of PFASs (n=30)*	0.1	ug/L	< 0.1	< 0.1

## Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.  
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B1SG: TRH (With Silica Gel Clean up), BTEXN			
BTEX	Melbourne	Nov 24, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Melbourne	Nov 24, 2020	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Melbourne	Nov 24, 2020	7 Days
- Method: TRH C6-C36 (Silica Gel Cleanup) - MGT 100A			
Eurofins Suite B19E: Total N, TKN, NOx, NO2, NO3, NH3, Total P, Reactive P			
Ammonia (as N)	Melbourne	Nov 24, 2020	28 Days
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Nitrate & Nitrite (as N)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrate (as N)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Nitrite (as N)	Melbourne	Nov 24, 2020	2 Days
- Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA			
Phosphate total (as P)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4040 Phosphate by CFA			
Phosphorus reactive (as P)	Melbourne	Nov 24, 2020	2 Days
- Method: APHA 4500-P			
Total Kjeldahl Nitrogen (as N)	Melbourne	Nov 24, 2020	7 Days
- Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA			
Eurofins Suite B11E: Cl/SO4/Alkalinity			
Chloride	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Sulphate (as SO4)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4110 Sulfate by Discrete Analyser			
Alkalinity (speciated)	Melbourne	Nov 24, 2020	14 Days
- Method: LTM-INO-4250 Alkalinity by Electrometric Titration			
Chromium (hexavalent)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4100 Hexavalent Chromium in water			
Heavy Metals (filtered)	Melbourne	Nov 24, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Conductivity (at 25°C)	Melbourne	Nov 24, 2020	28 Days
- Method: LTM-INO-4030 Conductivity			
Fluoride (Total)	Melbourne	Nov 24, 2020	28 Days
- Method: APHA 4500 F-C Fluoride by Ion Selective Electrode			
pH (at 25 °C)	Melbourne	Nov 24, 2020	0 Hours
- Method: LTM-GEN-7090 pH in water by ISE			
Total Suspended Solids Dried at 103–105°C	Melbourne	Nov 23, 2020	7 Days
- Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry			
Total Dissolved Solids Dried at 180°C ± 2°C	Melbourne	Nov 21, 2020	7 Days
- Method: LTM-INO-4170 Total Dissolved Solids in Water			
Eurofins Suite B11D: Na/K/Ca/Mg and Hardness			
Hardness mg equivalent CaCO3/L	Melbourne	Nov 24, 2020	28 Days
- Method: APHA 2340B Hardness by Calculation			
Alkali Metals	Melbourne	Nov 24, 2020	180 Days
- Method: LTM-MET-3010 Alkali Metals Sulfur Silicon Phosphorus by ICP-AES			

Description	Testing Site	Extracted	Holding Time
Per- and Polyfluoroalkyl Substances (PFASs)			
Perfluoroalkyl carboxylic acids (PFCAs)	Brisbane	Nov 23, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonamido substances	Brisbane	Nov 23, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
Perfluoroalkyl sulfonic acids (PFSAs)	Brisbane	Nov 23, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			
n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)	Brisbane	Nov 23, 2020	14 Days
- Method: LTM-ORG-2100 Per- and Polyfluoroalkyl Substances (PFAS)			

**Australia**

<b>Melbourne</b> 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271	<b>Sydney</b> Unit F3, Building F 16 Mars Road Lane Cove West NSW 2066 Phone : +61 2 9900 8400 NATA # 1261 Site # 18217	<b>Brisbane</b> 1/21 Smallwood Place Murarrie QLD 4172 Phone : +61 7 3902 4600 NATA # 1261 Site # 20794	<b>Perth</b> 2/91 Leach Highway Kewdale WA 6105 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736	<b>Newcastle</b> 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Phone : +61 2 4968 8448
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<b>Auckland</b> 35 O'Rorke Road Penrose, Auckland 1061 Phone : +64 9 526 45 51 IANZ # 1327	<b>Christchurch</b> 43 Detroit Drive Rolleston, Christchurch 7675 Phone : 0800 856 450 IANZ # 1290
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**Company Name:** Kleinfelder Aust Pty Ltd (NEWCASTLE)**Address:**  
95 Mitchell Rd  
Cardiff  
NSW 2285**Project Name:** WSS - CABBAGE TREE RD WATER MONITORING  
**Project ID:** 20193820**Order No.:**

758129

**Report #:**

02 4949 5200

**Phone:****Fax:****Received:**

Nov 18, 2020 2:25 PM

**Due:**

Nov 25, 2020

**Priority:**

5 Day

**Contact Name:**

Tom Overton

**Eurofins Analytical Services Manager :** Andrew Black**Sample Detail****Melbourne Laboratory - NATA Site # 1254 & 14271**

X X X X X X X X X X X X

**Sydney Laboratory - NATA Site # 18217**

X X X X X X X X X X X X

**Brisbane Laboratory - NATA Site # 20794**

X

**Perth Laboratory - NATA Site # 23736**

X X X X X X X X X X X X

**Mayfield Laboratory**

X X X X X X X X X X X X

**External Laboratory**

X X X X X X X X X X X X

**No Sample ID Sample Date Sampling Time Matrix LAB ID**

1 QW35 Nov 16, 2020 Water S20-No34956 X X X X X X X X X X X X

2 QW37 Nov 16, 2020 Water S20-No34957 X X X X X X X X X X X X

**Test Counts**

1 1 1 1 1 1 1 1 1 1 1 2 1

## Internal Quality Control Review and Glossary

### General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

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

**\*\*NOTE:** pH duplicates are reported as a range NOT as RPD

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**ug/L:** micrograms per litre

**ppm:** Parts per million

**ppb:** Parts per billion

**%:** Percentage

**org/100mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

### Terms

<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>LOR</b>	Limit of Reporting.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>CRM</b>	Certified Reference Material - reported as percent recovery.
<b>Method Blank</b>	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>USEPA</b>	United States Environmental Protection Agency
<b>APHA</b>	American Public Health Association
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>COC</b>	Chain of Custody
<b>SRA</b>	Sample Receipt Advice
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.3
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>NCP</b>	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
<b>TEQ</b>	Toxic Equivalency Quotient

### QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

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

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

### QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

## Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Method Blank</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	mg/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>BTEX</b>							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
<b>Method Blank</b>							
<b>TRH - 2013 NEPM Fractions (after silica gel clean-up)</b>							
TRH >C10-C16 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
<b>TRH - 1999 NEPM Fractions (after silica gel clean-up)</b>							
TRH C10-C14 (after silica gel clean-up)	mg/L	< 0.05			0.05	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/L	< 0.1			0.1	Pass	
<b>Method Blank</b>							
Ammonia (as N)	mg/L	< 0.01			0.01	Pass	
Chloride	mg/L	< 1			1	Pass	
Chromium (hexavalent)	mg/L	< 0.005			0.005	Pass	
Conductivity (at 25°C)	uS/cm	< 10			10	Pass	
Fluoride (Total)	mg/L	< 0.5			0.5	Pass	
Nitrate & Nitrite (as N)	mg/L	< 0.05			0.05	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Nitrite (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (as P)	mg/L	< 0.01			0.01	Pass	
Phosphorus reactive (as P)	mg/L	< 0.01			0.01	Pass	
Sulphate (as SO4)	mg/L	< 5			5	Pass	
Total Dissolved Solids Dried at 180°C ± 2°C	mg/L	< 10			10	Pass	
Total Kjeldahl Nitrogen (as N)	mg/L	< 0.2			0.2	Pass	
Total Suspended Solids Dried at 103–105°C	mg/L	< 1			1	Pass	
<b>Method Blank</b>							
<b>Heavy Metals</b>							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Barium (filtered)	mg/L	< 0.02			0.02	Pass	
Beryllium (filtered)	mg/L	< 0.001			0.001	Pass	
Boron (filtered)	mg/L	< 0.05			0.05	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Vanadium (filtered)	mg/L	< 0.005			0.005	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
<b>Method Blank</b>							
<b>Alkali Metals</b>							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
<b>Method Blank</b>							
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>							
Perfluorobutanoic acid (PFBA)	ug/L	< 0.05			0.05	Pass	
Perfluoropentanoic acid (PFPeA)	ug/L	< 0.01			0.01	Pass	
Perfluorohexanoic acid (PFHxA)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanoic acid (PFHpA)	ug/L	< 0.01			0.01	Pass	
Perfluoroctanoic acid (PFOA)	ug/L	< 0.01			0.01	Pass	
Perfluorononanoic acid (PFNA)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanoic acid (PFDA)	ug/L	< 0.01			0.01	Pass	
Perfluoroundecanoic acid (PFUnDA)	ug/L	< 0.01			0.01	Pass	
Perfluorododecanoic acid (PFDoDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotridecanoic acid (PFTrDA)	ug/L	< 0.01			0.01	Pass	
Perfluorotetradecanoic acid (PFTeDA)	ug/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>Perfluoroalkyl sulfonamido substances</b>							
Perfluoroctane sulfonamide (FOSA)	ug/L	< 0.05			0.05	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	ug/L	< 0.05			0.05	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	ug/L	< 0.05			0.05	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	ug/L	< 0.05			0.05	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	ug/L	< 0.05			0.05	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ug/L	< 0.05			0.05	Pass	
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	ug/L	< 0.05			0.05	Pass	
<b>Method Blank</b>							
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>							
Perfluorobutanesulfonic acid (PFBS)	ug/L	< 0.01			0.01	Pass	
Perfluoronananesulfonic acid (PFNS)	ug/L	< 0.01			0.01	Pass	
Perfluoropropanesulfonic acid (PFPoS)	ug/L	< 0.01			0.01	Pass	
Perfluoropentanesulfonic acid (PFPeS)	ug/L	< 0.01			0.01	Pass	
Perfluorohexameresulfonic acid (PFHxS)	ug/L	< 0.01			0.01	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	ug/L	< 0.01			0.01	Pass	
Perfluoroctanesulfonic acid (PFOS)	ug/L	< 0.01			0.01	Pass	
Perfluorodecanesulfonic acid (PFDS)	ug/L	< 0.01			0.01	Pass	
<b>Method Blank</b>							
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>							
1H.1H.2H.2H-perfluorohexameresulfonic acid (4:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	ug/L	< 0.05			0.05	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	ug/L	< 0.01			0.01	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	ug/L	< 0.01			0.01	Pass	
<b>LCS - % Recovery</b>							
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>							
Naphthalene	%	98			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>BTEX</b>							
Benzene	%	103			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	91			70-130	Pass	
m&p-Xylenes	%	91			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Xylenes - Total*	%	89			70-130	Pass	
<b>LCS - % Recovery</b>							
Ammonia (as N)	%	101			70-130	Pass	
Chloride	%	107			70-130	Pass	
Chromium (hexavalent)	%	123			70-130	Pass	
Conductivity (at 25°C)	%	102			70-130	Pass	
Fluoride (Total)	%	101			70-130	Pass	
Nitrate & Nitrite (as N)	%	99			70-130	Pass	
Nitrate (as N)	%	99			70-130	Pass	
Nitrite (as N)	%	104			70-130	Pass	
Phosphate total (as P)	%	103			70-130	Pass	
Phosphorus reactive (as P)	%	84			70-130	Pass	
Sulphate (as SO4)	%	109			70-130	Pass	
Total Dissolved Solids Dried at 180°C ± 2°C	%	104			70-130	Pass	
Total Kjeldahl Nitrogen (as N)	%	86			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Alkalinity (speciated)</b>							
Carbonate Alkalinity (as CaCO3)	%	83			70-130	Pass	
Total Alkalinity (as CaCO3)	%	89			70-130	Pass	
<b>LCS - % Recovery</b>							
<b>Alkali Metals</b>							
Calcium	%	102			80-120	Pass	
Magnesium	%	97			80-120	Pass	
Potassium	%	98			80-120	Pass	
Sodium	%	113			80-120	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>							
Perfluorobutanoic acid (PFBA)	%	123			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	%	118			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	%	118			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	%	139			50-150	Pass	
Perfluorooctanoic acid (PFOA)	%	101			50-150	Pass	
Perfluorononanoic acid (PFNA)	%	134			50-150	Pass	
Perfluorodecanoic acid (PFDA)	%	135			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	%	132			50-150	Pass	
Perfluorododecanoic acid (PFDDoDA)	%	139			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	%	143			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	%	124			50-150	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl sulfonamido substances</b>							
Perfluorooctane sulfonamide (FOSA)	%	136			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	%	119			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	%	136			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	%	138			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	%	108			50-150	Pass	
N-ethyl-perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	%	121			50-150	Pass	
N-methyl-perfluorooctanesulfonamidoacetic acid (N-MeFOSAA)	%	134			50-150	Pass	
<b>LCS - % Recovery</b>							
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>							
Perfluorobutanesulfonic acid (PFBS)	%	141			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	%	150			50-150	Pass	
Perfluoropropanesulfonic acid (PFPsS)	%	134			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	%	138			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	%	130			50-150	Pass	

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Perfluoroheptanesulfonic acid (PFHpS)		%	132			50-150	Pass	
Perfluorooctanesulfonic acid (PFOS)		%	136			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)		%	134			50-150	Pass	
<b>LCS - % Recovery</b>								
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSA)</b>								
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)			%	135			50-150	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)			%	130			50-150	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)			%	132			50-150	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)			%	129			50-150	Pass
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits
<b>Spike - % Recovery</b>								
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1				
Naphthalene	M20-No42457	NCP	%	83			70-130	Pass
<b>Spike - % Recovery</b>								
<b>BTEX</b>				Result 1				
Benzene	M20-No42457	NCP	%	100			70-130	Pass
Toluene	M20-No42457	NCP	%	87			70-130	Pass
Ethylbenzene	M20-No42457	NCP	%	87			70-130	Pass
m&p-Xylenes	M20-No42457	NCP	%	84			70-130	Pass
o-Xylene	M20-No42457	NCP	%	88			70-130	Pass
Xylenes - Total*	M20-No42457	NCP	%	85			70-130	Pass
<b>Spike - % Recovery</b>								
				Result 1				
Ammonia (as N)	S20-No37409	NCP	%	102			70-130	Pass
Chloride	P20-No35568	NCP	%	74			70-130	Pass
Nitrate & Nitrite (as N)	S20-No37409	NCP	%	87			70-130	Pass
Nitrate (as N)	S20-No37409	NCP	%	87			70-130	Pass
Nitrite (as N)	S20-No37409	NCP	%	104			70-130	Pass
Phosphate total (as P)	P20-No32888	NCP	%	108			70-130	Pass
Sulphate (as SO4)	P20-No31778	NCP	%	95			70-130	Pass
Total Kjeldahl Nitrogen (as N)	B20-No33196	NCP	%	88			70-130	Pass
<b>Spike - % Recovery</b>								
<b>Alkalinity (speciated)</b>				Result 1				
Total Alkalinity (as CaCO3)	B20-No33072	NCP	%	91			70-130	Pass
<b>Spike - % Recovery</b>								
<b>Heavy Metals</b>				Result 1				
Arsenic (filtered)	S20-No37304	NCP	%	93			75-125	Pass
Barium (filtered)	S20-No37304	NCP	%	88			75-125	Pass
Beryllium (filtered)	S20-No37304	NCP	%	100			75-125	Pass
Boron (filtered)	S20-No37304	NCP	%	97			75-125	Pass
Cadmium (filtered)	S20-No37304	NCP	%	90			75-125	Pass
Chromium (filtered)	S20-No37304	NCP	%	93			75-125	Pass
Cobalt (filtered)	S20-No37304	NCP	%	90			75-125	Pass
Copper (filtered)	S20-No37304	NCP	%	76			75-125	Pass
Iron (filtered)	S20-No37304	NCP	%	93			75-125	Pass
Lead (filtered)	S20-No37304	NCP	%	89			75-125	Pass
Manganese (filtered)	S20-No37304	NCP	%	91			75-125	Pass
Mercury (filtered)	S20-No37304	NCP	%	93			75-125	Pass
Nickel (filtered)	S20-No37304	NCP	%	78			75-125	Pass
Vanadium (filtered)	S20-No37304	NCP	%	95			75-125	Pass
Zinc (filtered)	S20-No37304	NCP	%	78			75-125	Pass
<b>Spike - % Recovery</b>								
<b>Alkali Metals</b>				Result 1				
Calcium	S20-No37793	NCP	%	131			75-125	Fail
								Q08

