

Our Ref: 217505_LET_006.docx

23 July 2019

Oberon Council
 137-139 Oberon Street
 Oberon NSW 2787

Attn: Shane Wilson – Planning & Development Director

ENVIRONMENTAL MONITORING OF OBERON WASTE FACILITY

Premise Australia has completed scheduled environmental monitoring per the requirements of Environment Protection Licence (EPL) 20289 at Oberon Waste Facility, located at 364 – 372 Lowes Mount Road, Oberon.

Groundwater Levels

Groundwater was gauged at ten (10) groundwater monitoring wells across the site. Groundwater gauging data is included in **Table 1** (attached), and elevations are shown on **Figure 1**.

Observations were as follows:

- Groundwater monitoring locations BH1S and BH6S were dry during gauging. Groundwater at monitoring locations BH2 and BH4S did not recharge following purging and no sample could be collected.
- Depths to groundwater ranged from 2.90 metres below ground level (mbgl) at BH4D, to 8.01 mbgl at BH6D.
- Corresponding groundwater elevations ranged from 1,101.95 metres Australian Height Datum (AHD) at BH4S to 1,115.19 mAHD at BH6D, indicating a groundwater flow direction to the north-east.

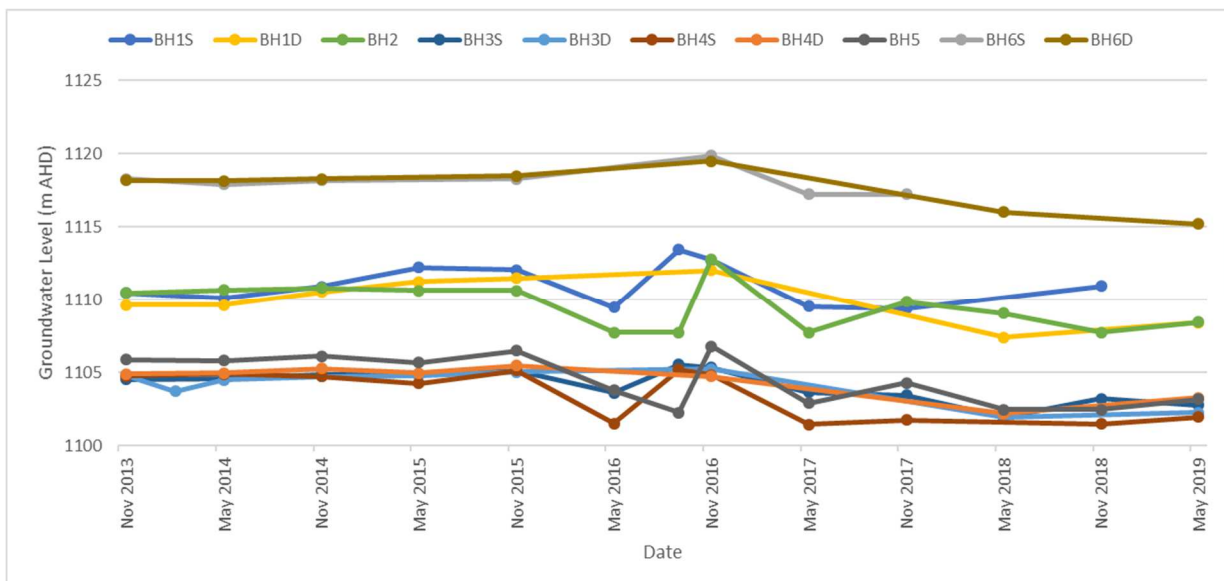


Figure 1: Oberon Waste Facility – Groundwater Elevations

Groundwater Quality

Groundwater samples were able to be collected from monitoring locations BH1D, BH3S, BH3D, BH4D, BH5 and BH6D. Samples were couriered to SGS Laboratories in Alexandria, NSW, who are NATA accredited to perform the scheduled analysis. Results of analysis are included in **Table 2** (attached), and laboratory certificates have also been appended to this letter.

Groundwater quality has been assessed by comparison to criteria (where available) adopted from Australian and New Zealand Environment and Conservation Council (ANZECC) Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 – Primary Industries: Water quality for irrigation and general water use.

- Laboratory measured pH ranged from 5.6 at BH1D to 7.1 at BH5. Groundwater pH at all monitored locations, excluding BH1D, was within the guideline range considered suitable for pumping, irrigation and stock watering (6.0 to 8.5 pH units).
- Electrical conductivity (EC) ranged from 110 $\mu\text{S}/\text{cm}$ at BH1D to 620 $\mu\text{S}/\text{cm}$ at BH5.
- Total dissolved solids (TDS) concentrations were recorded to range from 63 mg/L at BH1D to 380 mg/L at BH3S. TDS concentrations were below the livestock watering 'loss of production' tolerance limit for the most susceptible livestock category, poultry (3000 mg/L – ANZECC & ARMCANZ, 2000).
- Total alkalinity in groundwater ranged from 31 mg/L at BH1D to 250 mg/L at BH4D. The total alkalinity of groundwater was lower than the guideline hardness value for potential fouling of waters (350 mg/L).
- Groundwater chloride concentrations ranged from 5.1 mg/L at BH4D to 29 mg/L at BH3S. All concentrations were below the guideline value for protection of moderately sensitive crops (350 mg/L).
- Sulfate concentrations in groundwater ranged from 5.2 mg/L at BH4D to 66 mg/L at BH5.
- Calcium concentrations ranged from 3.5 mg/L at BH1D to 15 mg/L at BH4D.
- Magnesium concentrations ranged from 4 mg/L at BH1D to 35 mg/L at BH5.
- Potassium concentrations ranged from 0.5 mg/L at BH3S to 2.9 mg/L at BH6D.
- Concentrations of sodium ranged from 8.8 mg/L at BH1D, to 100 mg/L at BH3S. Sodium concentrations were below the guideline level for irrigation to moderately sensitive crops (< 230 mg/L).
- The concentration of total organic carbon (TOC) ranged from 0.4 mg/L at BH3D, to 5.3 mg/L at BH5.
- Ammonia concentrations in groundwater ranged from below the laboratory limit of reporting (LOR) of 0.01 mgN/L at BH6D, to 0.03 mgN/L at BH1D, BH3S and BH5.
- Nitrate concentrations ranged from below the laboratory LOR of 0.005 mgN/L at BH6D to 1.9 mgN/L at BH3S.
- Concentrations of total phosphorus ranged 0.03 mg/L at BH1D to 2.2 mg/L at BH3S. Total phosphorus concentrations were above the guideline level for long-term irrigation to prevent algal growth in irrigation water (< 0.05 mg/L) in all groundwater samples with the exception of BH1D.
- Concentrations of the trace metals mercury, aluminium, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead and zinc, were below respective laboratory LORs and/or below the long-term (up to 100 years) irrigation guideline concentrations at all groundwater monitoring points.
- Manganese concentrations ranged from 0.003 mg/L at BH3D to 0.61 mg/L at BH3S. Manganese concentrations in groundwater at BH3S, BH4D and BH6D exceeded the long-term (up to 100 years) irrigation guideline concentration of 0.20 mg/L.

