

Location	Area	Depth (m)	Field ID	Sample Date	Lab Report #	4,5-Trichloropheno	4,6-Trichloropheno	4-Dichloropheno	6-Dichloropheno	Chloropheno	Chloro-3-methylph	Pentachloropheno	tetrachloropheno	Total Halogenated P	4-Dimethylpheno	2,4-Dinitrophenol	Cyclohexyl-4,6-dim	2-Methyl-4,6-ditrop	3,4-Methylpheno (m	4-Nitrophenol	Pinoseb	Phenol	Total cresole	Total Non-Halogenat
LODR																								
NEMW 2013 Table 1A(1) Contaminated Soil Hill for Soil Contaminants, Sand																								
NEMW 2013 Table 1A(3) Contaminated Soil Hill for Vapour Intrusion, Sand																								
0-1m																								
1-2m																								
2-4m																								
>4m																								
NEMW 2013 Table 1B(6) ESLS for Comm/Ind. Coarse Soil																								
NEMW 2013 Table 1B(7) Management Limits Comm / Ind. Coarse Soil																								
CFC Care (2011) HSI Invasive Maintenance Worker (Direct Contact)																								
V150	S of Ramp Rd	0	V150	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V151	S of Ramp Rd	0	V151	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V152	S of Ramp Rd	0	V152	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V153	S of Ramp Rd	0	V153	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V154	S of Ramp Rd	0	V154	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V155	S of Ramp Rd	0.5	V155	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V156	S of Ramp Rd	0.5	V156	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V157	S of Ramp Rd	0.5	V157	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V158	S of Ramp Rd	0.5	V158	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V159	S of Ramp Rd	0.5	V159	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V160	S of Ramp Rd	0.5	V160	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V161	S of Ramp Rd	0.1	V161	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V162	S of Ramp Rd	0.1	V162	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V163	S of Ramp Rd	0.1	V163	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V164	S of Ramp Rd	0.1	V164	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V165	S of Ramp Rd	0.1	V165	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V166	S of Ramp Rd	0.1	V166	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V167	S of Ramp Rd	0.1	V167	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V168	S of Ramp Rd	0.1	V168	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V169	S of Ramp Rd	0.1	V169	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V170	S of Ramp Rd	0.1	V170	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V171	S of Ramp Rd	0.1	V171	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V172	S of Ramp Rd	0.1	V172	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V173	S of Ramp Rd	0.1	V173	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
V174	S of Ramp Rd	0.1	V174	1/10/2020	747984	<1	<1	0.5	0.5	0.5	1	10	1	0.5	5	5	20	5	0.2	1	0.4	5	20	240000
BIOPILE SAMPLES (PAH/Phenol Assessment)																								
BP01	Biopile 1			10/12/2021	850365	<1	<1	<0.5	<0.5	<0.5	<1	<10	<1	<1	<0.5	<5	<20	<5	<0.2	<1	<0.4	<5	<20	<0.5
BP02	Biopile 2			10/12/2021	850365	<1	<1	<0.5	<0.5	<0.5	<1	<10	<1	<1	<0.5	<5	<20	<5	<0.2	<1	<0.4	<5	<20	<0.5
BP03	Biopile 3			10/12/2021	850365	<1	<1	<0.5	<0.5	<0.5	<1	<10	<1	<1	<0.5	<5	<20	<5	<0.2	<1	<0.4	<5	<20	<0.5
BP04	Biopile 4			10/12/2021	850365	<1	<1	<0.5	<0.5	<0.5	<1	<10	<1	<1	<0.5	<5	<20	<5	<0.2	<1	<0.4	<5	<20	<0.5
BP05	Biopile 5			10/12/2021	850365	<1	<1	<0.5	<0.5	<0.5	<1	<10	<1	<1	<0.5	<5	<20	<5	<0.2	<1	<0.4	<5	<20	<0.5

Location	Area	Sample Date	Lab Report #	Inorganic		TRH				TPH				BTEXN										
				mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			
LOR				1		20	20	50	50	100	100	20	20	50	50	0.1	0.1	0.2	0.1	0.3	0.5			
NEPM 2013 Table 1A(1) Comm/Ind D Soil HLL for Soil Contaminants, Sand																								
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand																								
0-1m						260		NL								NL				230	NL			
1-2m						370		NL								NL					NL			
2-4m						650		NL								NL					NL			
>4m								NL								NL					NL			
NEPM 2013 Table 1B(6) ESLS for Comm/Ind, Coarse Soil						700		1000														370		
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil						26000		20000															11000	
CRC Care (2011) HSL D (Comm/Ind) (Direct Contact)						82000		62000															29000	
CRC Care (2011) HSL Intrusive Maintenance Worker (Direct Contact)																								
CRC Care (2011) HSL D for Vapour Intrusion (Comm/Ind), Sand																								
0 - <1m						260																		
1 - <2m						370																		
2 - <4m						630																		
4m+						NL																		
CRC Care (2011) HSL for Vapour Intrusion (Intrusive Maintenance Worker), Sand																								
0 - <2m																								
2 - <4m																								
4m+																								
Location	Area	Sample Date	Lab Report #																					
BP01	Biopile 5	10/12/2021	850365	<1		<20	<20	340	340	1400	370	2110	2110	1300	420	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5		
BP02	Biopile 5	10/12/2021	850365	1.2		<20	<20	3600	3600	8700	210	12510	12510	12000	1900	<0.1	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5		
BP03	Biopile 5	10/12/2021	850365	2.6		<20	<20	730	730	2200	120	3050	3050	2500	99	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5		
BP04	Biopile 5	10/12/2021	850365	2.5		<20	<20	57	57	450	<100	507	507	<20	430	<0.1	<0.1	<0.1	<0.1	<0.3	<0.5	<0.5		
BP05	Biopile 5	10/12/2021	850365	1.8		<20	<20	530	530	1800	190	2520	2520	2000	180	<0.1	<0.1	<0.2	<0.1	<0.3	<0.5	<0.5		

One Rail Diesel Spill - Contaminated Stockpiled Soil
Relative Percentage Duplicate Results
December 2021

