

CERTIFICATE OF ANALYSIS

116543

Client:

SMEC Australia
Level 5, 20 Berry St
North Sydney
NSW 2060

Attention: Daniel Saulders

Sample log in details:

Your Reference:	30011806, Badgerys Creek
No. of samples:	7 waters
Date samples received / completed instructions received	23/09/2014 / 23/09/2014

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	26/09/14 / 1/10/14
Date of Preliminary Report:	26/09/2014

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Results Approved By:



Jacinta Hurst
Laboratory Manager

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date extracted	-	23/09/2014	23/09/2014	23/09/2014	23/09/2014	23/09/2014
Date analysed	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Dichlorodifluoromethane	µg/L	<10	<10	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1	<1	<1
Chloroform	µg/L	<1	<1	<1	<1	<1
2,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1	<1	<1
Benzene	µg/L	<1	<1	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	<1	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
Bromoform	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
Styrene	µg/L	<1	<1	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1	<1	<1
o-xylene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1	<1	<1	<1

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Isopropylbenzene	µg/L	<1	<1	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1	<1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	103	103	104	106
Surrogate toluene-d8	%	98	98	99	100	99
Surrogate 4-BFB	%	106	107	106	104	103

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date extracted	-	23/09/2014	23/09/2014
Date analysed	-	24/09/2014	24/09/2014
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	<1	<1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1
1,2,3-trichloropropane	µg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	104	104
Surrogate toluene-d8	%	98	101
Surrogate 4-BFB	%	108	105

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date extracted	-	23/09/2014	23/09/2014	23/09/2014	23/09/2014	23/09/2014
Date analysed	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
TRHC ₆ - C ₉	µg/L	<10	<10	<10	<10	<10
TRHC ₆ - C ₁₀	µg/L	<10	<10	<10	<10	<10
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1	<1
Naphthalene	µg/L	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%	103	103	103	104	106
Surrogate toluene-d8	%	98	98	99	100	99
Surrogate 4-BFB	%	106	107	106	104	103

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date extracted	-	23/09/2014	23/09/2014
Date analysed	-	24/09/2014	24/09/2014
TRHC ₆ - C ₉	µg/L	<10	<10
TRHC ₆ - C ₁₀	µg/L	<10	<10
TRHC ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	104	104
Surrogate toluene-d8	%	98	101
Surrogate 4-BFB	%	108	105

svTRH (C10-C40) in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Date analysed	-	25/09/2014	25/09/2014	25/09/2014	25/09/2014	25/09/2014
TRHC ₁₀ - C ₁₄	µg/L	<50	<50	<50	<50	<50
TRHC ₁₅ - C ₂₈	µg/L	<100	<100	150	230	<100
TRHC ₂₉ - C ₃₆	µg/L	220	190	500	340	<100
TRH>C ₁₀ - C ₁₆	µg/L	<50	<50	<50	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50	<50	<50	<50
TRH>C ₁₆ - C ₃₄	µg/L	260	240	540	480	<100
TRH>C ₃₄ - C ₄₀	µg/L	<100	<100	280	180	<100
Surrogate o-Terphenyl	%	84	104	121	109	112

svTRH (C10-C40) in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014
Date analysed	-	25/09/2014	25/09/2014
TRHC ₁₀ - C ₁₄	µg/L	<50	<50
TRHC ₁₅ - C ₂₈	µg/L	120	140
TRHC ₂₉ - C ₃₆	µg/L	320	250
TRH>C ₁₀ - C ₁₆	µg/L	<50	<50
TRH>C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50
TRH>C ₁₆ - C ₃₄	µg/L	380	350
TRH>C ₃₄ - C ₄₀	µg/L	150	110
Surrogate o-Terphenyl	%	111	140

PAHs in Water - Low Level Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Naphthalene	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+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	102	91	67	74	104

PAHs in Water - Low Level Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014
Naphthalene	µg/L	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1
Pyrene	µg/L	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	81	105

Total Phenolics in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05

Total Phenolics in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date extracted	-	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05

HM in water - dissolved						
Our Reference:	UNITS	116543-1	116543-2	116543-3	116543-4	116543-5
Your Reference	-----	C1	B1	B2	B3	T1
Date Sampled	-----	22/09/2014	22/09/2014	22/09/2014	22/09/2014	22/09/2014
Type of sample		water	water	water	water	water
Date prepared	-	25/09/2014	25/09/2014	25/09/2014	25/09/2014	25/09/2014
Date analysed	-	25/09/2014	25/09/2014	25/09/2014	25/09/2014	25/09/2014
Arsenic-Dissolved	µg/L	<1	3	2	1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1	<1
Copper-Dissolved	µg/L	3	7	10	8	3
Lead-Dissolved	µg/L	<1	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	1	4	5	3	2
Zinc-Dissolved	µg/L	3	10	10	7	7