- Total phenolics were below the laboratory LOR of 0.01 mg/L at all groundwater monitoring points with the exception of BH3D, where a concentration of 0.09 mg/L was recorded.
- Organochlorine pesticides and organophosphorus pesticides were below respective laboratory LORs at all groundwater monitoring points.
- Benzene, toluene, ethylbenzene, xylene and naphthalene compounds (BTEXN), total petroleum hydrocarbons (TPH), total recoverable hydrocarbons (TRH) and polycyclic aromatic hydrocarbons (PAHs) were below respective laboratory LORs at all groundwater monitoring points.

Surface Water Quality

Surface water discharge points are inspected for discharge following rain events and on a monthly basis. No discharge events were recorded or observed to have occurred at the facility since March 2019.

Accumulated Landfill Gas Monitoring

Gas concentrations in buildings and sheds proximal to landfilled areas were all below the detection limits (0.005% v/v) during the monthly monitoring rounds conducted in April 2019 to May 2019.

Summary

Elevated concentrations of manganese were recorded in samples collected from groundwater monitoring wells BH3S, BH4D and BH6D, however this was consistent with historical results.

Total phosphorus concentrations were also above guideline levels at all groundwater monitoring points with the exception of BH1D. Future scheduled sampling and analysis will review potential for increasing trends.

Groundwater monitoring is scheduled to continue biannually. The next monitoring event will occur in November 2019, however will not include the groundwater monitoring points installed in the deeper aquifer (BH1D, BH3D, BH4D and BH6D).

Please do not hesitate to contact us with any questions or comments you may have regarding this report.

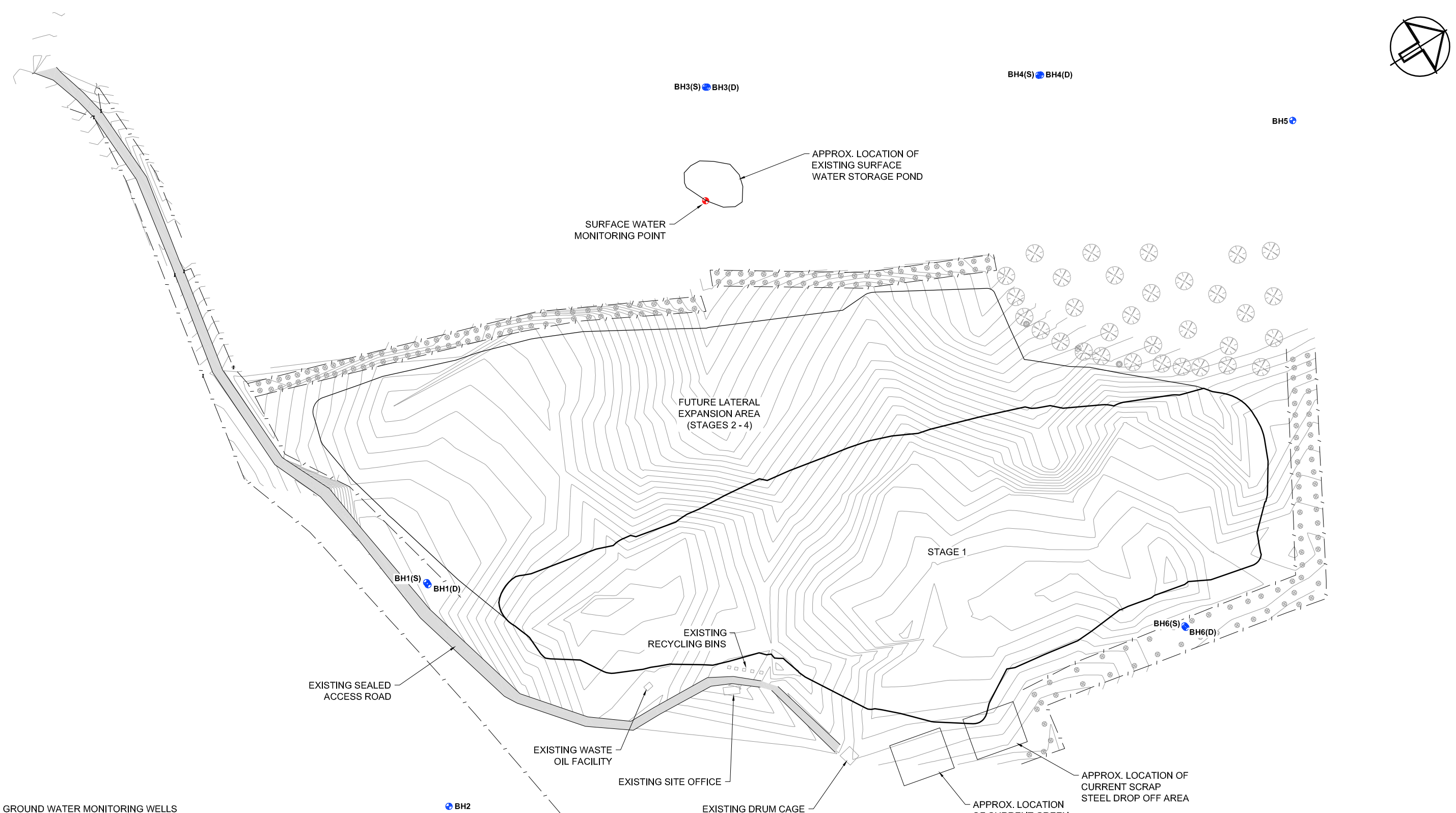
Yours sincerely



BRENDAN STUART

Environmental Scientist

No. of Attachments – 4: Environmental Monitoring Point Locations
Table 1 – Groundwater Gauging Results
Table 2 – Results of Laboratory Analyses
SGS Laboratories Analytical Reports



GROUND WATER MONITORING WELLS

BOREHOLE ID	EASTING	NORTHING	ELEVATION (m AHD)	SCREEN LENGTH (m)
BH1(S)	765448.70	6270701.64	1114.87	1.5
BH1(D)	765447.11	6270701.61	1114.81	6.0
BH2	765577.81	6270636.72	1113.52	1.5
BH3(S)	765270.91	6271025.90	1106.14	1.5
BH3(D)	765273.17	6271029.31	1105.96	6.0
BH4(S)	765379.42	6271213.28	1106.15	1.5
BH4(D)	765379.95	6271214.43	1106.16	6.0
BH5	765491.95	6271337.41	1107.75	1.5
BH6(S)	765732.53	6271103.63	1123.07	1.5
BH6(D)	765733.70	6271103.79	1123.20	6.0