Chem_Group	ChemName	Units	SDG Field ID Sampled Date/Time	16-Dec-21	16-Dec-21	16-Dec-21	22/12/2021	RPD
				BP01 10/12/2021	QC01 10/12/2021	BP01 10/12/2021	QC01A 10/12/2021	
BTEX	Benzene	mg/kg	0.1 (Primary); 0.2 (Secondary)	<0.1	<0.1	0	<0.2	0
	Ethylbenzene	mg/kg	0.1 (Primary); 0.5 (Secondary)	<0.1	<0.1	0	<0.5	0
	Toluene	mg/kg	0.1 (Primary); 0.5 (Secondary)	<0.1	<0.1	0	<0.5	0
	Xylene (m & p)	mg/kg	0.2 (Primary); 0.5 (Secondary)	<0.2	<0.2	0	<0.5	0
	Xylene (o)	mg/kg	0.1 (Primary); 0.5 (Secondary)	<0.1	<0.1	0	<0.5	0
	Xylene Total	mg/kg	0.3 (Primary); 0.5 (Secondary)	<0.3	<0.3	0	<0.5	0
	Inorganics	%		<1	1.5	40	<1	1.8
	PAH/Phenols							
	2,4,5-Trichlorophenol	mg/kg	1 (Primary); 0.5 (Secondary)	<1	<1	0	<0.5	0
	2,4,6-Trichlorophenol	mg/kg	1	<1	<1	0	<0.5	0
2,4-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
2,6-Dichlorophenol	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
2-Chlorophenol	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
4-Chloro-3-methylphenol	mg/kg	1 (Primary); 0.5 (Secondary)	<1	<1	0	<0.5	0	
Pentachlorophenol	mg/kg	1 (Primary); 2 (Secondary)	<1	<1	0	<0.5	0	
Tetrachlorophenols - Total	mg/kg	10	<10	<10	0	<0.5	0	
Total Halogenated Phenol*	mg/kg	1	<1	<1	0	<0.5	0	
2,4-Dimethylphenol	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
2,4-Dinitrophenol	mg/kg	5	<5	<5	0	<0.5	0	
2-Cyclohexyl-4,6-dinitrophenol	mg/kg	20	<20	<20	0	<0.5	0	
2-Methyl-4,6-dinitrophenol	mg/kg	5	<5	<5	0	<0.5	0	
2-Methylphenol (o-Cresol)	mg/kg	0.2 (Primary); 1 (Secondary)	<0.2	<0.2	0	<0.2	<0.5	
2-Nitrophenol	mg/kg	1 (Primary); 0.5 (Secondary)	<1	<1	0	<0.5	0	
3,4,4-Methylphenol (m&p-Cresol)	mg/kg	0.4 (Primary); 1 (Secondary)	<0.4	<0.4	0	<0.5	0	
4-Nitrophenol	mg/kg	5	<5	<5	0	<0.5	0	
Dinoseb	mg/kg	20	<20	<20	0	<0.5	0	
Phenol	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Total cresols*	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Total Non-Halogenated Phenol*	mg/kg	20	<20	<20	0	<0.5	0	
Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Benz(a)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Benz(a)pyrene TEQ (lower bound) *	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Benz(a)pyrene TEQ (medium bound) *	mg/kg	0.5	0.6	0.6	0	0.6	0	
Benz(b)fluoranthene	mg/kg	0.5	1.2	1.2	0	1.2	0	
Benz(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Benz(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Indeno(1,2,3-cd)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
Total PAH*	mg/kg	0.5	<0.5	<0.5	0	<0.5	0	
TPH								
C10-C16	mg/kg	50	340	740	74	340	450	28
C16-C34	mg/kg	100	1400	2000	35	1400	1490	6
C34-C40	mg/kg	100	370	550	39	370	350	6
F2-NAPHTHALENE	mg/kg	50	340	740	74	340	450	6
G6 - C9	mg/kg	20 (Primary); 10 (Secondary)	<20	<20	<10	<20	<10	0
C10 - C14	mg/kg	20 (Primary); 50 (Secondary)	130	280	73	130	120	8
C15 - C28	mg/kg	50 (Primary); 100 (Secondary)	1300	2160	51	1300	1520	16
C29-C36	mg/kg	50 (Primary); 100 (Secondary)	420	580	32	420	420	0
+C10 - C36 (Sum of total)	mg/kg	50	1850	2960	46	1850	2060	11
G6-C10 less BTEX (F1)	mg/kg	20 (Primary); 10 (Secondary)	<20	<20	0	<20	<10	0
C10 - C40 (Sum of total)	mg/kg	100 (Primary); 50 (Secondary)	2110	3290	44	2110	2290	8
G6-C10	mg/kg	20 (Primary); 10 (Secondary)	<20	<20	0	<20	<10	0

**One Rail Diesel Spill - Contaminated Stockpiled Soil
Blanks Results
December 2021**

J168829

Chem_Group	ChemName	Units	EQI	SDG	
				Field ID	Sampled_Date/Time
				16-Dec-21 RB01 10/12/2021 Rinsate	16-Dec-21 TB01 10/12/2021 Trip_B
BTEX	Benzene	mg/l	0.001	<0.001	<0.001
	Ethylbenzene	mg/l	0.001	<0.001	<0.001
	Toluene	mg/l	0.001	<0.001	<0.001
	Xylene (m & p)	mg/l	0.002	<0.002	<0.002
	Xylene (o)	mg/l	0.001	<0.001	<0.001
	Xylene Total	mg/l	0.003	<0.003	<0.003
TRH	TRH >C10-C16	mg/l	0.05	<0.05	<0.05
	TRH >C10-C16 less Naphthalene (F2)	mg/l	0.05	<0.05	<0.05
	TRH >C10-C40 (total)*	mg/l	0.1	<0.1	<0.1
	TRH >C16-C34	mg/l	0.1	<0.1	<0.1
	TRH >C34-C40	mg/l	0.1	<0.1	<0.1
	TRH C10-C14	mg/l	0.05	<0.05	<0.05
	TRH C10-C36 (Total)	mg/l	0.1	<0.1	<0.1
	TRH C15-C28	mg/l	0.1	<0.1	<0.1
	TRH C29-C36	mg/l	0.1	<0.1	<0.1
	TRH C6-C10	mg/l	0.02	<0.02	<0.02
	TRH C6-C10 less BTEX (F1)	mg/l	0.02	<0.02	<0.02
	TRH C6-C9	mg/l	0.02	<0.02	<0.02

Diesel Spill – Detailed Site Investigation

Aurizon

Berrimah Freight Terminal, Export Drive, Berrimah NT

Appendix A LABORATORY CERTIFICATES – SOIL

Eurofins Environment Testing Australia Pty Ltd

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IANZ # 1327

Christchurch

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Rolleston, Christchurch 7675
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IANZ # 1290

Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Peter Spiers
Project name: TREATABILITY STUDY
Project ID: J168829-05
Turnaround time: 3 Day
Date/Time received: Dec 10, 2021 3:45 AM
Eurofins reference: 850365

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:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Peter Spiers - peter.spiers@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Peter Spiers**

Report **850365-S**
Project name **TREATABILITY STUDY**
Project ID **J168829-05**
Received Date **Dec 10, 2021**

Client Sample ID			SP01_01	SP01_02	SP01_03	SP02_01
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35363	M21-De35364	M21-De35365	M21-De35366
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	120	840	460	280
TRH C15-C28	50	mg/kg	1400	8300	5400	3900
TRH C29-C36	50	mg/kg	170	170	120	150
TRH C10-C36 (Total)	50	mg/kg	1690	9310	5980	4330
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	390	3000	1500	1000
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	390	3000	1500	1000
TRH >C16-C34	100	mg/kg	1400	6000	4700	3500
TRH >C34-C40	100	mg/kg	160	170	< 100	160
TRH >C10-C40 (total)*	100	mg/kg	1950	9170	6200	4660
ph (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.8	-	-	9.1
% Moisture	1	%	1.4	1.3	1.5	8.2

Client Sample ID			SP02_02	SP02_03	SP03_01	SP03_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35367	M21-De35368	M21-De35369	M21-De35370
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	260	160	340	150
TRH C15-C28	50	mg/kg	3100	3400	5600	4200
TRH C29-C36	50	mg/kg	120	140	85	95
TRH C10-C36 (Total)	50	mg/kg	3480	3700	6025	4445
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	810	650	1300	730
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	810	650	1300	730
TRH >C16-C34	100	mg/kg	2800	3200	5000	4000

Client Sample ID			SP02_02	SP02_03	SP03_01	SP03_02
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35367	M21-De35368	M21-De35369	M21-De35370
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH >C34-C40	100	mg/kg	140	160	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	3750	4010	6300	4730
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	8.8	8.8
% Moisture	1	%	8.2	8.7	11	9.3
Ammonia (as N)	5	mg/kg	-	-	220	170
Nitrate & Nitrite (as N)	5	mg/kg	-	-	< 5	< 5
Nitrate (as N)	5	mg/kg	-	-	< 5	< 5
Nitrite (as N)	5	mg/kg	-	-	< 5	< 5
Phosphorus reactive (as P)	10	mg/kg	-	-	< 10	< 10
Total Carbon	0.1	%	-	-	1.3	1.4
Total Kjeldahl Nitrogen (as N)	10	mg/kg	-	-	420	580
Total Nitrogen (as N)*	10	mg/kg	-	-	420	580
Phosphorus	5	mg/kg	-	-	220	250
Alkali Metals						
Potassium	5	mg/kg	-	-	360	540

Client Sample ID			SP03_03	BP01	BP02	BP03
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35371	M21-De35372	M21-De35373	M21-De35374
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	320	130	1200	230
TRH C15-C28	50	mg/kg	4900	1300	10000	2500
TRH C29-C36	50	mg/kg	110	420	190	99
TRH C10-C36 (Total)	50	mg/kg	5330	1850	11390	2829
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	1200	340	3600	730
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	1200	340	3600	730
TRH >C16-C34	100	mg/kg	4400	1400	8700	2200
TRH >C34-C40	100	mg/kg	110	370	210	120
TRH >C10-C40 (total)*	100	mg/kg	5710	2110	12510	3050
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.8	-	-	-
% Moisture	1	%	10	< 1	1.2	2.6
Ammonia (as N)	5	mg/kg	210	-	-	-
Nitrate & Nitrite (as N)	5	mg/kg	20	-	-	-
Nitrate (as N)	5	mg/kg	8.2	-	-	-
Nitrite (as N)	5	mg/kg	12	-	-	-
Phosphorus reactive (as P)	10	mg/kg	< 10	-	-	-
Total Carbon	0.1	%	1.1	-	-	-
Total Kjeldahl Nitrogen (as N)	10	mg/kg	490	-	-	-
Total Nitrogen (as N)*	10	mg/kg	510	-	-	-
Phosphorus	5	mg/kg	250	-	-	-

Client Sample ID			SP03_03	BP01	BP02	BP03
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35371	M21-De35372	M21-De35373	M21-De35374
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Alkali Metals						
Potassium	5	mg/kg	620	-	-	-
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	-	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	83	79	80
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	< 0.5	0.9	< 0.5
Total PAH*	0.5	mg/kg	-	< 0.5	0.9	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	81	94	102
p-Terphenyl-d14 (surr.)	1	%	-	136	86	96
Phenols (Halogenated)						
2-Chlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2,4,5-Trichlorophenol	1	mg/kg	-	< 1	< 1	< 1
2,4,6-Trichlorophenol	1	mg/kg	-	< 1	< 1	< 1
2,6-Dichlorophenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	-	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	-	< 1	< 1	< 1
Tetrachlorophenols - Total	10	mg/kg	-	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	-	< 1	< 1	< 1
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	-	< 20	< 20	< 20
2-Methyl-4,6-dinitrophenol	5	mg/kg	-	< 5	< 5	< 5
2-Nitrophenol	1.0	mg/kg	-	< 1	< 1	< 1
2,4-Dimethylphenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2,4-Dinitrophenol	5	mg/kg	-	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2

Client Sample ID			SP03_03	BP01	BP02	BP03
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			M21-De35371	M21-De35372	M21-De35373	M21-De35374
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	-	< 0.4	< 0.4	< 0.4
Total cresols*	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
4-Nitrophenol	5	mg/kg	-	< 5	< 5	< 5
Dinoseb	20	mg/kg	-	< 20	< 20	< 20
Phenol	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	-	90	103	128
Total Non-Halogenated Phenol*	20	mg/kg	-	< 20	< 20	< 20

Client Sample ID			BP04	BP05	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M21-De35375	M21-De35376	M21-De35377
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	160	280
TRH C15-C28	50	mg/kg	430	2000	2100
TRH C29-C36	50	mg/kg	55	180	580
TRH C10-C36 (Total)	50	mg/kg	485	2340	2960
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	57	530	740
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	57	530	740
TRH >C16-C34	100	mg/kg	450	1800	2000
TRH >C34-C40	100	mg/kg	< 100	190	550
TRH >C10-C40 (total)*	100	mg/kg	507	2520	3290
% Moisture	1	%	2.5	1.8	1.5
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	77	126	84
Polycyclic Aromatic Hydrocarbons					
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5