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Magnesium	S20-No37793	NCP	%	118			75-125	Pass	
Potassium	S20-No37793	NCP	%	102			75-125	Pass	
Sodium	S20-No37793	NCP	%	113			75-125	Pass	
<b>Spike - % Recovery</b>									
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>					Result 1				
Perfluorobutanoic acid (PFBA)	B20-No32962	NCP	%	124			50-150	Pass	
Perfluoropentanoic acid (PFPeA)	B20-No32962	NCP	%	119			50-150	Pass	
Perfluorohexanoic acid (PFHxA)	B20-No32962	NCP	%	112			50-150	Pass	
Perfluoroheptanoic acid (PFHpA)	B20-No32962	NCP	%	121			50-150	Pass	
Perfluoroctanoic acid (PFOA)	B20-No32962	NCP	%	91			50-150	Pass	
Perfluorononanoic acid (PFNA)	B20-No32962	NCP	%	119			50-150	Pass	
Perfluorodecanoic acid (PFDA)	B20-No32962	NCP	%	125			50-150	Pass	
Perfluoroundecanoic acid (PFUnDA)	B20-No32962	NCP	%	127			50-150	Pass	
Perfluorododecanoic acid (PFDoDA)	B20-No32962	NCP	%	128			50-150	Pass	
Perfluorotridecanoic acid (PFTrDA)	B20-No32962	NCP	%	124			50-150	Pass	
Perfluorotetradecanoic acid (PFTeDA)	B20-No32962	NCP	%	113			50-150	Pass	
<b>Spike - % Recovery</b>									
<b>Perfluoroalkyl sulfonamido substances</b>					Result 1				
Perfluoroctane sulfonamide (FOSA)	B20-No32962	NCP	%	138			50-150	Pass	
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B20-No32962	NCP	%	103			50-150	Pass	
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B20-No32962	NCP	%	116			50-150	Pass	
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B20-No32962	NCP	%	126			50-150	Pass	
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B20-No32962	NCP	%	108			50-150	Pass	
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	B20-No32962	NCP	%	117			50-150	Pass	
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	B20-No32962	NCP	%	130			50-150	Pass	
<b>Spike - % Recovery</b>									
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>					Result 1				
Perfluorobutanesulfonic acid (PFBS)	B20-No32962	NCP	%	137			50-150	Pass	
Perfluorononanesulfonic acid (PFNS)	B20-No32962	NCP	%	124			50-150	Pass	
Perfluoropropanesulfonic acid (PFPrS)	B20-No32962	NCP	%	135			50-150	Pass	
Perfluoropentanesulfonic acid (PFPeS)	B20-No32962	NCP	%	141			50-150	Pass	
Perfluorohexanesulfonic acid (PFHxS)	B20-No32962	NCP	%	134			50-150	Pass	
Perfluoroheptanesulfonic acid (PFHpS)	B20-No32962	NCP	%	121			50-150	Pass	
Perfluoroctanesulfonic acid (PFOS)	B20-No32962	NCP	%	123			50-150	Pass	
Perfluorodecanesulfonic acid (PFDS)	B20-No32962	NCP	%	105			50-150	Pass	
<b>Spike - % Recovery</b>									
<b>n:2 Fluorotelomer sulfonic acids (n:2 FTSAs)</b>					Result 1				
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	B20-No32962	NCP	%	122			50-150	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1H.1H.2H.2H-perfluoroctanesulfonic acid (6:2 FTSA)	B20-No32962	NCP	%	138			50-150	Pass	
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B20-No32962	NCP	%	136			50-150	Pass	
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B20-No32962	NCP	%	115			50-150	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
<b>Duplicate</b>									
<b>Total Recoverable Hydrocarbons - 2013 NEPM Fractions</b>				Result 1	Result 2	RPD			
Naphthalene	M20-No42456	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
<b>Duplicate</b>									
<b>BTEX</b>				Result 1	Result 2	RPD			
Benzene	M20-No42456	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M20-No42456	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M20-No42456	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M20-No42456	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M20-No42456	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M20-No42456	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
<b>Duplicate</b>									
				Result 1	Result 2	RPD			
Ammonia (as N)	S20-No37409	NCP	mg/L	0.09	0.08	14	30%	Pass	
Chloride	S20-No37440	NCP	mg/L	4000	3900	4.0	30%	Pass	
Chromium (hexavalent)	B20-No32956	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Conductivity (at 25°C)	S20-No37440	NCP	uS/cm	14000	14000	2.0	30%	Pass	
Fluoride (Total)	M20-No41970	NCP	mg/L	0.5	< 0.5	17	30%	Pass	
Nitrate & Nitrite (as N)	S20-No37409	NCP	mg/L	2.3	2.4	1.0	30%	Pass	
Nitrate (as N)	S20-No37409	NCP	mg/L	2.3	2.4	1.0	30%	Pass	
Nitrite (as N)	S20-No37409	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
pH (at 25 °C)	S20-No37440	NCP	pH Units	6.8	6.7	pass	30%	Pass	
Phosphate total (as P)	B20-No35432	NCP	mg/L	6.7	7.1	10	30%	Pass	
Sulphate (as SO4)	M20-No30927	NCP	mg/L	11	11	<1	30%	Pass	
Total Dissolved Solids Dried at 180°C ± 2°C	M20-No39533	NCP	mg/L	1500	1900	21	30%	Pass	
Total Kjeldahl Nitrogen (as N)	B20-No31371	NCP	mg/L	1.0	0.3	110	30%	Fail	Q15
Total Suspended Solids Dried at 103–105°C	M20-No35605	NCP	mg/L	< 1	3.8	130	30%	Fail	Q15
<b>Duplicate</b>									
<b>Alkalinity (speciated)</b>				Result 1	Result 2	RPD			
Bicarbonate Alkalinity (as CaCO3)	S20-No37440	NCP	mg/L	810	920	12	30%	Pass	
Carbonate Alkalinity (as CaCO3)	S20-No37440	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Hydroxide Alkalinity (as CaCO3)	S20-No37440	NCP	mg/L	< 20	< 20	<1	30%	Pass	
Total Alkalinity (as CaCO3)	S20-No37440	NCP	mg/L	810	920	12	30%	Pass	
<b>Duplicate</b>									
<b>Heavy Metals</b>				Result 1	Result 2	RPD			
Arsenic (filtered)	S20-No37304	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Barium (filtered)	S20-No37304	NCP	mg/L	0.05	0.05	1.0	30%	Pass	
Beryllium (filtered)	S20-No37304	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Boron (filtered)	S20-No37304	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Cadmium (filtered)	S20-No37304	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium (filtered)	S20-No37304	NCP	mg/L	0.002	0.002	3.0	30%	Pass	
Cobalt (filtered)	S20-No37304	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S20-No37304	NCP	mg/L	0.093	0.093	<1	30%	Pass	
Iron (filtered)	S20-No37304	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	

Duplicate							
<b>Heavy Metals</b>							
Lead (filtered)	S20-No37304	NCP	mg/L	0.002	0.002	4.0	30% Pass
Manganese (filtered)	S20-No37304	NCP	mg/L	0.007	0.006	3.0	30% Pass
Mercury (filtered)	S20-No37304	NCP	mg/L	< 0.0001	< 0.0001	<1	30% Pass
Nickel (filtered)	S20-No37304	NCP	mg/L	0.073	0.072	1.0	30% Pass
Vanadium (filtered)	S20-No37304	NCP	mg/L	< 0.005	< 0.005	<1	30% Pass
Zinc (filtered)	S20-No37304	NCP	mg/L	0.097	0.095	2.0	30% Pass
Duplicate							
<b>Alkali Metals</b>				Result 1	Result 2	RPD	
Calcium	S20-No37793	NCP	mg/L	18	18	2.0	30% Pass
Magnesium	S20-No37793	NCP	mg/L	10	9.9	5.0	30% Pass
Potassium	S20-No37793	NCP	mg/L	9.6	9.7	2.0	30% Pass
Sodium	S20-No37793	NCP	mg/L	47	47	2.0	30% Pass
Duplicate							
<b>Perfluoroalkyl carboxylic acids (PFCAs)</b>				Result 1	Result 2	RPD	
Perfluorobutanoic acid (PFBA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
Perfluoropentanoic acid (PFPeA)	B20-No32961	NCP	ug/L	0.02	0.02	13	30% Pass
Perfluorohexanoic acid (PFHxA)	B20-No32961	NCP	ug/L	0.07	0.08	15	30% Pass
Perfluoroheptanoic acid (PFHpA)	B20-No32961	NCP	ug/L	0.01	0.01	14	30% Pass
Perfluorooctanoic acid (PFOA)	B20-No32961	NCP	ug/L	0.02	0.02	4.0	30% Pass
Perfluorononanoic acid (PFNA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluorodecanoic acid (PFDA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluoroundecanoic acid (PFUnDA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluorododecanoic acid (PFDoDA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluorotridecanoic acid (PFTrDA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluorotetradecanoic acid (PFTeDA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Duplicate							
<b>Perfluoroalkyl sulfonamido substances</b>				Result 1	Result 2	RPD	
Perfluorooctane sulfonamide (FOSA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
N-methylperfluoro-1-octane sulfonamide (N-MeFOSA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
N-ethylperfluoro-1-octane sulfonamide (N-EtFOSA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
2-(N-methylperfluoro-1-octane sulfonamido)-ethanol (N-MeFOSE)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
2-(N-ethylperfluoro-1-octane sulfonamido)-ethanol (N-EtFOSE)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
N-ethyl-perfluoroctanesulfonamidoacetic acid (N-EtFOSAA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
N-methyl-perfluoroctanesulfonamidoacetic acid (N-MeFOSAA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30% Pass
Duplicate							
<b>Perfluoroalkyl sulfonic acids (PFSAs)</b>				Result 1	Result 2	RPD	
Perfluorobutanesulfonic acid (PFBS)	B20-No32961	NCP	ug/L	0.05	0.06	17	30% Pass
Perfluoronananesulfonic acid (PFNS)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30% Pass
Perfluoropropanesulfonic acid (PFPrS)	B20-No32961	NCP	ug/L	0.02	0.02	10	30% Pass
Perfluoropentanesulfonic acid (PFPeS)	B20-No32961	NCP	ug/L	0.05	0.05	8.0	30% Pass
Perfluorohexamersulfonic acid (PFHxS)	B20-No32961	NCP	ug/L	0.55	0.58	6.0	30% Pass