LEGEND:

- GROUND WATER MONITORING POINT
- SURFACE WATER MONITORING POINT
- EXISTING LANDFORM CONTOURS (0.5m INTERVAL)



SCALE 1:10000 (A3)

GEOLYSE
ORANGE
 154 PEISLEY STREET
 P.O. BOX 1963
 ORANGE, NSW 2800
 Ph. (02) 6393 5000
 Fx. (02) 6393 5050
 orange@geolyse.com
 www.geolyse.com

No	DATE	DRAFTING CHECK	APPROVED BY	DETAILS
A	02/05/13	LP	KH	DRAFT
B	16/05/13	LP	KH	ISSUED
C	01/10/14	MY	MH	UPDATE PIEZO BH3(D) DATA

PROJECT
OBERON LANDFILL EXTENSION
LANDFILL ENVIRONMENTAL MANAGEMENT PLAN
 FILE REFERENCE: 211129_05C_EV01-EV07.dwg

APPROVAL AUTHORITY
OBERON COUNCIL
ENVIRONMENT PROTECTION AUTHORITY

CLIENT

OBERON COUNCIL

DRAWING
EXPANSION STAGES AND MONITORING POINTS
 PROJECT NUMBER: 211129 DRAWING NUMBER: 05C_EV02 REV: C
 SOURCE: INTERNAL

TABLE 1 - EPL 20289 OBERON WASTE FACILITY- GROUNDWATER GAUGING RESULTS

Ground Water Levels: 1-May-19

Piezometer Details:

	Ground Elev (mAHD)	Stickup (m)	Elevation Top PVC (mAHD)	Date	Measured (m)	GWL (mAHD)	Well Depth (m)	Well Base (mAHD)	Water Column (m)
BH1S	-	-	1114.87	1/05/2019	WLNLM	-	5.50	1109.37	N/A
BH1D	-	-	1114.81	1/05/2019	6.41	1108.40	26.50	1088.31	20.09
BH2	-	-	1113.52	1/05/2019	5.10	1108.42	5.80	1107.72	0.70
BH3S	-	-	1106.14	1/05/2019	3.40	1102.74	5.00	1101.14	1.60
BH3D	-	-	1105.96	1/05/2019	3.70	1102.26	26.60	1079.36	22.90
BH4S	-	-	1106.15	1/05/2019	4.20	1101.95	4.80	1101.35	0.60
BH4D	-	-	1106.16	1/05/2019	2.90	1103.26	50.50	1055.66	47.60
BH5	-	-	1107.75	1/05/2019	4.61	1103.14	5.50	1102.25	0.89
BH6S	-	-	1123.07	1/05/2019	WLNLM	-	5.87	1117.20	N/A
BH6D	-	-	1123.20	1/05/2019	8.01	1115.19	27.00	1096.20	18.99

Definitions:

- Stickup: Height of piezometer pipe above ground surface.
- Ground Elev: Actual elevation of ground at the piezometer relative to an arbitrary datum. All ground elevations are measured to the same datum, hence Piezo GWLs are relative to each other.
- GWL: Actual elevation of groundwater at the piezometer relative to an arbitrary datum.
- Measured: Depth of groundwater measured from the top of the piezometer pipe.
- Gauging not required under EPL
- WLNLM: *Water Level Not Measured (Dry)*

Date	BH1S		BH1D		BH2		BH3S		BH3D		BH4S		BH4D		BH5		BH6S		BH6D	
	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)	Measured	GWL (mAHD)
19-Nov-13	4.41	1110.46	5.20	1109.61	3.06	1110.46	1.63	1104.51	1.18	1104.78	1.40	1104.75	1.27	1104.89	1.89	1105.86	4.83	1118.24	5.06	1118.14
25-Feb-14	-	-	-	-	-	-	-	-	2.28	1103.68	-	-	-	-	-	-	-	-	-	-
12-May-14	4.80	1110.07	5.20	1109.61	2.85	1110.67	1.58	1104.56	1.48	1104.48	1.26	1104.89	1.23	1104.93	1.97	1105.78	5.20	1117.87	5.07	1118.13
5-Nov-14	3.99	1110.88	4.28	1110.53	2.72	1110.80	1.31	1104.83	1.24	1104.72	1.43	1104.72	0.92	1105.24	1.66	1106.09	4.90	1118.17	4.94	1118.26
6-May-15	2.67	1112.20	3.58	1111.23	2.90	1110.62	1.27	1104.87	1.18	1104.78	1.91	1104.24	1.21	1104.95	2.11	1105.64	5.87	1118.24	WLNLM	-
23-Nov-15	2.82	1112.05	3.33	1111.48	2.90	1110.62	1.04	1105.10	0.94	1105.02	1.05	1105.10	0.70	1105.46	1.30	1106.45	4.83	1118.24	4.73	1118.47
19-May-16	5.42	1109.45	-	-	5.80	1107.72	2.55	1103.59	-	-	4.65	1101.50	-	-	3.97	1103.78	5.87	1118.24	-	-
5-Sep-16	1.46	1113.41	-	-	5.80	1107.72	0.61	1105.53	-	-	0.97	1105.18	-	-	5.50	1102.25	5.87	1118.24	-	-
7-Nov-16	2.14	1112.73	2.80	1112.01	0.74	1112.78	0.82	1105.32	0.76	1105.20	1.35	1104.80	1.45	1104.71	0.99	1106.76	3.22	1119.85	3.72	1119.48
17-May-17	5.37	1109.50	-	-	5.80	1107.72	2.51	1103.63	-	-	4.73	1101.42	-	-	4.87	1102.88	5.87	1117.20	-	-
13-Nov-17	5.50	1109.37	-	-	3.68	1109.84	2.71	1103.43	-	-	4.43	1101.72	-	-	3.47	1104.28	5.87	1117.20	-	-
28-May-18	WLNLM	-	7.42	1107.39	4.50	1109.02	4.22	1101.92	4.01	1101.95	WLNLM	-	4.00	1102.16	5.29	1102.46	WLNLM	1118.24	7.22	1115.98
15-Nov-18	3.94	1110.93	-	-	5.80	1107.72	2.94	1103.20	-	-	4.68	1101.47	-	-	5.30	1102.45	WLNLM	1118.24	-	-
1-May-19	WLNLM	-	6.41	1108.40	5.10	1108.42	3.40	1102.74	3.70	1102.26	4.20	1101.95	2.90	1103.26	4.61	1103.14	WLNLM	1118.24	8.01	1115.19