Client Sample ID			BP04	BP05	QC01
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			M21-De35375	M21-De35376	M21-De35377
Date Sampled			Dec 10, 2021	Dec 10, 2021	Dec 10, 2021
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	102	85	113
p-Terphenyl-d14 (surr.)	1	%	90	91	61
Phenols (Halogenated)					
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2,4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2,4,5-Trichlorophenol	1	mg/kg	< 1	< 1	< 1
2,4,6-Trichlorophenol	1	mg/kg	< 1	< 1	< 1
2,6-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5
4-Chloro-3-methylphenol	1	mg/kg	< 1	< 1	< 1
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1
Tetrachlorophenols - Total	10	mg/kg	< 10	< 10	< 10
Total Halogenated Phenol*	1	mg/kg	< 1	< 1	< 1
Phenols (non-Halogenated)					
2-Cyclohexyl-4,6-dinitrophenol	20	mg/kg	< 20	< 20	< 20
2-Methyl-4,6-dinitrophenol	5	mg/kg	< 5	< 5	< 5
2-Nitrophenol	1.0	mg/kg	< 1	< 1	< 1
2,4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5
2,4-Dinitrophenol	5	mg/kg	< 5	< 5	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2	< 0.2	< 0.2
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4	< 0.4	< 0.4
Total cresols*	0.5	mg/kg	< 0.5	< 0.5	< 0.5
4-Nitrophenol	5	mg/kg	< 5	< 5	< 5
Dinoseb	20	mg/kg	< 20	< 20	< 20
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenol-d6 (surr.)	1	%	123	56	38
Total Non-Halogenated Phenol*	20	mg/kg	< 20	< 20	< 20

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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 B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	14 Days
Phenols (Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	14 Days
Phenols (non-Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	14 Days
pH (1:5 Aqueous extract at 25°C as rec.) - Method: LTM-GEN-7090 pH in soil by ISE	Melbourne	Dec 15, 2021	7 Days
Total Carbon - Method: LTM-INO-4060 Total Organic Carbon in water and soil	Melbourne	Dec 16, 2021	28 Days
Alkali Metals - Method: LTM-MET-3010 Alkali Metals Sulfur Silicon Phosphorus by ICP-AES	Melbourne	Dec 15, 2021	180 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Dec 15, 2021	14 Days
Eurofins Suite B19E: Total N, TKN, NOx, NO2, NO3, NH3, Total P, Reactive P			
Ammonia (as N) - Method: APHA 4500-NH3 Ammonia Nitrogen by FIA	Melbourne	Dec 15, 2021	28 Days
Nitrate & Nitrite (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Dec 15, 2021	28 Days
Nitrate (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Dec 15, 2021	28 Days
Nitrite (as N) - Method: LTM-INO-4120 Analysis of NOx NO2 NH3 by FIA	Melbourne	Dec 15, 2021	28 Days
Phosphorus reactive (as P) - Method: APHA 4500-P	Melbourne	Dec 15, 2021	28 Days
Total Kjeldahl Nitrogen (as N) - Method: APHA 4500-Norg B,D Total Kjeldahl Nitrogen by FIA	Melbourne	Dec 15, 2021	28 Days
Phosphorus - Method: LTM-MET-3010 Alkali Metals Sulfur Silicon and Phosphorus by ICP-AES	Melbourne	Dec 15, 2021	180 Days

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.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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%

NOTE: pH duplicates are reported as a range not as RPD

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 where no positive PFAS results have been reported have been reviewed and no data was affected.

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. 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.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Total Recoverable Hydrocarbons						
TRH C6-C9	mg/kg	< 20		20	Pass	
TRH C10-C14	mg/kg	< 20		20	Pass	
TRH C15-C28	mg/kg	< 50		50	Pass	
TRH C29-C36	mg/kg	< 50		50	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
TRH C6-C10	mg/kg	< 20		20	Pass	
TRH >C10-C16	mg/kg	< 50		50	Pass	
TRH >C16-C34	mg/kg	< 100		100	Pass	
TRH >C34-C40	mg/kg	< 100		100	Pass	
Method Blank						
Nitrate & Nitrite (as N)	mg/kg	< 5		5	Pass	
Nitrate (as N)	mg/kg	< 5		5	Pass	
Nitrite (as N)	mg/kg	< 5		5	Pass	
Method Blank						
BTEX						
Benzene	mg/kg	< 0.1		0.1	Pass	
Toluene	mg/kg	< 0.1		0.1	Pass	
Ethylbenzene	mg/kg	< 0.1		0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2		0.2	Pass	
o-Xylene	mg/kg	< 0.1		0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3		0.3	Pass	
Method Blank						
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	mg/kg	< 0.5		0.5	Pass	
Acenaphthylene	mg/kg	< 0.5		0.5	Pass	
Anthracene	mg/kg	< 0.5		0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5		0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5		0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5		0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5		0.5	Pass	
Chrysene	mg/kg	< 0.5		0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5		0.5	Pass	
Fluoranthene	mg/kg	< 0.5		0.5	Pass	
Fluorene	mg/kg	< 0.5		0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5		0.5	Pass	
Naphthalene	mg/kg	< 0.5		0.5	Pass	
Phenanthrene	mg/kg	< 0.5		0.5	Pass	
Pyrene	mg/kg	< 0.5		0.5	Pass	
Method Blank						
Phenols (Halogenated)						
2-Chlorophenol	mg/kg	< 0.5		0.5	Pass	
2,4-Dichlorophenol	mg/kg	< 0.5		0.5	Pass	
2,4,5-Trichlorophenol	mg/kg	< 1		1	Pass	
2,4,6-Trichlorophenol	mg/kg	< 1		1	Pass	
2,6-Dichlorophenol	mg/kg	< 0.5		0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1		1	Pass	
Pentachlorophenol	mg/kg	< 1		1	Pass	
Tetrachlorophenols - Total	mg/kg	< 10		10	Pass	
Method Blank						