Duplicate								
Perfluoroalkyl sulfonic acids (PFSAs)				Result 1	Result 2	RPD		
Perfluoroheptanesulfonic acid (PFHpS)	B20-No32961	NCP	ug/L	0.02	0.03	17	30%	Pass
Perfluorooctanesulfonic acid (PFOS)	B20-No32961	NCP	ug/L	0.62	0.64	3.0	30%	Pass
Perfluorodecanesulfonic acid (PFDS)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
Duplicate								
n:2 Fluorotelomer sulfonic acids (n:2 FTSA)				Result 1	Result 2	RPD		
1H.1H.2H.2H-perfluorohexanesulfonic acid (4:2 FTSA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorooctanesulfonic acid (6:2 FTSA)	B20-No32961	NCP	ug/L	< 0.05	< 0.05	<1	30%	Pass
1H.1H.2H.2H-perfluorodecanesulfonic acid (8:2 FTSA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass
1H.1H.2H.2H-perfluorododecanesulfonic acid (10:2 FTSA)	B20-No32961	NCP	ug/L	< 0.01	< 0.01	<1	30%	Pass

**Comments****Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

**Qualifier Codes/Comments**

Code	Description
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N09	Quantification of linear and branched isomers has been conducted as a single total response using the relative response factor for the corresponding linear/branched standard.
N11	Isotope dilution is used for calibration of each native compound for which an exact labelled analogue is available (Isotope Dilution Quantitation). The isotopically labelled analogues allow identification and recovery correction of the concentration of the associated native PFAS compounds.
N15	Where the native PFAS compound does not have labelled analogue then the quantification is made using the Extracted Internal Standard Analyte with the closest retention time to the analyte and no recovery correction has been made (Internal Standard Quantitation).
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

**Authorised By**

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Sarah McCallion	Senior Analyst-PFAS (QLD)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Vivian Wang	Senior Analyst-Volatile (VIC)

**Glenn Jackson****General Manager**

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

\* Indicates NATA accreditation does not cover the performance of this service

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

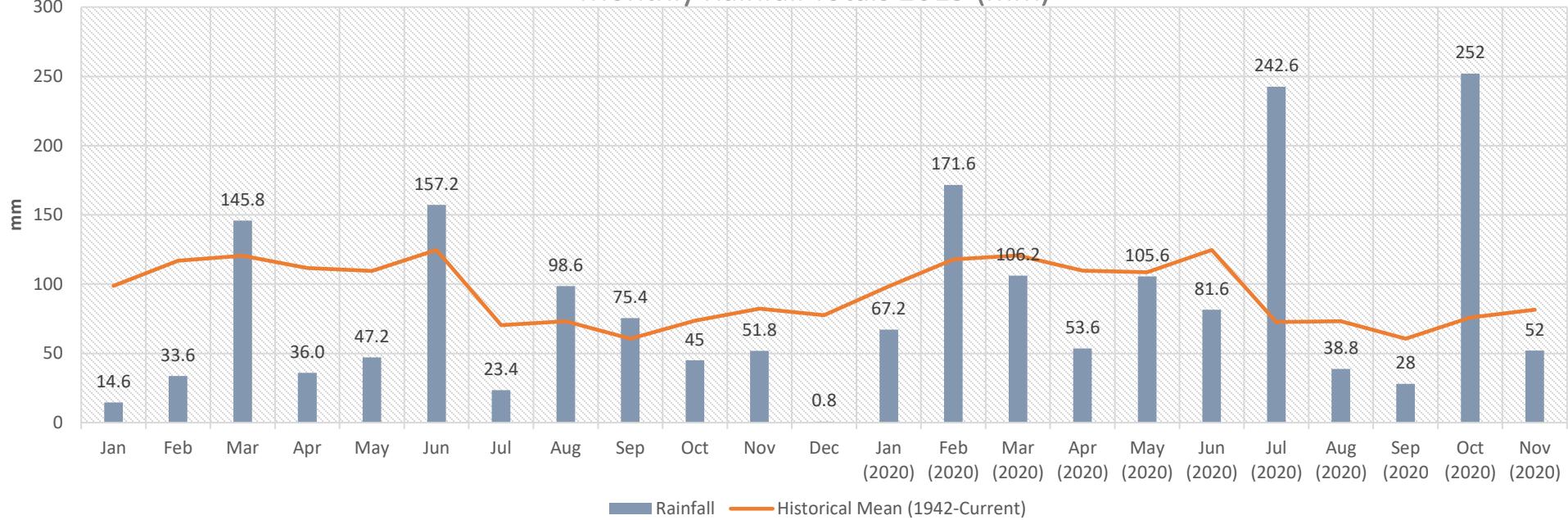
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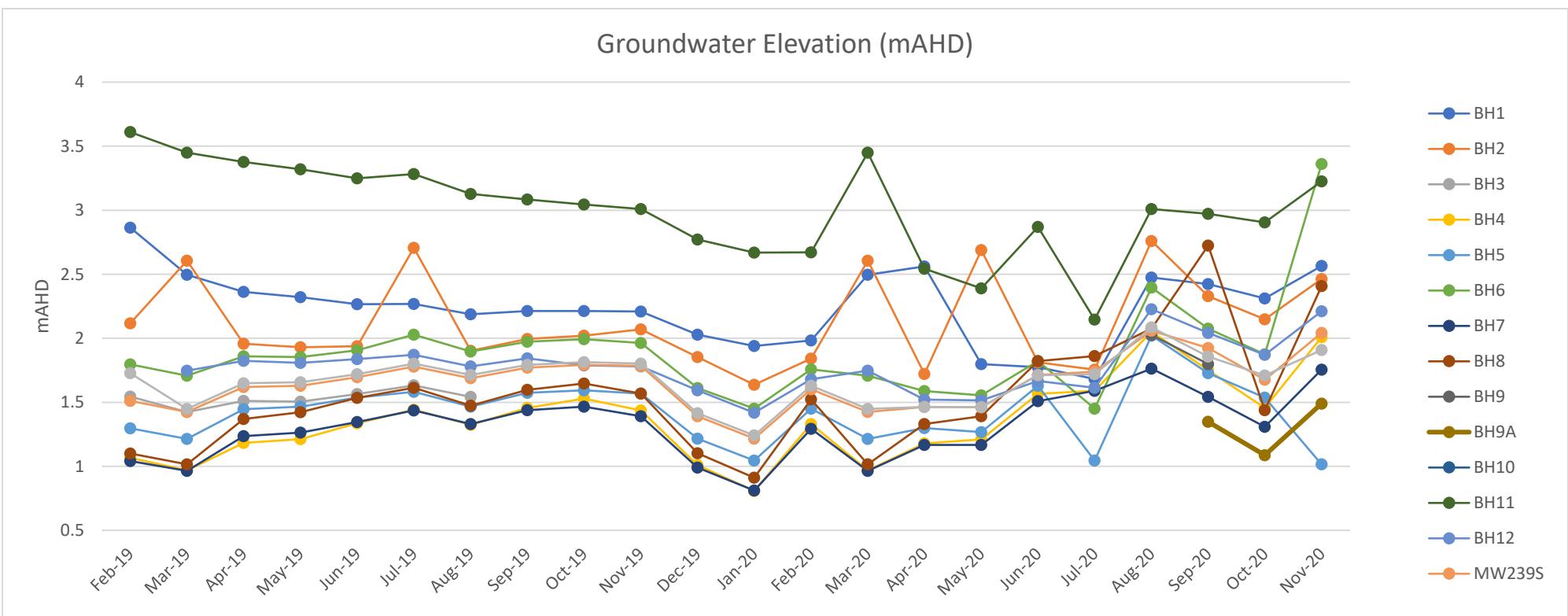
## ATTACHMENT 4: DATA TRENDS



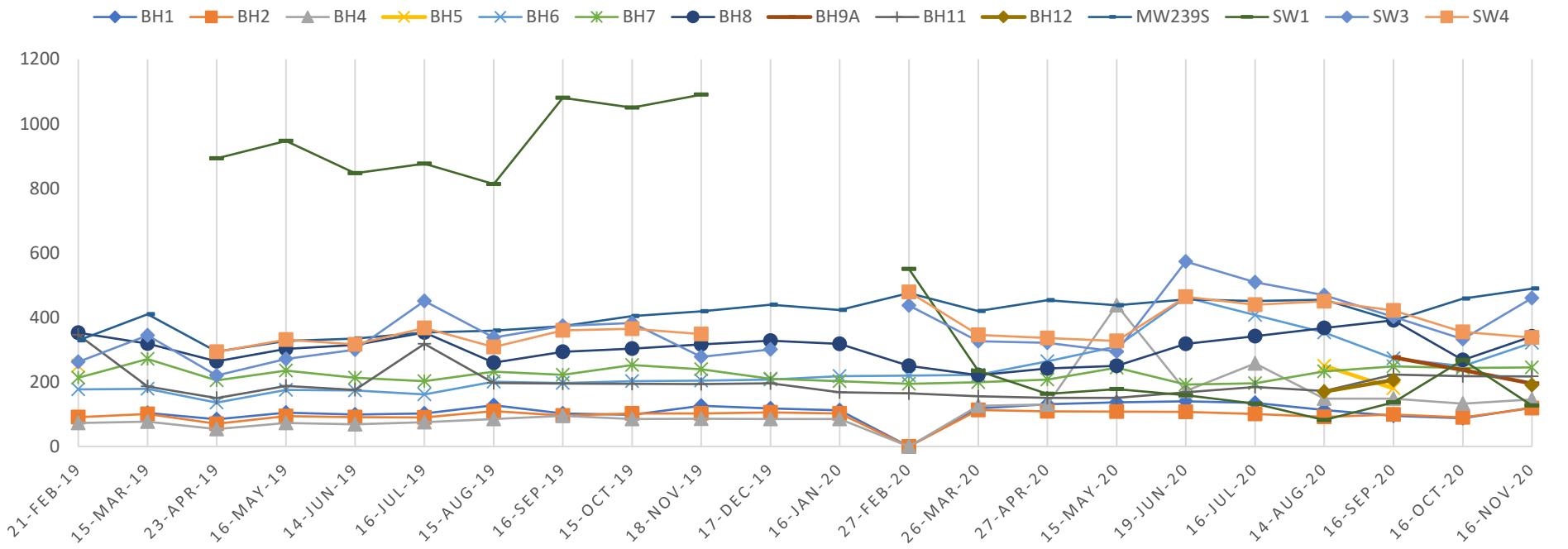
## Monthly Rainfall Totals 2019 (mm)