**TABLE 2: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS
MAY 2019**





		Sample ID	BH1(D)	BH3(S)	BH3(D)	BH4(D)	BH5	BH6(D)		
									Sample Date	1/05/2019
Group	Analyte	LOR	Units	Criteria	PS	PS	PS	PS	PS	PS
Physical Parameters	pH (Lab)	0	No unit	6.0 - 8.5	5.6	6.7	6.1	6.5	7.1	6.6
	Electrical Conductivity (Lab)	2	µS/cm	-	110	530	200	250	620	230
	Total Dissolved Solids	10	mg/L	3000	63	380	150	140	380	110
Alkalinity	Total Alkalinity as CaCO3	5	mg/L	350	31	250	72	120	250	100
Anions	Chloride	1	mg/L	350	12	29	14	5.1	18	6.9
	Fluoride	0.1	mg/L	1	< 0.1	0.63	0.12	0.22	1	< 0.1
	Sulfate (SO4)	1	mg/L	-	9.7	10	7.2	5.2	66	4.3
Cations	Calcium (Ca)	0.2	mg/L	-	3.5	10	4.7	15	12	4.8
	Magnesium (Mg)	0.1	mg/L	-	4	15	13	15	35	19
	Potassium (K)	0.1	mg/L	-	2.9	0.5	1.5	1.5	1.1	2.5
	Sodium (Na)	0.5	mg/L	230	8.8	100	14	12	81	11
Forms of Carbon	Total Organic Carbon	0.2	mg/L	-	0.4	2.3	0.4	0.7	5.3	0.5
Nutrients	Ammonia (NH3) as N	0.01	mg/L	-	0.03	0.03	0.02	0.02	0.03	< 0.01
	Nitrate (NO3) as N	0.005	mg/L	-	0.17	1.9	0.056	0.019	0.49	< 0.005
	Nitrite (NO2) as N	0.005	mg/L	-	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	Total Phosphorus	0.02	mg/L	0.05	0.03	2.2	0.1	0.19	0.61	0.12
Trace Metals	Aluminium (Al)	0.005	mg/L	5	< 0.005	0.029	< 0.005	< 0.005	0.033	< 0.005
	Arsenic (As)	0.001	mg/L	0.1	< 0.001	0.001	< 0.001	0.003	0.001	0.004
	Barium (Ba)	0.001	mg/L	-	0.14	0.18	0.059	0.025	0.074	0.009
	Cadmium (Cd)	0.0001	mg/L	0.01	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
	Chromium (Cr)	0.001	mg/L	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Cobalt (Co)	0.001	mg/L	0.05	0.001	0.007	< 0.001	< 0.001	< 0.001	0.002
	Copper (Cu)	0.001	mg/L	0.2	< 0.001	0.002	< 0.001	< 0.001	0.003	< 0.001
	Iron (Fe)	0.005	mg/L	0.2	0.006	0.014	< 0.005	< 0.005	0.047	0.014
	Lead (Pb)	0.001	mg/L	2	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Manganese (Mn)	0.001	mg/L	0.2	0.027	0.61	0.003	0.51	0.043	0.43
	Mercury (Hg)	0.0001	mg/L	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
	Zinc (Zn)	0.005	mg/L	2	0.035	0.005	0.006	0.008	< 0.005	< 0.005

**TABLE 2: OBERON WASTE FACILITY - RESULTS OF LABORATORY ANALYSIS
MAY 2019**



Group	Analyte	LOR	Units	Criteria	Sample ID	BH1(D)	BH3(S)	BH3(D)	BH4(D)	BH5	BH6(D)
					Sample Date	1/05/2019	1/05/2019	1/05/2019	1/05/2019	1/05/2019	1/05/2019
Total Recoverable Hydrocarbons	Benzene (F0)	0.5	µg/L	-	PS	< 0.5	< 5	< 0.5	< 0.5	< 0.5	< 0.5
	TRH C6-C10	50	µg/L	-	PS	< 50	< 500	< 50	< 50	< 50	< 50
	TRH C6-C10 less BTEX (F1)	50	µg/L	-	PS	< 50	< 500	< 50	< 50	< 50	< 50
	TRH >C10-C16 (F2)	60	µg/L	-	PS	< 60	< 60	< 60	< 60	< 60	< 60
	TRH >C10-C16 less Naphthalene (F2)	60	µg/L	-	PS	< 60	< 60	< 60	< 60	< 60	< 60
	TRH >C16-C34 (F3)	500	µg/L	-	PS	< 500	< 500	< 500	< 500	< 500	< 500
	TRH >C34-C40 (F4)	500	µg/L	-	PS	< 500	< 500	< 500	< 500	< 500	< 500
	TRH C10-C40	650	µg/L	-	PS	< 650	< 650	< 650	< 650	< 650	< 650

- mg/L milligrams per litre
- µg/L micrograms per litre
- µS/cm microsiemens per centimetre
- LOR limit of reporting
- PS primary sample
- Criteria Criteria adopted from *Australian and New Zealand Environment and Conservation Council (ANZECC) Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality - 'Primary Industries: Water quality for irrigation and general water use', 2000*

 within criteria
 criteria exceeded

CLIENT DETAILS

Contact **Brendan Stuart**
 Client **GEOLYSE PTY LIMITED**
 Address **PO BOX 1963
 NSW 2800**

Telephone **61 2 68841525**
 Facsimile **(Not specified)**
 Email **bstuart@geolyse.com**

Project **217505 - Oberon WF**
 Order Number **(Not specified)**
 Samples **6**

LABORATORY DETAILS

Manager **Huong Crawford**
 Laboratory **SGS Alexandria Environmental**
 Address **Unit 16, 33 Maddox St
 Alexandria NSW 2015**

Telephone **+61 2 8594 0400**
 Facsimile **+61 2 8594 0499**
 Email **au.environmental.sydney@sgs.com**

SGS Reference **SE192292 R0**
 Date Received **03 May 2019**
 Date Reported **10 May 2019**

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

VOC/VPH - Detection limit(s) raised due to the presence of interferences in the sample.