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4,6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2,4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2,4-Dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons							
TRH C6-C9	%	101			70-130	Pass	
TRH C10-C14	%	93			70-130	Pass	
Naphthalene	%	97			70-130	Pass	
TRH C6-C10	%	97			70-130	Pass	
TRH >C10-C16	%	93			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	115			70-130	Pass	
Nitrate & Nitrite (as N)	%	102			70-130	Pass	
Nitrate (as N)	%	102			70-130	Pass	
Nitrite (as N)	%	106			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	87			70-130	Pass	
Toluene	%	91			70-130	Pass	
Ethylbenzene	%	94			70-130	Pass	
m&p-Xylenes	%	96			70-130	Pass	
Xylenes - Total*	%	96			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	86			70-130	Pass	
Acenaphthylene	%	98			70-130	Pass	
Anthracene	%	80			70-130	Pass	
Benz(a)anthracene	%	83			70-130	Pass	
Benzo(a)pyrene	%	80			70-130	Pass	
Benzo(b&j)fluoranthene	%	113			70-130	Pass	
Benzo(g,h,i)perylene	%	112			70-130	Pass	
Benzo(k)fluoranthene	%	118			70-130	Pass	
Chrysene	%	91			70-130	Pass	
Dibenz(a,h)anthracene	%	93			70-130	Pass	
Fluoranthene	%	88			70-130	Pass	
Fluorene	%	109			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	91			70-130	Pass	
Naphthalene	%	105			70-130	Pass	
Phenanthrene	%	78			70-130	Pass	
Pyrene	%	101			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	82			25-140	Pass	
2,4-Dichlorophenol	%	69			25-140	Pass	
2,4,5-Trichlorophenol	%	64			25-140	Pass	
2,4,6-Trichlorophenol	%	53			25-140	Pass	

Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code		
2,6-Dichlorophenol	%	72	25-140	Pass			
4-Chloro-3-methylphenol	%	49	25-140	Pass			
Pentachlorophenol	%	28	25-140	Pass			
Tetrachlorophenols - Total	%	47	25-140	Pass			
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	38	25-140	Pass			
2-Methyl-4,6-dinitrophenol	%	60	25-140	Pass			
2-Nitrophenol	%	62	25-140	Pass			
2,4-Dimethylphenol	%	59	25-140	Pass			
2,4-Dinitrophenol	%	73	25-140	Pass			
2-Methylphenol (o-Cresol)	%	65	25-140	Pass			
3&4-Methylphenol (m&p-Cresol)	%	72	25-140	Pass			
4-Nitrophenol	%	31	25-140	Pass			
Dinoseb	%	59	25-140	Pass			
Phenol	%	69	25-140	Pass			
Test	Lab Sample ID	QA Source	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery							
Total Recoverable Hydrocarbons				Result 1			
TRH C10-C14	M21-De33360	NCP	%	119	70-130	Pass	
TRH >C10-C16	M21-De33360	NCP	%	115	70-130	Pass	
Spike - % Recovery							
Total Recoverable Hydrocarbons				Result 1			
TRH C6-C9	M21-De35364	CP	%	107	70-130	Pass	
Naphthalene	M21-De35364	CP	%	82	70-130	Pass	
TRH C6-C10	M21-De35364	CP	%	98	70-130	Pass	
Spike - % Recovery							
BTEX				Result 1			
Benzene	M21-De35364	CP	%	92	70-130	Pass	
Toluene	M21-De35364	CP	%	96	70-130	Pass	
Ethylbenzene	M21-De35364	CP	%	90	70-130	Pass	
m&p-Xylenes	M21-De35364	CP	%	90	70-130	Pass	
o-Xylene	M21-De35364	CP	%	88	70-130	Pass	
Xylenes - Total*	M21-De35364	CP	%	89	70-130	Pass	
Spike - % Recovery							
Polycyclic Aromatic Hydrocarbons				Result 1			
Acenaphthene	M21-De26666	NCP	%	85	70-130	Pass	
Acenaphthylene	M21-De26666	NCP	%	101	70-130	Pass	
Anthracene	M21-De26666	NCP	%	96	70-130	Pass	
Benz(a)anthracene	M21-De26666	NCP	%	83	70-130	Pass	
Benzo(a)pyrene	M21-De26666	NCP	%	76	70-130	Pass	
Benzo(b&j)fluoranthene	M21-De26666	NCP	%	101	70-130	Pass	
Benzo(g,h,i)perylene	M21-De26666	NCP	%	72	70-130	Pass	
Benzo(k)fluoranthene	M21-De26666	NCP	%	116	70-130	Pass	
Chrysene	M21-De26666	NCP	%	83	70-130	Pass	
Dibenz(a,h)anthracene	M21-De26666	NCP	%	77	70-130	Pass	
Fluoranthene	M21-De26666	NCP	%	93	70-130	Pass	
Fluorene	M21-De26666	NCP	%	129	70-130	Pass	
Indeno(1,2,3-cd)pyrene	M21-De26666	NCP	%	82	70-130	Pass	
Naphthalene	M21-De26666	NCP	%	101	70-130	Pass	
Phenanthrene	M21-De26666	NCP	%	92	70-130	Pass	
Pyrene	M21-De26666	NCP	%	98	70-130	Pass	
Spike - % Recovery							
Phenols (Halogenated)				Result 1			

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Chlorophenol	M21-De26666	NCP	%	82			30-130	Pass	
2,4-Dichlorophenol	M21-De26666	NCP	%	85			30-130	Pass	
2,4,5-Trichlorophenol	M21-De26666	NCP	%	78			30-130	Pass	
2,4,6-Trichlorophenol	M21-De26666	NCP	%	77			30-130	Pass	
2,6-Dichlorophenol	M21-De26666	NCP	%	89			30-130	Pass	
4-Chloro-3-methylphenol	M21-De26666	NCP	%	76			30-130	Pass	
Pentachlorophenol	M21-De26666	NCP	%	41			30-130	Pass	
Tetrachlorophenols - Total	M21-De26666	NCP	%	61			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	M21-De24811	NCP	%	59			30-130	Pass	
2-Methyl-4,6-dinitrophenol	M21-De24811	NCP	%	45			30-130	Pass	
2-Nitrophenol	M21-De26666	NCP	%	86			30-130	Pass	
2,4-Dimethylphenol	M21-De26666	NCP	%	83			30-130	Pass	
2-Methylphenol (o-Cresol)	M21-De26666	NCP	%	69			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M21-De26666	NCP	%	99			30-130	Pass	
4-Nitrophenol	M21-De26666	NCP	%	49			30-130	Pass	
Dinoseb	M21-De26666	NCP	%	20			30-130	Fail	Q08
Phenol	M21-De26666	NCP	%	78			30-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M21-De35373	CP	%	122			70-130	Pass	
Naphthalene	M21-De35373	CP	%	92			70-130	Pass	
TRH C6-C10	M21-De35373	CP	%	110			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M21-De35373	CP	%	98			70-130	Pass	
Toluene	M21-De35373	CP	%	101			70-130	Pass	
Ethylbenzene	M21-De35373	CP	%	109			70-130	Pass	
m&p-Xylenes	M21-De35373	CP	%	111			70-130	Pass	
o-Xylene	M21-De35373	CP	%	111			70-130	Pass	
Xylenes - Total*	M21-De35373	CP	%	111			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M21-De35363	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M21-De33359	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M21-De33359	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	M21-De33359	NCP	mg/kg	65	61	7.0	30%	Pass	
TRH C6-C10	M21-De35363	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M21-De33359	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M21-De33359	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	M21-De33359	NCP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	M21-De35363	CP	pH Units	8.8	8.8	pass	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M21-De35363	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M21-De35363	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M21-De35363	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M21-De35363	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	M21-De35363	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	M21-De35363	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	

Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
Naphthalene	M21-De28821	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
Ammonia (as N)	B21-De29521	NCP	mg/kg	< 50	< 50	<1	30%	Pass
Nitrate & Nitrite (as N)	B21-De29521	NCP	mg/kg	< 50	< 50	<1	30%	Pass
Nitrate (as N)	B21-De29521	NCP	mg/kg	< 50	< 50	<1	30%	Pass
Nitrite (as N)	B21-De29521	NCP	mg/kg	< 50	< 50	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Acenaphthylene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Anthracene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)anthracene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(a)pyrene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(b&j)fluoranthene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(g,h,i)perylene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Benzo(k)fluoranthene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Chrysene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Dibenz(a,h)anthracene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluoranthene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Fluorene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Naphthalene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Phenanthrene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Pyrene	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4-Dichlorophenol	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4,5-Trichlorophenol	M21-De32519	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,4,6-Trichlorophenol	M21-De32519	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,6-Dichlorophenol	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
4-Chloro-3-methylphenol	M21-De32519	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Pentachlorophenol	M21-De32519	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Tetrachlorophenols - Total	M21-De32519	NCP	mg/kg	< 10	< 10	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	M21-De32519	NCP	mg/kg	< 20	< 20	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	M21-De32519	NCP	mg/kg	< 5	< 5	<1	30%	Pass
2-Nitrophenol	M21-De32519	NCP	mg/kg	< 1	< 1	<1	30%	Pass
2,4-Dimethylphenol	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
2,4-Dinitrophenol	M21-De32519	NCP	mg/kg	< 5	< 5	<1	30%	Pass
2-Methylphenol (o-Cresol)	M21-De32519	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M21-De32519	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
4-Nitrophenol	M21-De32519	NCP	mg/kg	< 5	< 5	<1	30%	Pass
Dinoseb	M21-De32519	NCP	mg/kg	< 20	< 20	<1	30%	Pass
Phenol	M21-De32519	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	M21-De35373	CP	%	1.2	1.4	18	30%	Pass

Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	M21-De28813	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	M21-De28813	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	M21-De28813	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	M21-De28813	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	M21-De28813	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total*	M21-De28813	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass

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Comments
Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.

Authorised by:

Harry Bacalis	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Scott Beddoes	Senior Analyst-Inorganic (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Emily Rosenberg	Senior Analyst-Metal (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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NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Peter Spiers

Report 850365-W
Project name TREATABILITY STUDY
Project ID J168829-05
Received Date Dec 10, 2021

Client Sample ID			RB01 Water	TB01 Water
Sample Matrix			M21-De35378	M21-De35379
Eurofins Sample No.			Dec 10, 2021	Dec 10, 2021
Date Sampled				
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons				
TRH C6-C9	0.02	mg/L	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	-
BTEX				
Benzene	0.001	mg/L	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	99	99

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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 B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days

DRAFT

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800
Project Name: TREATABILITY STUDY
Project ID: J168829-05

Order No.:
Report #: 850365
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Dec 10, 2021 3:45 AM
Due: Dec 16, 2021
Priority: 3 Day
Contact Name: Peter Spiers

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	Test Parameters
1	SP01_01	Dec 10, 2021		Soil	M21-De35363	X
2	SP01_02	Dec 10, 2021		Soil	M21-De35364	X
3	SP01_03	Dec 10, 2021		Soil	M21-De35365	X
4	SP02_01	Dec 10, 2021		Soil	M21-De35366	X
5	SP02_02	Dec 10, 2021		Soil	M21-De35367	X
6	SP02_03	Dec 10, 2021		Soil	M21-De35368	X
7	SP03_01	Dec 10, 2021		Soil	M21-De35369	X
8	SP03_02	Dec 10, 2021		Soil	M21-De35370	X
9	SP03_03	Dec 10, 2021		Soil	M21-De35371	X
						pH (1:5 Aqueous extract at 25°C as rec.)
						Potassium
						Total Carbon
						BTEX and Naphthalene
						Moisture Set
						Total Recoverable Hydrocarbons
						Eurofins Suite B4A
						Eurofins Suite B19E: Total N, TKN, NOx, NO2, NO3, NH3, Total P, Reactive P

Internal Quality Control Review and Glossary

General

- 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.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- 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.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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%

NOTE: pH duplicates are reported as a range not as RPD

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 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- 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.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code	
Method Blank											
Total Recoverable Hydrocarbons											
TRH C10-C14				mg/L	< 0.05			0.05	Pass		
TRH C15-C28				mg/L	< 0.1			0.1	Pass		
TRH C29-C36				mg/L	< 0.1			0.1	Pass		
TRH >C10-C16				mg/L	< 0.05			0.05	Pass		
TRH >C16-C34				mg/L	< 0.1			0.1	Pass		
TRH >C34-C40				mg/L	< 0.1			0.1	Pass		
LCS - % Recovery											
Total Recoverable Hydrocarbons											
TRH C10-C14				%	113			70-130	Pass		
TRH >C10-C16				%	114			70-130	Pass		
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code		
Spike - % Recovery											
Total Recoverable Hydrocarbons											
TRH C10-C14				M21-De35756	NCP	%	114		70-130	Pass	
TRH >C10-C16				M21-De35756	NCP	%	114		70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code		
Duplicate											
Total Recoverable Hydrocarbons											
TRH C10-C14				B21-De21561	NCP	mg/L	0.30	0.32	6.0	30%	Pass
TRH C15-C28				B21-De21561	NCP	mg/L	0.2	0.2	3.0	30%	Pass
TRH C29-C36				B21-De21561	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C10-C16				B21-De21561	NCP	mg/L	0.05	0.06	16	30%	Pass
TRH >C16-C34				B21-De21561	NCP	mg/L	0.2	0.2	<1	30%	Pass
TRH >C34-C40				B21-De21561	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass



Comments
Sample Integrity

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

Qualifier Codes/Comments

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

Authorised by:

Harry Bacalis	Analytical Services Manager
Vivian Wang	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (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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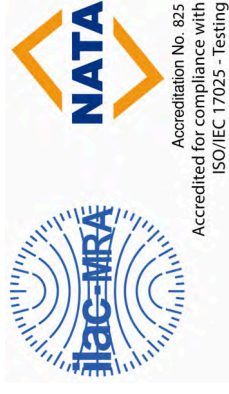
QUALITY CONTROL REPORT

Work Order : ES2145418

Page : 1 of 7

Client : GREENCAP-NAA PTY LTD
 Contact : MR DYLAN BYFORD
 Address : 11/14 Winnellie Road
 WINNELLIE NT, AUSTRALIA 0820
 Telephone : +61 08 8299 9955
 Project : J168829-05 ORA Diesel Spill
 Order number : ----
 C-O-C number : ----
 Sampler : VARUN BHAGWAT
 Site : Berrimah Freight Terminal
 Quote number : EN/333 - secondary work only
 No. of samples received : 1
 No. of samples analysed : 1

Laboratory : Environmental Division Sydney
 Contact : Peter Ravlic
 Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
 Telephone : +6138549 9645
 Date Samples Received : 14-Dec-2021
 Date Analysis Commenced : 15-Dec-2021
 Issue Date : 22-Dec-2021



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.

Signatories	Position	Accreditation Category
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW



Page : 2 of 7
 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

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.

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: SOIL

Laboratory sample ID	Sample ID	Method/Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			
						Original Result	Duplicate Result	RPD (%)	
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4088339)									
ES2145418-001	QC01A	EA055: Moisture Content	---	0.1	%	1.8	1.9	0.0	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 4078042)									
ES2145544-001	Anonymous								
		EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	<1	0.0	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	<2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4078042)									
ES2145544-001	Anonymous								
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit



Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			Acceptable RPD (%)
						Original Result	Duplicate Result	RPD (%)	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4078042) - continued									
ES214544-001	Anonymous	EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+i)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4077475)									
ES2145472-022	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2145482-006	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4078043)									
ES214544-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4077475)									
ES2145472-022	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2145482-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4078043)									
ES214544-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4077475)									
ES2145472-022	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
ES2145482-006	Anonymous	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit



Page : 4 of 7
 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

Sub-Matrix: **SOIL**

Laboratory sample ID		Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP080: BTEXN (QC Lot: 4077475) - continued										
ES2145482-006	Anonymous	EP080: Naphthalene		91-20-3	1	mg/kg	<1	<1	0.0	No Limit

FORBIDDEN



Method Blank (MB) and Laboratory Control Sample (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 Sample (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: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report		
				Result	Spike Concentration	Spike Recovery (%)	LCS	Low
EP075(SIM)A: Phenolic Compounds (QCLot: 4078042)								
EP075(SIM): Phenol	108-95-2	0.5	mg/kg	<0.5	6 mg/kg	90.6	71.0	125
EP075(SIM): 2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5	6 mg/kg	87.0	72.0	124
EP075(SIM): 2-Methylphenol	95-48-7	0.5	mg/kg	<0.5	6 mg/kg	97.3	71.0	123
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1	12 mg/kg	89.1	67.0	127
EP075(SIM): 2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5	6 mg/kg	84.3	54.0	114
EP075(SIM): 2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5	6 mg/kg	88.0	68.0	126
EP075(SIM): 2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5	6 mg/kg	86.5	66.0	120
EP075(SIM): 2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5	6 mg/kg	88.1	70.0	120
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5	6 mg/kg	86.7	70.0	116
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5	6 mg/kg	91.9	54.0	114
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5	6 mg/kg	93.7	60.0	114
EP075(SIM): Pentachlorophenol	87-86-5	2	mg/kg	<2	12 mg/kg	36.7	10.0	57.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4078042)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	90.6	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	88.8	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	92.5	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.5	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.1	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	86.0	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	94.1	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	93.8	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	85.0	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	91.6	75.0	127
EP075(SIM): Benzo(b+h)fluoranthene	205-99-2	0.5	mg/kg	<0.5	6 mg/kg	85.4	68.0	116
	205-82-3							
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	97.0	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	88.4	70.0	126
EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	91.3	61.0	121
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	91.5	62.0	118
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	89.4	63.0	121
EP080/074: Total Petroleum Hydrocarbons (QCLot: 4077475)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	109	68.4	128
EP080/074: Total Petroleum Hydrocarbons (QCLot: 4078043)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	101	75.0	129



Sub-Matrix: SOIL				Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)	LCS	Low	High
EP080/074: Total Petroleum Hydrocarbons (QCLot: 4078043) - continued									
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	99.0	77.0	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	99.6	71.0	71.0	129
EP080/074: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4077475)									
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	111	68.4	68.4	128
EP080/074: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4078043)									
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	103	77.0	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	96.9	74.0	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	102	63.0	63.0	131
EP080: BTEXN (QCLot: 4077475)									
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	106	62.0	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	109	67.0	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	105	65.0	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	106	66.0	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	109	68.0	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	103	63.0	63.0	119

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: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	SpikeRecovery(%)	Acceptable Limits (%)
			MS	Low	High	
EP075(SIM)A: Phenolic Compounds (QCLot: 4078042)						
ES2145544-001	Anonymous	EP075(SIM): Phenol	108-95-2	10 mg/kg	90.3	70.0
		EP075(SIM): 2-Chlorophenol	95-57-8	10 mg/kg	85.6	70.0
		EP075(SIM): 2-Nitrophenol	88-75-5	10 mg/kg	78.7	60.0
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	10 mg/kg	84.4	70.0
		EP075(SIM): Pentachlorophenol	87-86-5	10 mg/kg	49.6	20.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4078042)						
ES2145544-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	91.6	70.0
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	94.6	70.0
EP080/074: Total Petroleum Hydrocarbons (QCLot: 4077475)						
ES2145472-022	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	90.0	70.0
EP080/074: Total Petroleum Hydrocarbons (QCLot: 4078043)						
ES2145544-001	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	111	73.0