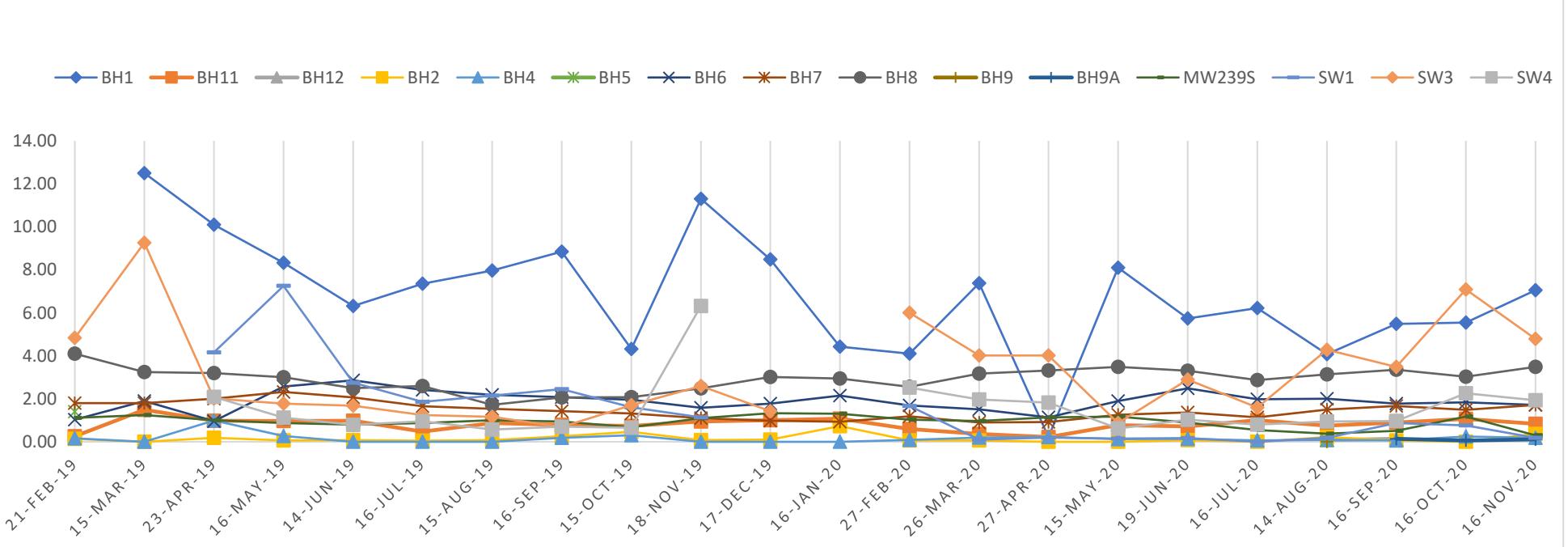
## Groundwater Elevation (mAHD)

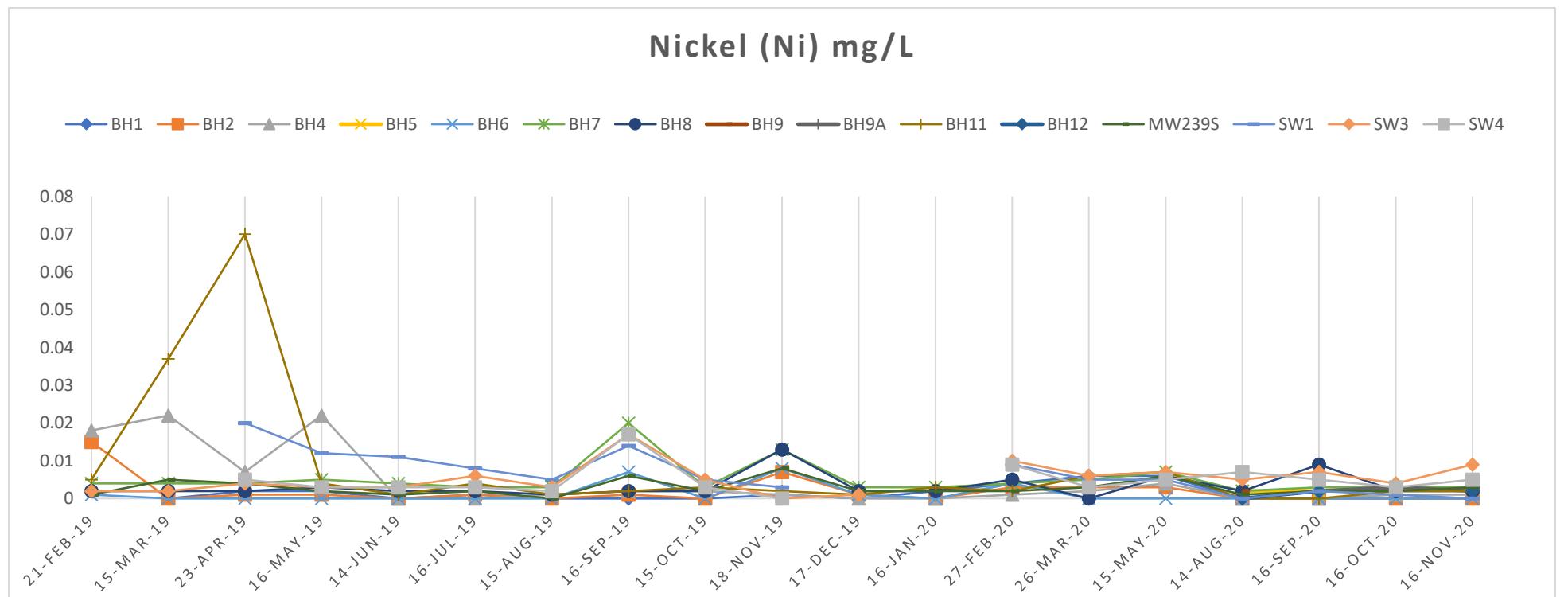
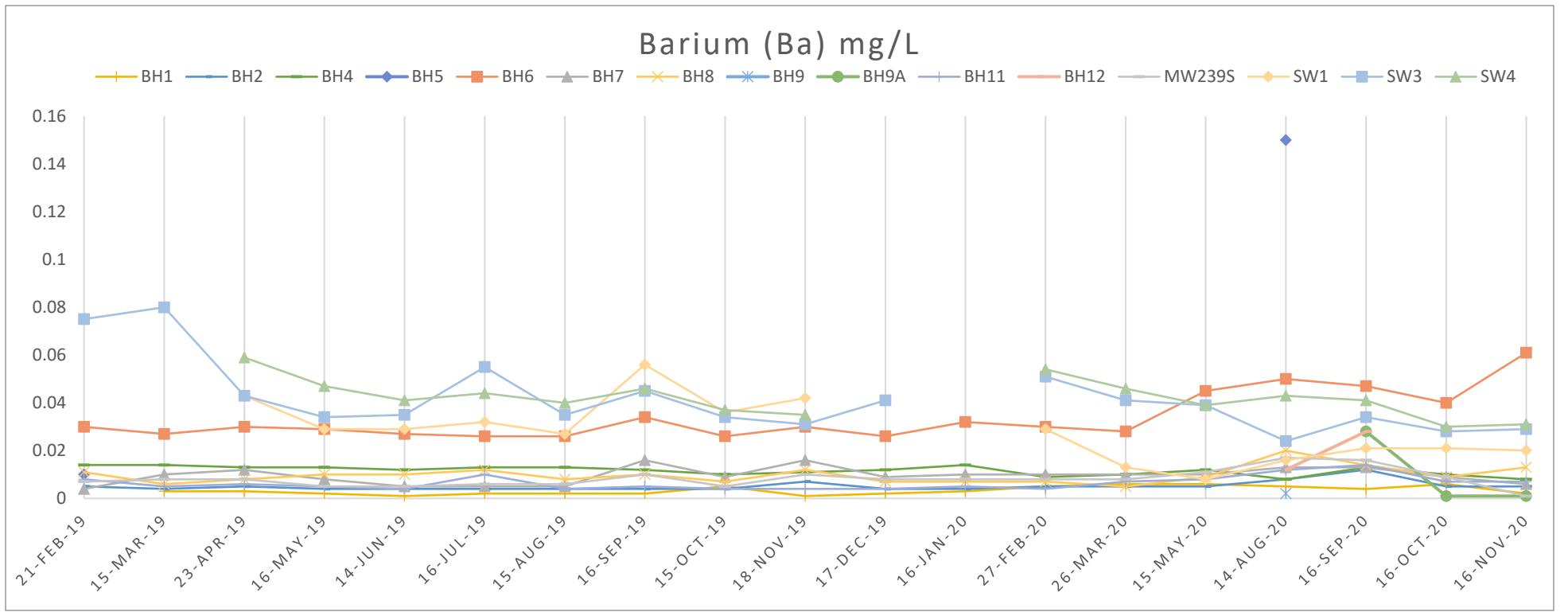