SIGNATORIES



Bennet Lo
 Senior Organic Chemist/Metals Chemis



Huong Crawford
 Production Manager



Kamrul Ahsan
 Senior Chemist



Ly Kim Ha
 Organic Section Head



Shane McDermott
 Inorganic/Metals Chemist

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Number			SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Matrix			Water	Water	Water	Water
Sample Date			01 May 2019	01 May 2019	01 May 2019	01 May 2019
Sample Name			BH3(S)	BH5	BH1(D)	BH3(D)

VOCs in Water Method: AN433 Tested: 8/5/2019

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Benzene	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<10†	<1	<1	<1
o-xylene	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5

Polycyclic VOCs

Naphthalene	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5
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Surrogates

Dibromofluoromethane (Surrogate)	%	-	124	118	122	121
d4-1,2-dichloroethane (Surrogate)	%	-	115	119	119	119
d8-toluene (Surrogate)	%	-	117	111	120	121
Bromofluorobenzene (Surrogate)	%	-	113	115	118	121

Totals

Total Xylenes	µg/L	1.5	<15†	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<30†	<3	<3	<3

Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 8/5/2019

TRH C6-C10	µg/L	50	<500†	<50	<50	<50
TRH C6-C9	µg/L	40	<400†	<40	<40	<40

Surrogates

Dibromofluoromethane (Surrogate)	%	-	124	118	122	121
d4-1,2-dichloroethane (Surrogate)	%	-	115	119	119	119
d8-toluene (Surrogate)	%	-	117	111	120	121
Bromofluorobenzene (Surrogate)	%	-	113	115	118	121

VPH F Bands

Benzene (F0)	µg/L	0.5	<5.0†	<0.5	<0.5	<0.5
TRH C6-C10 minus BTEX (F1)	µg/L	50	<500†	<50	<50	<50

Parameter	Units	LOR	Sample Number	SE192292.001	SE192292.002	SE192292.003	SE192292.004
			Sample Matrix	Water	Water	Water	Water
			Sample Date	01 May 2019	01 May 2019	01 May 2019	01 May 2019
			Sample Name	BH3(S)	BH5	BH1(D)	BH3(D)

TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 7/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
TRH C10-C14	µg/L	50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200
TRH C10-C36	µg/L	450	<450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650	<650

TRH F Bands

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
TRH >C10-C16	µg/L	60	<60	<60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 Tested: 7/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1	<1

Surrogates

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
d5-nitrobenzene (Surrogate)	%	-	72	46	44	46
2-fluorobiphenyl (Surrogate)	%	-	72	52	50	48
d14-p-terphenyl (Surrogate)	%	-	88	76	80	72

OC Pesticides in Water Method: AN420 Tested: 7/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1	<0.1	<0.1

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Number			SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Matrix			Water	Water	Water	Water
Sample Date			01 May 2019	01 May 2019	01 May 2019	01 May 2019
Sample Name			BH3(S)	BH5	BH1(D)	BH3(D)

OC Pesticides in Water Method: AN420 Tested: 7/5/2019 (continued)

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
p,p'-DDT	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1	<0.1	<0.1

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	92	61	93	61
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OP Pesticides in Water Method: AN420 Tested: 7/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Dichlorvos	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2	<0.2	<0.2

Surrogates

2-fluorobiphenyl (Surrogate)	%	-	72	52	50	48
d14-p-terphenyl (Surrogate)	%	-	88	76	80	72

Total Phenolics in Water Method: AN289 Tested: 10/5/2019

Total Phenols	mg/L	0.01	<0.01	<0.01	<0.01	0.09
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pH in water Method: AN101 Tested: 6/5/2019

pH**	No unit	-	6.7	7.1	5.6	6.1
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Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Number			SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Matrix			Water	Water	Water	Water
Sample Date			01 May 2019	01 May 2019	01 May 2019	01 May 2019
Sample Name			BH3(S)	BH5	BH1(D)	BH3(D)

Conductivity and TDS by Calculation - Water Method: AN106 Tested: 6/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Conductivity @ 25 C	µS/cm	2	530	620	110	200

Anions by Ion Chromatography in Water Method: AN245 Tested: 8/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Chloride	mg/L	1	29	18	12	14
Sulfate, SO4	mg/L	1	10	66	9.7	7.2
Fluoride	mg/L	0.1	0.63	1.0	<0.10	0.12
Nitrate Nitrogen, NO3-N	mg/L	0.005	1.9	0.49	0.17	0.056

Alkalinity Method: AN135 Tested: 6/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Total Alkalinity as CaCO3	mg/L	5	250	250	31	72

Total Dissolved Solids (TDS) in water Method: AN113 Tested: 6/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Total Dissolved Solids Dried at 175-185°C	mg/L	10	380	380	63	150

Forms of Carbon Method: AN190 Tested: 8/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Total Organic Carbon as NPOC	mg/L	0.2	2.3	5.3	0.4	0.4

Nitrite in Water Method: AN277 Tested: 6/5/2019

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005	<0.005	<0.005	<0.005

Parameter	Units	LOR	SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Number			SE192292.001	SE192292.002	SE192292.003	SE192292.004
Sample Matrix			Water	Water	Water	Water
Sample Date			01 May 2019	01 May 2019	01 May 2019	01 May 2019
Sample Name			BH3(S)	BH5	BH1(D)	BH3(D)

Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 9/5/2019

Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	2.2	0.61	0.03	0.10
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Ammonia Nitrogen by Discrete Analyser (Aquakem) Method: AN291 Tested: 6/5/2019

Ammonia Nitrogen, NH ₃ as N	mg/L	0.01	0.03	0.03	0.03	0.02
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Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/5/2019

Calcium, Ca	mg/L	0.2	10	12	3.5	4.7
Magnesium, Mg	mg/L	0.1	15	35	4.0	13
Potassium, K	mg/L	0.1	0.5	1.1	2.9	1.5
Sodium, Na	mg/L	0.5	100	81	8.8	14

Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 8/5/2019

Aluminium, Al	µg/L	5	29	33	<5	<5
Arsenic, As	µg/L	1	1	1	<1	<1
Barium, Ba	µg/L	1	180	74	140	59
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	<1	<1
Cobalt, Co	µg/L	1	7	<1	1	<1
Copper, Cu	µg/L	1	2	3	<1	<1
Iron, Fe	µg/L	5	14	47	6	<5
Lead, Pb	µg/L	1	<1	<1	<1	<1
Manganese, Mn	µg/L	1	610	43	27	3
Zinc, Zn	µg/L	5	5	<5	35	6

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 10/5/2019

Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
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Parameter	Units	LOR	SE192292.005	SE192292.006
Sample Number			SE192292.005	SE192292.006
Sample Matrix			Water	Water
Sample Date			01 May 2019	01 May 2019
Sample Name			BH4(D)	BH6(D)

VOCs in Water Method: AN433 Tested: 8/5/2019

Monocyclic Aromatic Hydrocarbons

Parameter	Units	LOR	SE192292.005	SE192292.006
Benzene	µg/L	0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5

Polycyclic VOCs

Parameter	Units	LOR	SE192292.005	SE192292.006
Naphthalene	µg/L	0.5	<0.5	<0.5

Surrogates

Parameter	Units	LOR	SE192292.005	SE192292.006
Dibromofluoromethane (Surrogate)	%	-	118	115
d4-1,2-dichloroethane (Surrogate)	%	-	114	113
d8-toluene (Surrogate)	%	-	119	120
Bromofluorobenzene (Surrogate)	%	-	114	114

Totals

Parameter	Units	LOR	SE192292.005	SE192292.006
Total Xylenes	µg/L	1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3