HM in water - dissolved			
Our Reference:	UNITS	116543-6	116543-7
Your Reference	-----	DN1	QC1
Date Sampled	-----	22/09/2014	22/09/2014
Type of sample		water	water
Date prepared	-	25/09/2014	25/09/2014
Date analysed	-	25/09/2014	25/09/2014
Arsenic-Dissolved	µg/L	1	3
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	4	8
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	3	4
Zinc-Dissolved	µg/L	6	9

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-1 C1 22/09/2014 water	116543-2 B1 22/09/2014 water	116543-3 B2 22/09/2014 water	116543-4 B3 22/09/2014 water	116543-5 T1 22/09/2014 water
Date prepared	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014	24/09/2014	24/09/2014	24/09/2014
Total Suspended Solids	mg/L	32	10	17	16	31
Oil & Grease (LLE)	mg/L	<5	<5	<5	<5	<5
Total Organic Carbon	mg/L	10	25	24	18	11
M.B.A.S Methylene Blue Active Substances	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10
Turbidity	NTU	11	3.2	14	11	17
Nitrite as N in water	mg/L	<0.005	<0.005	0.011	0.010	<0.005
Nitrate as N in water	mg/L	<0.005	<0.005	0.13	0.078	<0.005
Ammonia as N in water	mg/L	<0.005	0.01	0.013	0.006	<0.005
TKN in water	mg/L	0.8	2.8	2.3	2.5	0.7
Total Nitrogen in water	mg/L	0.8	2.8	2.5	2.6	0.7
Phosphorus - Total	mg/L	0.09	1.6	0.5	0.5	0.07

Miscellaneous Inorganics Our Reference: Your Reference Date Sampled Type of sample	UNITS ----- -----	116543-6 DN1 22/09/2014 water	116543-7 QC1 22/09/2014 water
Date prepared	-	24/09/2014	24/09/2014
Date analysed	-	24/09/2014	24/09/2014
Total Suspended Solids	mg/L	30	22
Oil & Grease (LLE)	mg/L	<5	<5
Total Organic Carbon	mg/L	16	25
M.B.A.S Methylene Blue Active Substances	mg/L	<0.10	<0.10
Turbidity	NTU	35	3.7
Nitrite as N in water	mg/L	<0.005	<0.005
Nitrate as N in water	mg/L	<0.005	<0.005
Ammonia as N in water	mg/L	<0.005	0.032
TKN in water	mg/L	1.5	2.9
Total Nitrogen in water	mg/L	1.5	2.9
Phosphorus - Total	mg/L	0.1	1.7

Method ID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-019	Suspended Solids - determined gravimetrically by filtration of the sample. The samples are dried at 104+/-5oC.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA latest edition, 5220-B.
Inorg-079	TOC determined using a TOC analyser using the combustion method. DOC is filtered prior to determination. Analysis using APHA latest edition 5310B.
Ext-044	Analysed by LabPoint NATA accreditation 11111.
Inorg-022	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130-B.
Inorg-055	Nitrite - determined colourimetrically based on APHA latest edition NO2- B. Soils are analysed following a water extraction.
Inorg-055	Nitrate - determined colourimetrically. Soils are analysed following a water extraction.
Inorg-057	Ammonia - determined colourimetrically, based on APHA latest edition 4500-NH3 F. Soils are analysed following a KCl extraction.
Inorg-062	TKN - determined colourimetrically based on APHA latest edition 4500 Norg.
Inorg-055/062	Total Nitrogen - Calculation sum of TKN and oxidised Nitrogen.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 30011806, Badgerys Creek

QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOCs in water						Base II Duplicate II %RPD		
Date extracted	-			23/09/2014	[NT]	[NT]	LCS-W2	23/09/2014
Date analysed	-			23/09/2014	[NT]	[NT]	LCS-W2	23/09/2014
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	99%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	99%
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	97%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	99%
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	108%
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	99%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	98%
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W2	97%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NR]	[NR]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
VOCs in water						Base II Duplicate II %RPD		
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate	%		Org-013	104	[NT]	[NT]	LCS-W2	101%
Dibromofluoromethane								
Surrogate toluene-d8	%		Org-013	99	[NT]	[NT]	LCS-W2	99%
Surrogate 4-BFB	%		Org-013	105	[NT]	[NT]	LCS-W2	102%