## Laboratory EC ( $\mu\text{S}/\text{cm}$ )

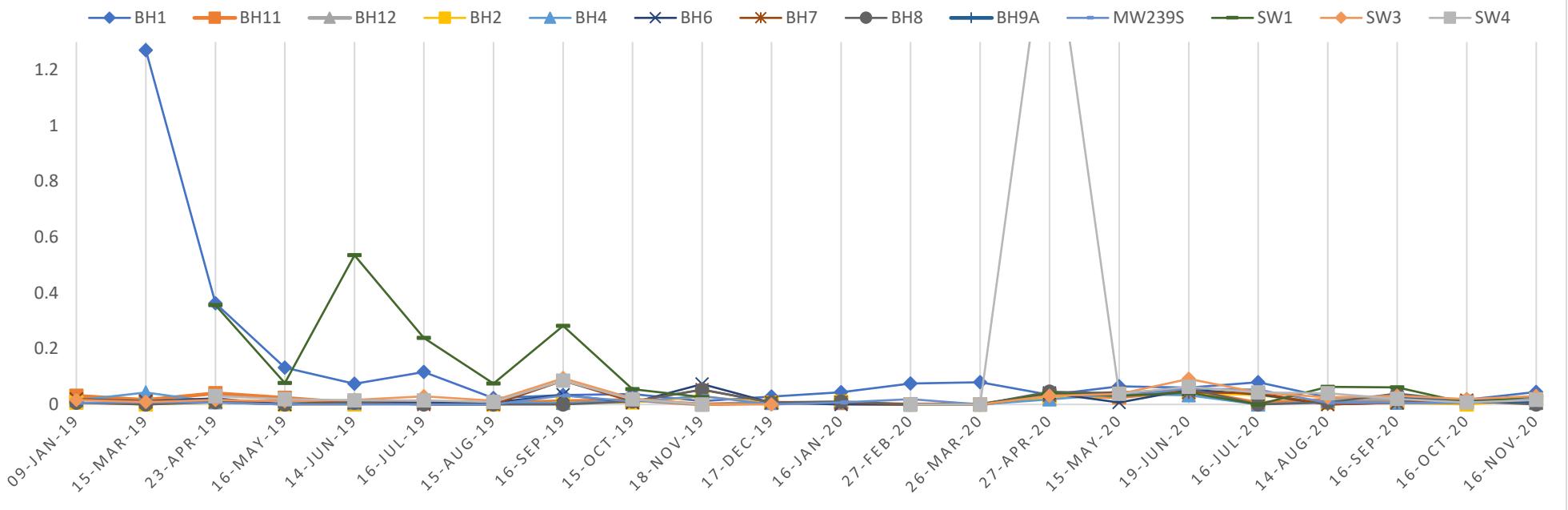


## Iron (Fe) mg/L

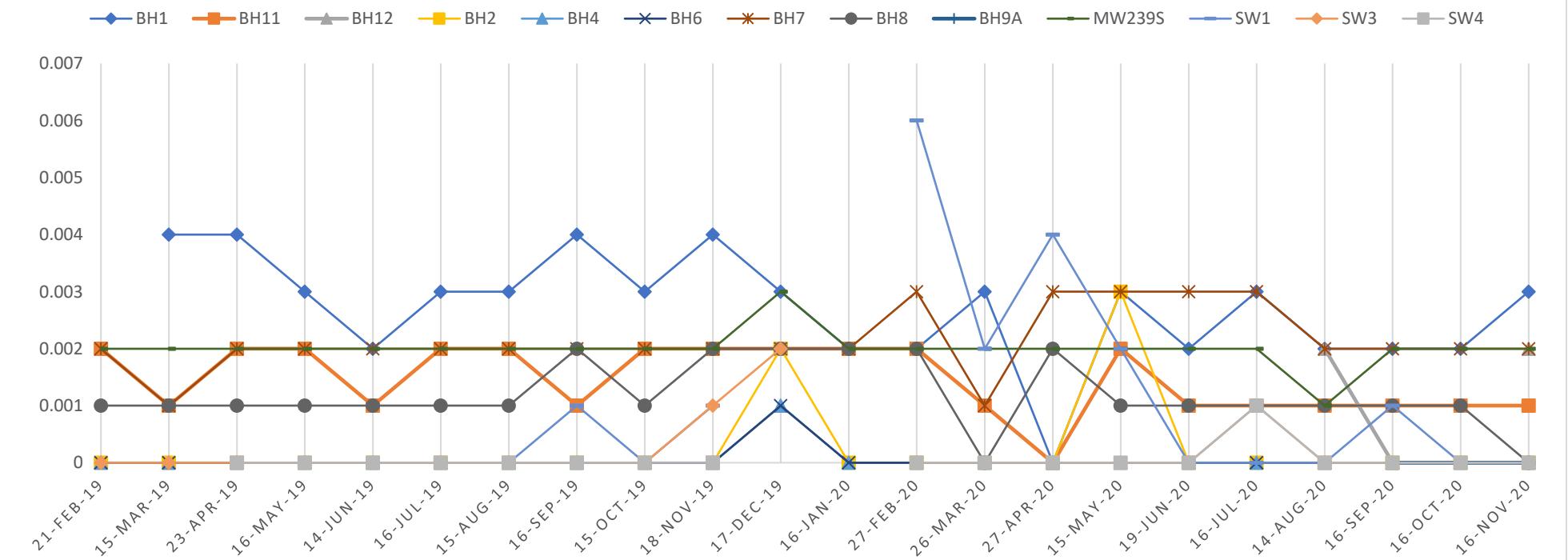


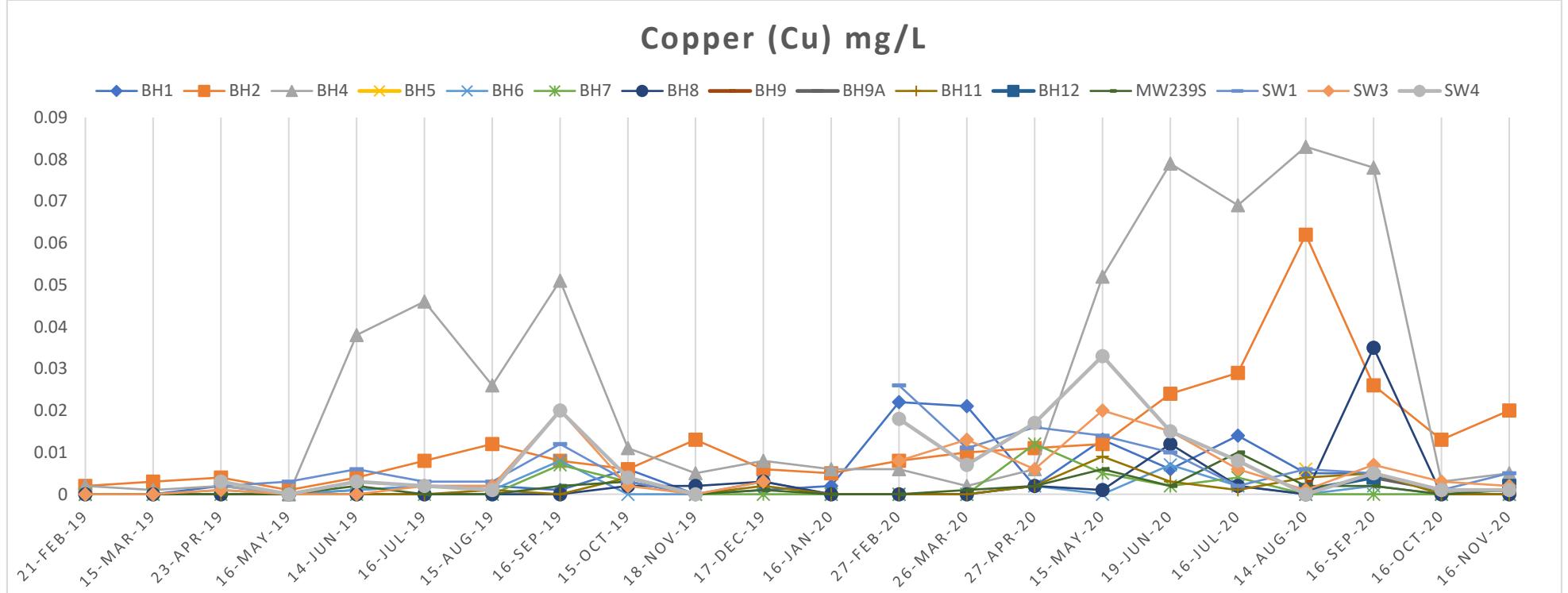
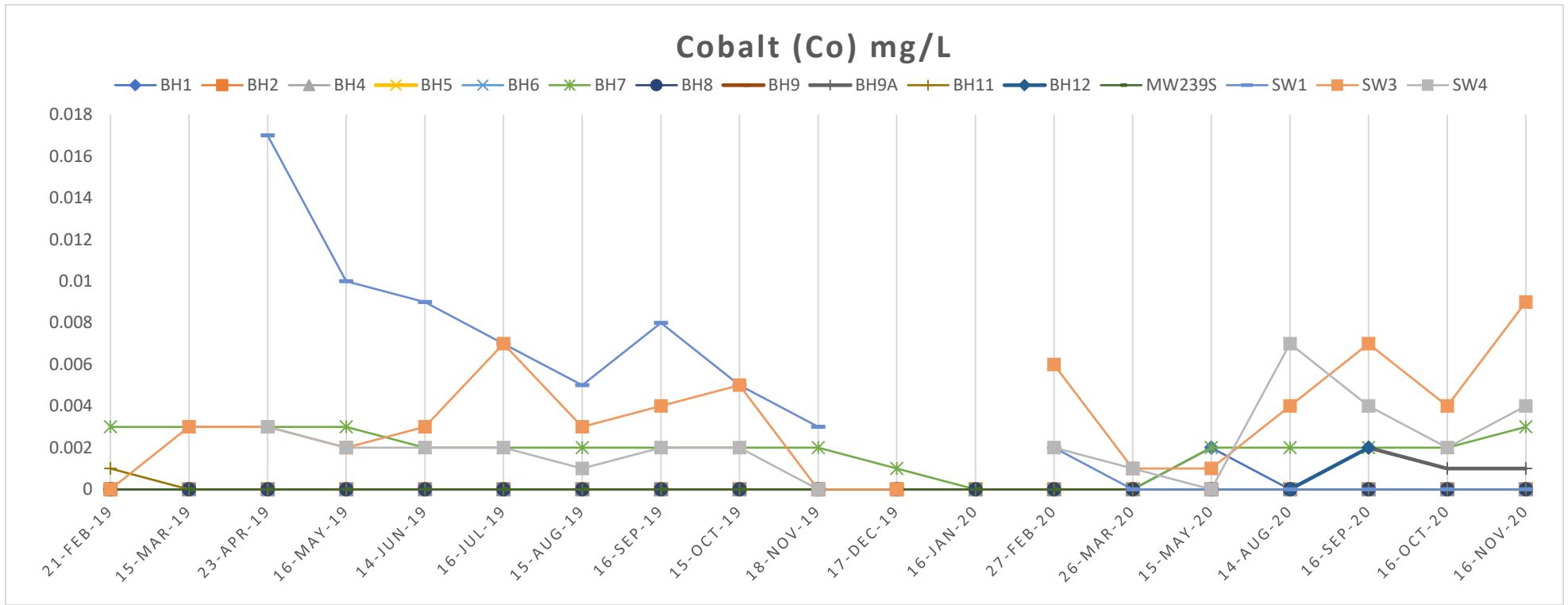