Volatile Petroleum Hydrocarbons in Water Method: AN433 Tested: 8/5/2019

Parameter	Units	LOR	SE192292.005	SE192292.006
TRH C6-C10	µg/L	50	<50	<50
TRH C6-C9	µg/L	40	<40	<40

Surrogates

Parameter	Units	LOR	SE192292.005	SE192292.006
Dibromofluoromethane (Surrogate)	%	-	118	115
d4-1,2-dichloroethane (Surrogate)	%	-	114	113
d8-toluene (Surrogate)	%	-	119	120
Bromofluorobenzene (Surrogate)	%	-	114	114

VPH F Bands

Parameter	Units	LOR	SE192292.005	SE192292.006
Benzene (F0)	µg/L	0.5	<0.5	<0.5
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50

	Sample Number	SE192292.005	SE192292.006
	Sample Matrix	Water	Water
	Sample Date	01 May 2019	01 May 2019
	Sample Name	BH4(D)	BH6(D)
Parameter	Units	LOR	

TRH (Total Recoverable Hydrocarbons) in Water Method: AN403 Tested: 7/5/2019

TRH C10-C14	µg/L	50	<50	<50
TRH C15-C28	µg/L	200	<200	<200
TRH C29-C36	µg/L	200	<200	<200
TRH C37-C40	µg/L	200	<200	<200
TRH C10-C36	µg/L	450	<450	<450
TRH C10-C40	µg/L	650	<650	<650

TRH F Bands

TRH >C10-C16	µg/L	60	<60	<60
TRH >C10-C16 - Naphthalene (F2)	µg/L	60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: AN420 Tested: 7/5/2019

Naphthalene	µg/L	0.1	<0.1	<0.1
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1

Surrogates

d5-nitrobenzene (Surrogate)	%	-	48	56
2-fluorobiphenyl (Surrogate)	%	-	54	60
d14-p-terphenyl (Surrogate)	%	-	76	82

OC Pesticides in Water Method: AN420 Tested: 7/5/2019

Hexachlorobenzene (HCB)	µg/L	0.1	<0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1	<0.1
Heptachlor	µg/L	0.1	<0.1	<0.1
Aldrin	µg/L	0.1	<0.1	<0.1
Beta BHC	µg/L	0.1	<0.1	<0.1
Delta BHC	µg/L	0.1	<0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1	<0.1
Dieldrin	µg/L	0.1	<0.1	<0.1
Endrin	µg/L	0.1	<0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1	<0.1

	Sample Number	SE192292.005	SE192292.006
	Sample Matrix	Water	Water
	Sample Date	01 May 2019	01 May 2019
	Sample Name	BH4(D)	BH6(D)
Parameter	Units	LOR	

OC Pesticides in Water Method: AN420 Tested: 7/5/2019 (continued)

Beta Endosulfan	µg/L	0.1	<0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1	<0.1
Isodrin	µg/L	0.1	<0.1	<0.1
Mirex	µg/L	0.1	<0.1	<0.1

Surrogates

Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	81	77
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OP Pesticides in Water Method: AN420 Tested: 7/5/2019

Dichlorvos	µg/L	0.5	<0.5	<0.5
Dimethoate	µg/L	0.5	<0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2	<0.2
Malathion	µg/L	0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2	<0.2
Methidathion	µg/L	0.5	<0.5	<0.5
Ethion	µg/L	0.2	<0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2	<0.2

Surrogates

2-fluorobiphenyl (Surrogate)	%	-	54	60
d14-p-terphenyl (Surrogate)	%	-	76	82

	Sample Number	SE192292.005	SE192292.006
	Sample Matrix	Water	Water
	Sample Date	01 May 2019	01 May 2019
	Sample Name	BH4(D)	BH6(D)
Parameter	Units	LOR	

Total Phenolics in Water Method: AN289 Tested: 10/5/2019

Total Phenols	mg/L	0.01	<0.01	<0.01
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pH in water Method: AN101 Tested: 6/5/2019

pH**	No unit	-	6.5	6.6
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Conductivity and TDS by Calculation - Water Method: AN106 Tested: 6/5/2019

Conductivity @ 25 C	µS/cm	2	250	230
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Anions by Ion Chromatography in Water Method: AN245 Tested: 8/5/2019

Chloride	mg/L	1	5.1	6.9
Sulfate, SO4	mg/L	1	5.2	4.3
Fluoride	mg/L	0.1	0.22	<0.10
Nitrate Nitrogen, NO3-N	mg/L	0.005	0.019	<0.005

Alkalinity Method: AN135 Tested: 6/5/2019

Total Alkalinity as CaCO3	mg/L	5	120	100
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Total Dissolved Solids (TDS) in water Method: AN113 Tested: 6/5/2019

Total Dissolved Solids Dried at 175-185°C	mg/L	10	140	110
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	Sample Number	SE192292.005	SE192292.006
	Sample Matrix	Water	Water
	Sample Date	01 May 2019	01 May 2019
	Sample Name	BH4(D)	BH6(D)
Parameter	Units	LOR	

Forms of Carbon Method: AN190 Tested: 8/5/2019

Total Organic Carbon as NPOC	mg/L	0.2	0.7	0.5
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Nitrite in Water Method: AN277 Tested: 6/5/2019

Nitrite Nitrogen, NO ₂ as N	mg/L	0.005	<0.005	<0.005
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Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 9/5/2019

Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	0.19	0.12
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Ammonia Nitrogen by Discrete Analyser (Aquakem) Method: AN291 Tested: 6/5/2019

Ammonia Nitrogen, NH ₃ as N	mg/L	0.01	0.02	<0.01
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Metals in Water (Dissolved) by ICPOES Method: AN320 Tested: 6/5/2019

Calcium, Ca	mg/L	0.2	15	4.8
Magnesium, Mg	mg/L	0.1	15	19
Potassium, K	mg/L	0.1	1.5	2.5
Sodium, Na	mg/L	0.5	12	11

Trace Metals (Dissolved) in Water by ICPMS Method: AN318 Tested: 8/5/2019

Aluminium, Al	µg/L	5	<5	<5
Arsenic, As	µg/L	1	3	4
Barium, Ba	µg/L	1	25	9
Cadmium, Cd	µg/L	0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1
Cobalt, Co	µg/L	1	<1	2
Copper, Cu	µg/L	1	<1	<1
Iron, Fe	µg/L	5	<5	14
Lead, Pb	µg/L	1	<1	<1
Manganese, Mn	µg/L	1	510	430
Zinc, Zn	µg/L	5	8	<5

	Sample Number	SE192292.005	SE192292.006
	Sample Matrix	Water	Water
	Sample Date	01 May 2019	01 May 2019
	Sample Name	BH4(D)	BH6(D)
Parameter	Units	LOR	