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
vTRH(C6-C10)/BTEXN in Water						Base II Duplicate II %RPD		
Date extracted	-			23/09/2014	[NT]	[NT]	LCS-W2	23/09/2014
Date analysed	-			23/09/2014	[NT]	[NT]	LCS-W2	23/09/2014
TRHC ₆ - C ₉	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W2	101%
TRHC ₆ - C ₁₀	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W2	101%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	100%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	101%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	101%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W2	102%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	102%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	104	[NT]	[NT]	LCS-W2	101%
Surrogate toluene-d8	%		Org-016	99	[NT]	[NT]	LCS-W2	99%
Surrogate 4-BFB	%		Org-016	105	[NT]	[NT]	LCS-W2	102%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
svTRH (C10-C40) in Water						Base II Duplicate II %RPD		
Date extracted	-			24/09/2014	[NT]	[NT]	LCS-W1	24/09/2014
Date analysed	-			24/09/2014	[NT]	[NT]	LCS-W1	24/09/2014
TRHC ₁₀ - C ₁₄	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	105%
TRHC ₁₅ - C ₂₈	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	85%
TRHC ₂₉ - C ₃₆	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	86%
TRH>C ₁₀ - C ₁₆	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	105%
TRH>C ₁₆ - C ₃₄	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	85%
TRH>C ₃₄ - C ₄₀	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	86%
Surrogate o-Terphenyl	%		Org-003	79	[NT]	[NT]	LCS-W1	79%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Water - Low Level						Base II Duplicate II %RPD		
Date extracted	-			24/09/2014	[NT]	[NT]	LCS-W1	24/09/2014
Date analysed	-			24/09/2014	[NT]	[NT]	LCS-W1	24/09/2014
Naphthalene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	111%
Acenaphthylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	100%
Phenanthrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	100%

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QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
PAHs in Water - Low Level						Base II Duplicate II %RPD		
Anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	95%
Pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	96%
Benzo(a)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	92%
Benzo(b,j+k) fluoranthene	µg/L	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-W1	106%
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	80	[NT]	[NT]	LCS-W1	103%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Total Phenolics in Water						Base II Duplicate II %RPD		
Date extracted	-			24/09/2014	116543-1	24/09/2014 24/09/2014	LCS-W1	24/09/2014
Date analysed	-			24/09/2014	116543-1	24/09/2014 24/09/2014	LCS-W1	24/09/2014
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	116543-1	<0.05 <0.05	LCS-W1	96%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
HM in water - dissolved						Base II Duplicate II %RPD		
Date prepared	-			24/09/2014	[NT]	[NT]	LCS-W1	25/09/2014
Date analysed	-			24/09/2014	[NT]	[NT]	LCS-W1	25/09/2014
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	97%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	97%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	98%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	99%
Mercury-Dissolved	µg/L	0.05	Metals-021 CV-AAS	<0.05	[NT]	[NT]	LCS-W1	100%