## Zinc (Zi) mg/L

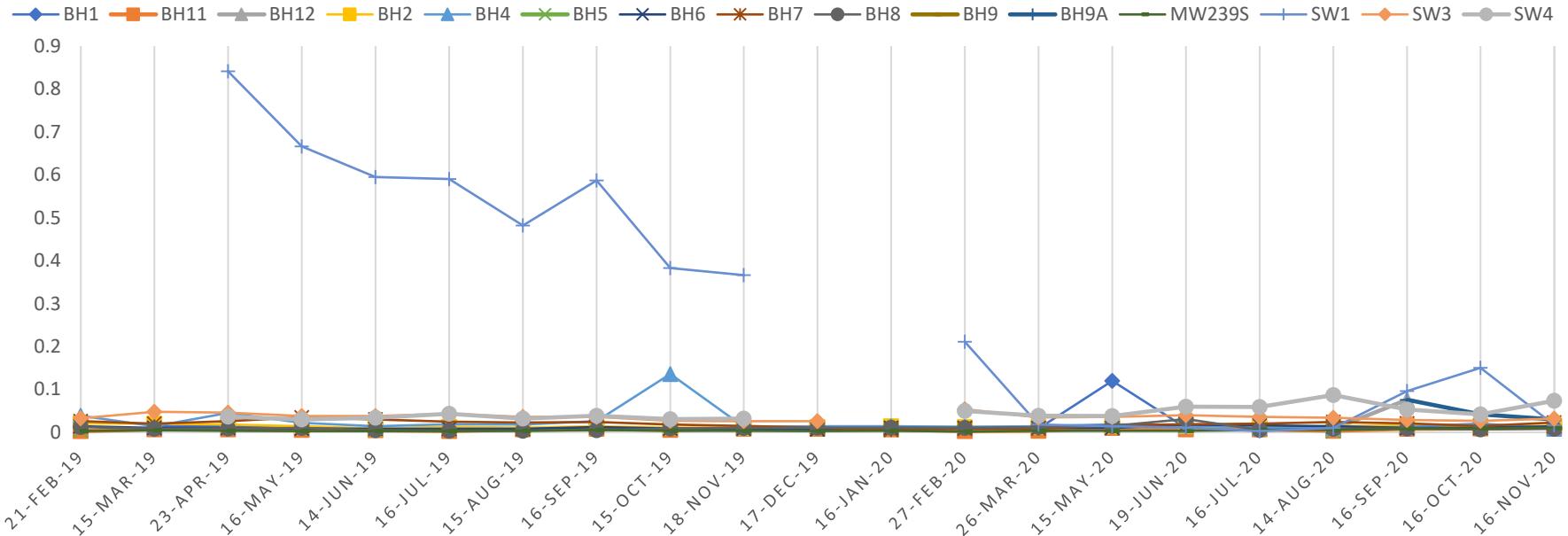


## Chromium (Cr) mg/L

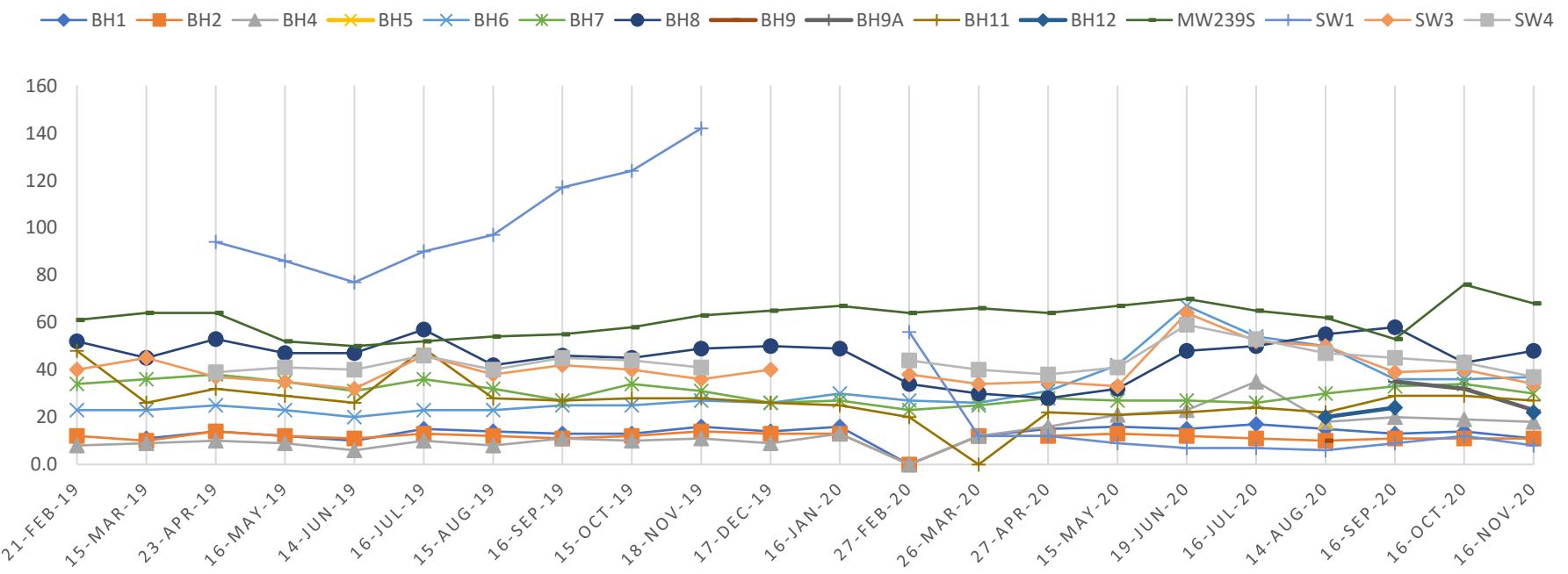


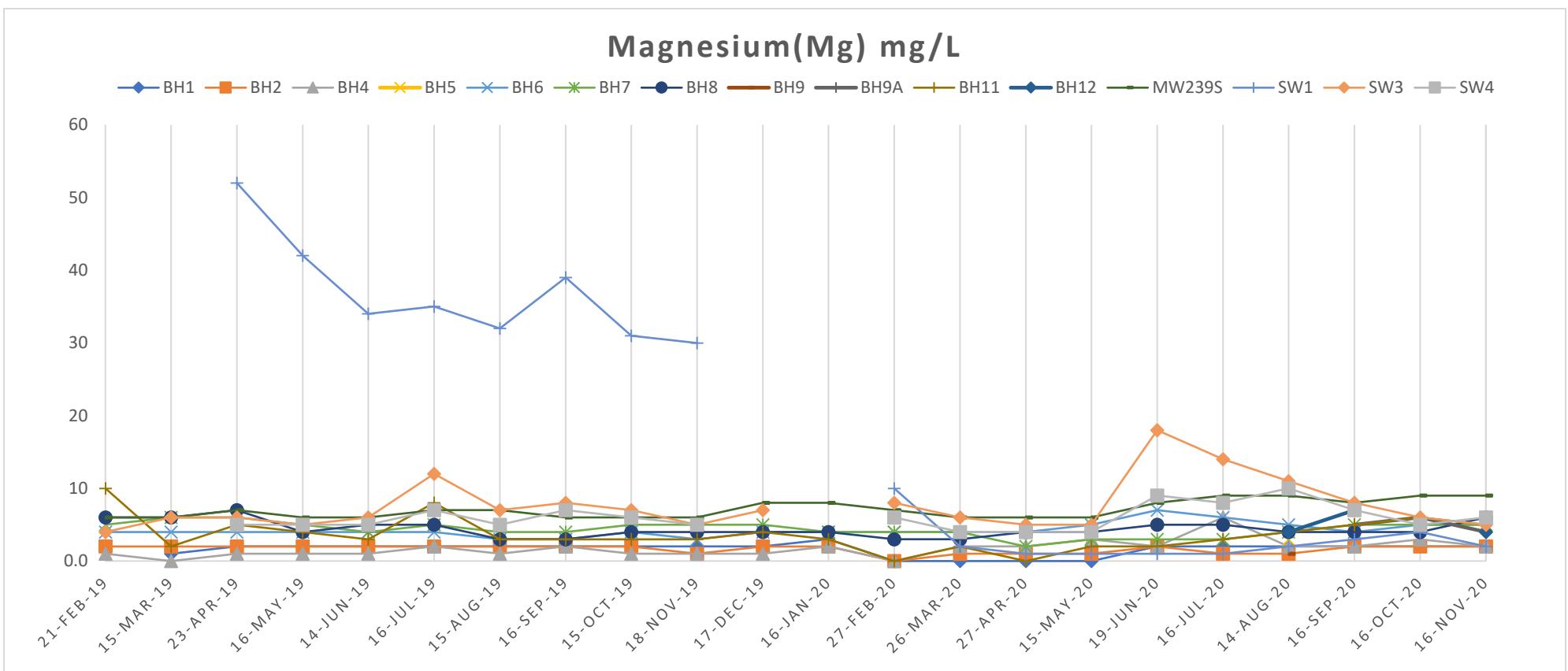