Mercury (dissolved) in Water Method: AN311(Perth)/AN312 Tested: 10/5/2019

Mercury	mg/L	0.0001	<0.0001	<0.0001
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MB blank results are compared to the Limit of Reporting
 LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
 DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Alkalinity Method: ME-(AU)-[ENV]AN135

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Alkalinity as CaCO3	LB173066	mg/L	5	<5	1%	98%

Ammonia Nitrogen by Discrete Analyser (AquaKem) Method: ME-(AU)-[ENV]AN291

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Ammonia Nitrogen, NH ₃ as N	LB172973	mg/L	0.01	<0.01	1%	97%	93%

Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloride	LB173160	mg/L	1	<1.0		95%
Sulfate, SO ₄	LB173160	mg/L	1	<1.0	0%	94%
Fluoride	LB173160	mg/L	0.1	<0.10		95%
Nitrate Nitrogen, NO ₃ -N	LB173160	mg/L	0.005	<0.005	0%	95%

Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]AN106

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB173028	µS/cm	2	<2	4%	98%

Forms of Carbon Method: ME-(AU)-[ENV]AN190

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Organic Carbon as NPOC	LB173170	mg/L	0.2	<0.2	0%	104 - 107%	107%

Mercury (dissolved) in Water Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Mercury	LB173393	mg/L	0.0001	<0.0001	0%	92%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Calcium, Ca	LB172959	mg/L	0.2	<0.2	0%	96%	79%
Magnesium, Mg	LB172959	mg/L	0.1	<0.1	1 - 2%	98%	
Potassium, K	LB172959	mg/L	0.1	<0.1	1 - 3%	94%	
Sodium, Na	LB172959	mg/L	0.5	<0.5	0 - 1%	94%	

Nitrite in Water Method: ME-(AU)-[ENV]AN277

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Nitrite Nitrogen, NO2 as N	LB172973	mg/L	0.005	<0.005	0%	101%

OC Pesticides in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Hexachlorobenzene (HCB)	LB173085	µg/L	0.1	<0.1	0%	NA
Alpha BHC	LB173085	µg/L	0.1	<0.1	0%	NA
Lindane (gamma BHC)	LB173085	µg/L	0.1	<0.1	0%	NA
Heptachlor	LB173085	µg/L	0.1	<0.1	0%	110%
Aldrin	LB173085	µg/L	0.1	<0.1	0%	90%
Beta BHC	LB173085	µg/L	0.1	<0.1	0%	NA
Delta BHC	LB173085	µg/L	0.1	<0.1	0%	117%
Heptachlor epoxide	LB173085	µg/L	0.1	<0.1	0%	NA
o,p'-DDE	LB173085	µg/L	0.1	<0.1	0%	NA
Alpha Endosulfan	LB173085	µg/L	0.1	<0.1	0%	NA
Gamma Chlordane	LB173085	µg/L	0.1	<0.1	0%	NA
Alpha Chlordane	LB173085	µg/L	0.1	<0.1	0%	NA
trans-Nonachlor	LB173085	µg/L	0.1	<0.1	0%	NA
p,p'-DDE	LB173085	µg/L	0.1	<0.1	0%	NA
Dieldrin	LB173085	µg/L	0.1	<0.1	0%	123%
Endrin	LB173085	µg/L	0.1	<0.1	0%	125%
o,p'-DDD	LB173085	µg/L	0.1	<0.1	0%	NA
o,p'-DDT	LB173085	µg/L	0.1	<0.1	0%	NA
Beta Endosulfan	LB173085	µg/L	0.1	<0.1	0%	NA
p,p'-DDD	LB173085	µg/L	0.1	<0.1	0%	NA
p,p'-DDT	LB173085	µg/L	0.1	<0.1	0%	124%
Endosulfan sulphate	LB173085	µg/L	0.1	<0.1	0%	NA
Endrin aldehyde	LB173085	µg/L	0.1	<0.1	0%	NA
Methoxychlor	LB173085	µg/L	0.1	<0.1	0%	NA
Endrin ketone	LB173085	µg/L	0.1	<0.1	0%	NA
Isodrin	LB173085	µg/L	0.1	<0.1	0%	NA
Mirex	LB173085	µg/L	0.1	<0.1	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB173085	%	-	97%	13%	61%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

OP Pesticides in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorvos	LB173085	µg/L	0.5	<0.5	0%	104%
Dimethoate	LB173085	µg/L	0.5	<0.5	0%	NA
Diazinon (Dimpylate)	LB173085	µg/L	0.5	<0.5	0%	101%
Fenitrothion	LB173085	µg/L	0.2	<0.2	0%	NA
Malathion	LB173085	µg/L	0.2	<0.2	0%	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB173085	µg/L	0.2	<0.2	0%	98%
Parathion-ethyl (Parathion)	LB173085	µg/L	0.2	<0.2	0%	NA
Bromophos Ethyl	LB173085	µg/L	0.2	<0.2	0%	NA
Methidathion	LB173085	µg/L	0.5	<0.5	0%	NA
Ethion	LB173085	µg/L	0.2	<0.2	0%	98%
Azinphos-methyl	LB173085	µg/L	0.2	<0.2	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
2-fluorobiphenyl (Surrogate)	LB173085	%	-	68%	4%	68%
d14-p-terphenyl (Surrogate)	LB173085	%	-	72%	3%	72%

PAH (Polynuclear Aromatic Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Naphthalene	LB173085	µg/L	0.1	<0.1	0%	73%
2-methylnaphthalene	LB173085	µg/L	0.1	<0.1	0%	NA
1-methylnaphthalene	LB173085	µg/L	0.1	<0.1	0%	NA
Acenaphthylene	LB173085	µg/L	0.1	<0.1	0%	80%
Acenaphthene	LB173085	µg/L	0.1	<0.1	0%	76%
Fluorene	LB173085	µg/L	0.1	<0.1	0%	NA
Phenanthrene	LB173085	µg/L	0.1	<0.1	0%	75%
Anthracene	LB173085	µg/L	0.1	<0.1	0%	73%
Fluoranthene	LB173085	µg/L	0.1	<0.1	0%	84%
Pyrene	LB173085	µg/L	0.1	<0.1	0%	76%
Benzo(a)anthracene	LB173085	µg/L	0.1	<0.1	0%	NA
Chrysene	LB173085	µg/L	0.1	<0.1	0%	NA
Benzo(b&j)fluoranthene	LB173085	µg/L	0.1	<0.1	0%	NA
Benzo(k)fluoranthene	LB173085	µg/L	0.1	<0.1	0%	NA
Benzo(a)pyrene	LB173085	µg/L	0.1	<0.1	0%	79%
Indeno(1,2,3-cd)pyrene	LB173085	µg/L	0.1	<0.1	0%	NA
Dibenzo(ah)anthracene	LB173085	µg/L	0.1	<0.1	0%	NA
Benzo(ghi)perylene	LB173085	µg/L	0.1	<0.1	0%	NA
Total PAH (18)	LB173085	µg/L	1	<1		