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QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
HM in water - dissolved						Base Duplicate %RPD		
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	96%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	97%
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Miscellaneous Inorganics						Base Duplicate %RPD		
Date prepared	-			24/09/2014	116543-2	24/09/2014 24/09/2014	LCS-W1	24/09/2014
Date analysed	-			24/09/2014	116543-2	24/09/2014 24/09/2014	LCS-W1	24/09/2014
Total Suspended Solids	mg/L	5	Inorg-019	<5	116543-2	10 11 RPD: 10	LCS-W1	94%
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	116543-2	<5 [N/T]	LCS-W1	92%
Total Organic Carbon	mg/L	1	Inorg-079	<1	116543-2	25 [N/T]	[NR]	[NR]
M.B.A.S Methylene Blue Active Substances	mg/L	0.1	Ext-044	<0.10	116543-2	<0.10 <0.10	[NR]	[NR]
Turbidity	NTU	0.1	Inorg-022	<0.1	116543-2	3.2 [N/T]	LCS-W1	100%
Nitrite as N in water	mg/L	0.005	Inorg-055	<0.005	116543-2	<0.005 [N/T]	LCS-W1	111%
Nitrate as N in water	mg/L	0.005	Inorg-055	<0.005	116543-2	<0.005 [N/T]	LCS-W1	98%
Ammonia as N in water	mg/L	0.005	Inorg-057	<0.005	116543-2	0.01 [N/T]	LCS-W1	93%
TKN in water	mg/L	0.1	Inorg-062	<0.1	116543-2	2.8 [N/T]	[NR]	[NR]
Total Nitrogen in water	mg/L	0.1	Inorg-055/062	<0.1	116543-2	2.8 [N/T]	LCS-W1	102%
Phosphorus - Total	mg/L	0.05	Metals-020 ICP-AES	<0.05	116543-2	1.6 [N/T]	LCS-W1	103%
QUALITY CONTROL Total Phenolics in Water	UNITS	Dup. Sm#		Duplicate Base + Duplicate + %RPD		Spike Sm#	Spike % Recovery	
Date extracted	-	[NT]		[NT]		116543-2	24/09/2014	
Date analysed	-	[NT]		[NT]		116543-2	24/09/2014	
Total Phenolics (as Phenol)	mg/L	[NT]		[NT]		116543-2	86%	
QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#		Duplicate Base + Duplicate + %RPD		Spike Sm#	Spike % Recovery	
Date prepared	-	116543-1		24/09/2014 24/09/2014		116543-2	24/09/2014	
Date analysed	-	116543-1		24/09/2014 24/09/2014		116543-2	24/09/2014	
Total Organic Carbon	mg/L	116543-1		10 10 RPD: 0		116543-2	100%	
Turbidity	NTU	116543-1		11 11 RPD: 0		[NR]	[NR]	
Nitrite as N in water	mg/L	116543-1		<0.005 <0.005		116543-2	107%	
Nitrate as N in water	mg/L	116543-1		<0.005 <0.005		116543-2	82%	
Ammonia as N in water	mg/L	116543-1		<0.005 <0.005		116543-2	94%	
TKN in water	mg/L	116543-1		0.8 0.7 RPD: 13		[NR]	[NR]	
Total Nitrogen in water	mg/L	116543-1		0.8 0.7 RPD: 13		116543-2	76%	
Phosphorus - Total	mg/L	116543-1		0.09 0.09 RPD: 0		116543-2	108%	

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QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	116543-3	24/09/2014
Date analysed	-	[NT]	[NT]	116543-3	24/09/2014
Total Suspended Solids	mg/L	[NT]	[NT]	[NR]	[NR]
Oil & Grease (LLE)	mg/L	[NT]	[NT]	[NR]	[NR]
Total Organic Carbon	mg/L	[NT]	[NT]	[NR]	[NR]
M.B.A.S Methylene Blue Active Substances	mg/L	[NT]	[NT]	[NR]	[NR]
Turbidity	NTU	[NT]	[NT]	[NR]	[NR]
Nitrite as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
Nitrate as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
Ammonia as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
TKN in water	mg/L	[NT]	[NT]	[NR]	[NR]
Total Nitrogen in water	mg/L	[NT]	[NT]	[NR]	[NR]
Phosphorus - Total	mg/L	[NT]	[NT]	116543-3	108%
QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	116543-1	24/09/2014
Date analysed	-	[NT]	[NT]	116543-1	24/09/2014
Total Suspended Solids	mg/L	[NT]	[NT]	[NR]	[NR]
Oil & Grease (LLE)	mg/L	[NT]	[NT]	[NR]	[NR]
Total Organic Carbon	mg/L	[NT]	[NT]	[NR]	[NR]
M.B.A.S Methylene Blue Active Substances	mg/L	[NT]	[NT]	116543-1	104%
Turbidity	NTU	[NT]	[NT]	[NR]	[NR]
Nitrite as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
Nitrate as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
Ammonia as N in water	mg/L	[NT]	[NT]	[NR]	[NR]
TKN in water	mg/L	[NT]	[NT]	[NR]	[NR]
Total Nitrogen in water	mg/L	[NT]	[NT]	[NR]	[NR]
Phosphorus - Total	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

MBAS ANALYSED BY LABPOINT. REPORT NO. NAA14-1832

Asbestos ID was analysed by Approved Identifier: Not applicable for this job

Asbestos ID was authorised by Approved Signatory: Not applicable for this job

INS: Insufficient sample for this test

PQL: Practical Quantitation Limit

NT: Not tested

NA: Test not required

RPD: Relative Percent Difference

NA: Test not required

<: Less than

>: Greater than

LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