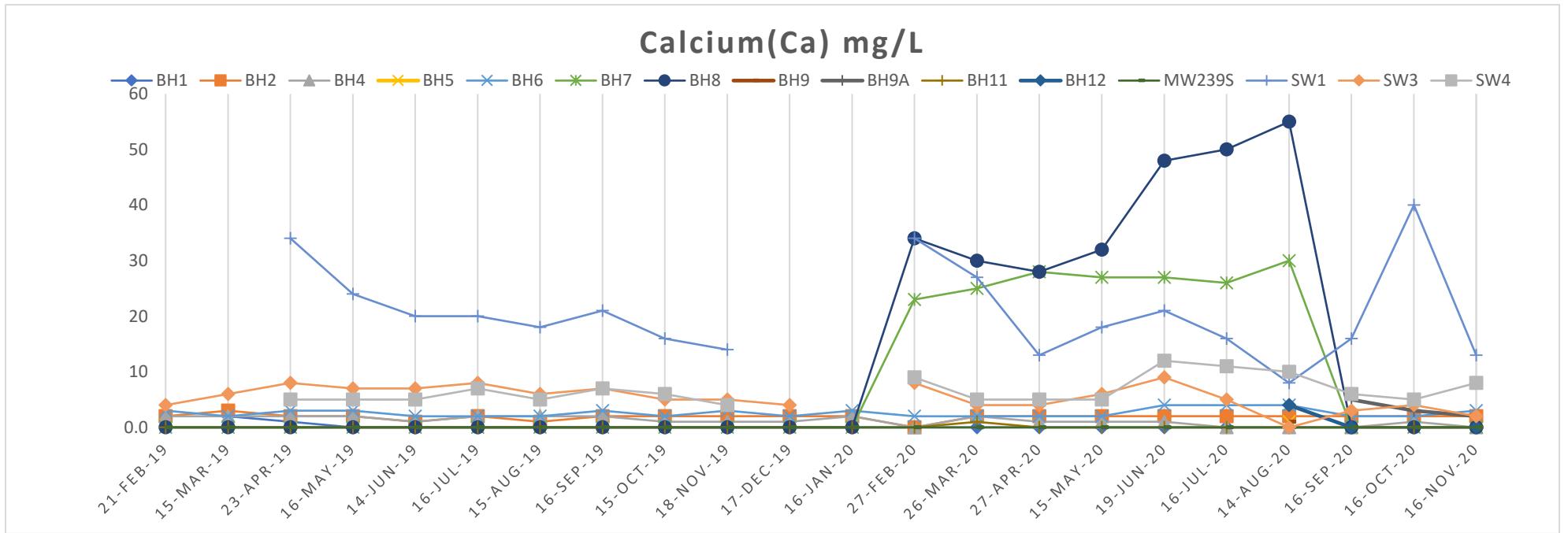


## Manganese (Mn) mg/L

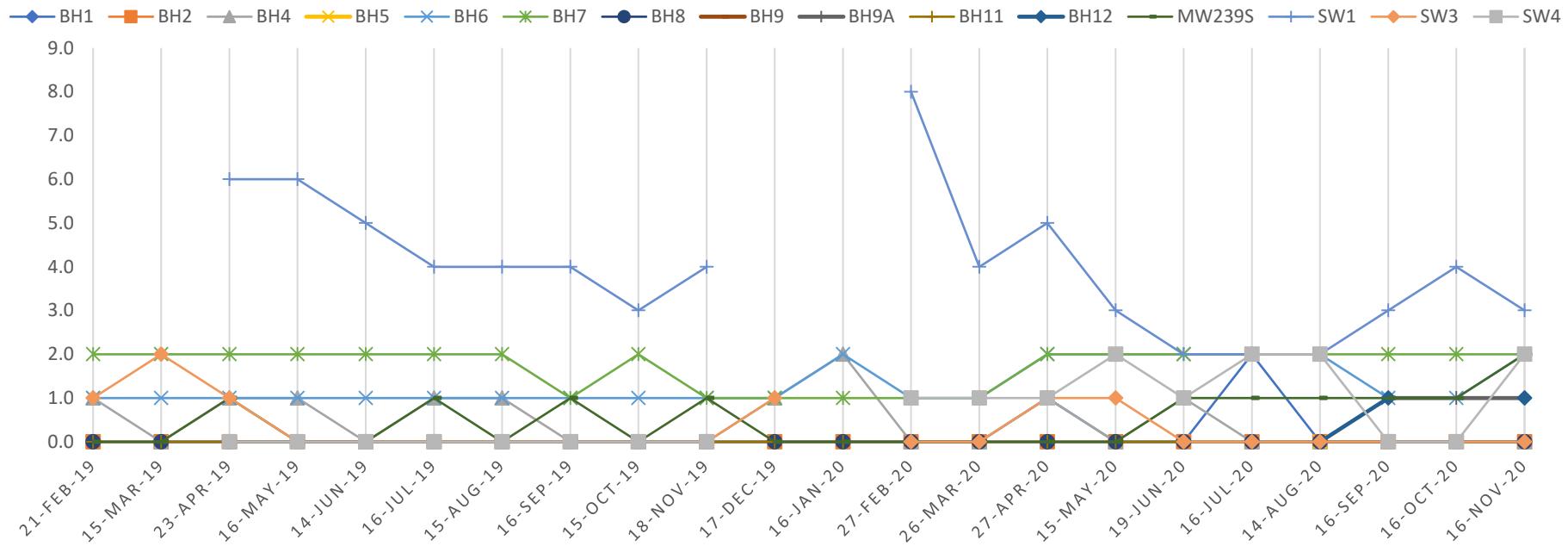


## Sodium(Na) mg/L





## Potassium(K) mg/L



## Sulphate ( $\text{SO}_4^{2-}$ ) mg/L