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
d5-nitrobenzene (Surrogate)	LB173085	%	-	64%	4%	64%
2-fluorobiphenyl (Surrogate)	LB173085	%	-	68%	4%	68%
d14-p-terphenyl (Surrogate)	LB173085	%	-	72%	3%	72%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

pH in water Method: ME-(AU)-[ENV]AN101

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH**	LB173028	No unit	-	0%	100%

Total Dissolved Solids (TDS) in water Method: ME-(AU)-[ENV]AN113

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Dissolved Solids Dried at 175-185°C	LB173045	mg/L	10	<10	7%	90%

Total Phenolics in Water Method: ME-(AU)-[ENV]AN289

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Phenols	LB173409	mg/L	0.01	<0.01	0%	98%

Total Phosphorus by Kjeldahl Digestion DA in Water Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Phosphorus (Kjeldahl Digestion) as P	LB173262	mg/L	0.02	<0.02	7%	101%	97%

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Aluminium, Al	LB173189	µg/L	5	<5		111%	96%
Arsenic, As	LB173189	µg/L	1	<1	4%	89%	96%
Barium, Ba	LB173189	µg/L	1	<1		99%	97%
Cadmium, Cd	LB173189	µg/L	0.1	<0.1	13%	103%	109%
Chromium, Cr	LB173189	µg/L	1	<1	0%	112%	106%
Cobalt, Co	LB173189	µg/L	1	<1	0%	110%	102%
Copper, Cu	LB173189	µg/L	1	<1	2%	111%	100%
Iron, Fe	LB173189	µg/L	5	<5		114%	93%
Lead, Pb	LB173189	µg/L	1	<1	0%	101%	102%
Manganese, Mn	LB173189	µg/L	1	<1	2%	102%	5%
Zinc, Zn	LB173189	µg/L	5	<5	0 - 1%	104%	98%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

TRH (Total Recoverable Hydrocarbons) in Water Method: ME-(AU)-[ENV]AN403

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH C10-C14	LB173085	µg/L	50	<50	0%	102%
TRH C15-C28	LB173085	µg/L	200	<200	0%	111%
TRH C29-C36	LB173085	µg/L	200	<200	0%	116%
TRH C37-C40	LB173085	µg/L	200	<200	0%	NA
TRH C10-C36	LB173085	µg/L	450	<450	0%	NA
TRH C10-C40	LB173085	µg/L	650	<650	0%	NA

TRH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
TRH >C10-C16	LB173085	µg/L	60	<60	0%	105%
TRH >C10-C16 - Naphthalene (F2)	LB173085	µg/L	60	<60	0%	NA
TRH >C16-C34 (F3)	LB173085	µg/L	500	<500	0%	115%
TRH >C34-C40 (F4)	LB173085	µg/L	500	<500	0%	123%

VOCs in Water Method: ME-(AU)-[ENV]AN433

Monocyclic Aromatic Hydrocarbons

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene	LB173168	µg/L	0.5	<0.5	0%	110%	121%
Toluene	LB173168	µg/L	0.5	<0.5	0%	110%	110%
Ethylbenzene	LB173168	µg/L	0.5	<0.5	0%	110%	114%
m/p-xylene	LB173168	µg/L	1	<1	0%	109%	100%
o-xylene	LB173168	µg/L	0.5	<0.5	0%	110%	119%

Polycyclic VOCs

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Naphthalene	LB173168	µg/L	0.5	<0.5	0%	NA	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB173168	%	-	126%	4 - 5%	85%	117%
d4-1,2-dichloroethane (Surrogate)	LB173168	%	-	99%	2 - 4%	99%	98%
d8-toluene (Surrogate)	LB173168	%	-	96%	2 - 4%	104%	97%
Bromofluorobenzene (Surrogate)	LB173168	%	-	111%	3 - 4%	94%	93%

Totals

Parameter	QC Reference	Units	LOR	MB
Total Xylenes	LB173168	µg/L	1.5	<1.5
Total BTEX	LB173168	µg/L	3	<3

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared to the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

Volatile Petroleum Hydrocarbons in Water Method: ME-(AU)-[ENV]AN433

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
TRH C6-C10	LB173168	µg/L	50	<50	0%	102%	103%
TRH C6-C9	LB173168	µg/L	40	<40	0%	106%	100%

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Dibromofluoromethane (Surrogate)	LB173168	%	-	112%	4 - 5%	116%	117%
d4-1,2-dichloroethane (Surrogate)	LB173168	%	-	108%	2 - 4%	120%	98%
d8-toluene (Surrogate)	LB173168	%	-	100%	2 - 4%	117%	97%
Bromofluorobenzene (Surrogate)	LB173168	%	-	115%	3 - 4%	122%	93%

VPH F Bands

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Benzene (F0)	LB173168	µg/L	0.5	<0.5	0%	NA	NA
TRH C6-C10 minus BTEX (F1)	LB173168	µg/L	50	<50	0%	104%	105%

METHOD

METHODOLOGY SUMMARY

AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B.
AN106	Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN113	The Total Dissolved Solids residue may also be ignited at 550 C and volatile TDS (Organic TDS) and non-volatile TDS (Inorganic) can be determined.
AN135	Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN190	TOC and DOC in Water: A homogenised micro portion of sample is injected into a heated reaction chamber packed with an oxidative catalyst that converts organic carbon to carbon dioxide. The CO ₂ is measured using a non-dispersive infrared detector. The process is fully automated in a commercially available analyser. If required a sugar value can be calculated from the TOC result. Reference APHA 5310 B.
AN190	Chemical oxygen demand can be calculated/estimated based on the O ₂ /C relation as 2.67*NPOC (TOC). This is an estimate only and the factor will vary with sample matrix so results should be interpreted with caution.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO ₂ , NO ₃ and SO ₄ are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN277/WC250.312	Nitrite ions, when reacted with a reagent containing sulphanilamide and N-(1-naphthyl)-ethylenediamine dihydrochloride produce a highly coloured azo dye that is measured photometrically at 540nm.
AN279/AN293(Sydney)	The sample is digested with Sulphuric acid, K ₂ SO ₄ and CuSO ₄ . All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.

METHOD

METHODOLOGY SUMMARY

AN291	Ammonia in solution reacts with hypochlorite ions from Sodium Dichloroisocyanate, and salicylate in the presence of Sodium Nitroprusside to form indophenol blue and measured at 670 nm by Discrete Analyser.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN320	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components .
AN320	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). Where F2 is corrected for Naphthalene, the VOC data for Naphthalene is used.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Silica) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents.
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
Calculation	Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported . APHA4500CO2 D.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
		-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received. Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/pv.sgsvr/en-gb/environment.

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