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 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	SpikeRecovery(%)	Acceptable Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4078043) - continued						
ES2145544-001	Anonymous	EP071: C15 - C28 Fraction	----	3100 mg/kg	113	53.0
		EP071: C29 - C36 Fraction	----	2060 mg/kg	118	52.0
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4077475)						
ES2145472-022	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	94.1	70.0
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4078043)						
ES2145544-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	114	73.0
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	113	53.0
		EP071: >C34 - C40 Fraction	----	890 mg/kg	104	52.0
EP080: BTEXN (QCLot: 4077475)						
ES2145472-022	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	79.8	70.0
		EP080: Toluene	108-88-3	2.5 mg/kg	77.0	70.0
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	82.7	70.0
		EP080: meta- & para-Xylene	108-38-3	2.5 mg/kg	83.6	70.0
			106-42-3			
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	83.8	70.0
		EP080: Naphthalene	91-20-3	2.5 mg/kg	89.6	70.0



ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2145418	Page	: 1 of 4
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR DYLAN BYFORD	Telephone	: +6138549 9645
Project	: J168829-05 ORA Diesel Spill	Date Samples Received	: 14-Dec-2021
Site	: Berrimah Freight Terminal	Issue Date	: 22-Dec-2021
Sampler	: VARUN BHAGWAT	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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

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

Summary of Outliers

Outliers : Quality Control Samples

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

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



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 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

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: **SOIL**

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

Method	Sample Date	Extraction / Preparation		Analysis	
		Date extracted	Due for extraction	Date analysed	Due for analysis
EA055: Moisture Content (Dried @ 105-110°C)					
Soil Glass Jar - Unpreserved (EA055) QC01A	10-Dec-2021	----	----	20-Dec-2021	24-Dec-2021
EP075(SIM)A: Phenolic Compounds					
Soil Glass Jar - Unpreserved (EP075(SIM)) QC01A	10-Dec-2021	16-Dec-2021	24-Dec-2021	20-Dec-2021	25-Jan-2022
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons					
Soil Glass Jar - Unpreserved (EP075(SIM)) QC01A	10-Dec-2021	16-Dec-2021	24-Dec-2021	20-Dec-2021	25-Jan-2022
EP080/071: Total Petroleum Hydrocarbons					
Soil Glass Jar - Unpreserved (EP080) QC01A	10-Dec-2021	15-Dec-2021	24-Dec-2021	21-Dec-2021	24-Dec-2021
Soil Glass Jar - Unpreserved (EP071) QC01A	10-Dec-2021	16-Dec-2021	24-Dec-2021	20-Dec-2021	25-Jan-2022
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
Soil Glass Jar - Unpreserved (EP080) QC01A	10-Dec-2021	15-Dec-2021	24-Dec-2021	21-Dec-2021	24-Dec-2021
Soil Glass Jar - Unpreserved (EP071) QC01A	10-Dec-2021	16-Dec-2021	24-Dec-2021	20-Dec-2021	25-Jan-2022
EP080: BTEXN					
Soil Glass Jar - Unpreserved (EP080) QC01A	10-Dec-2021	15-Dec-2021	24-Dec-2021	21-Dec-2021	24-Dec-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: **SOIL**

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

Quality Control Sample Type	Method	Count			Rate (%)		Evaluation	Quality Control Specification
		QC	Regular	Actual	Expected			
Laboratory Duplicates (DUP)								
Moisture Content	EA055	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard	
PAH/Phenols (SIM)	EP075(SIM)	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH - Semivolatle Fraction	EP071	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard	
Laboratory Control Samples (LCS)								
PAH/Phenols (SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH - Semivolatle Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
Method Blanks (MB)								
PAH/Phenols (SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH - Semivolatle Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
Matrix Spikes (MS)								
PAH/Phenols (SIM)	EP075(SIM)	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH - Semivolatle Fraction	EP071	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard	



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 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	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 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.



Environmental

CERTIFICATE OF ANALYSIS

Work Order : ES2145418
Client : GREENCAP-NAA PTY LTD
Contact : MR DYLAN BYFORD
Address : 11/14 Winnellie Road
WINNELLIE NT, AUSTRALIA 0820
Telephone : +61 08 8299 9955
Project : J168829-05 ORA Diesel Spill
Order number : ----
C-O-C number : ----
Sampler : VARUN BHAGWAT
Site : Berrimah Freight Terminal
Quote number : EN/333 - secondary work only
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 6
Laboratory : Environmental Division Sydney
Contact : Peter Ravlic
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +6138549 9645
Date Samples Received : 14-Dec-2021 07:00
Date Analysis Commenced : 15-Dec-2021
Issue Date : 22-Dec-2021 16:05



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 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
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Inorganics, Smithfield, NSW



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Work Order : ES2145418
Client : GREENCAP-NAA PTY LTD
Project : J168829-05 ORA Diesel Spill

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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3 cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP071: Results of sample QC01A have been confirmed by re-extraction and re-analysis.



Analytical Results

Compound	CAS Number	Sample ID		QC01A
		LOR	Unit	
Sub-Matrix: SOIL (Matrix: SOIL)		Sampling date / time	10-Dec-2021 00:00	
EA055: Moisture Content (Dried @ 105-110°C)		Moisture Content	1.8	ES2145418-001 Result
EP075(SIM)A: Phenolic Compounds				
Phenol	108-95-2	0.5	mg/kg	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg	<1
2-Nitrophenol	88-75-5	0.5	mg/kg	<0.5
2,4-Dimethylphenol	105-67-9	0.5	mg/kg	<0.5
2,4-Dichlorophenol	120-83-2	0.5	mg/kg	<0.5
2,6-Dichlorophenol	87-65-0	0.5	mg/kg	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg	<0.5
2,4,6-Trichlorophenol	88-06-2	0.5	mg/kg	<0.5
2,4,5-Trichlorophenol	95-95-4	0.5	mg/kg	<0.5
Pentachlorophenol	87-86-5	2	mg/kg	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons				
Naphthalene	91-20-3	0.5	mg/kg	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5
Benzo(b+)fluoranthene	205-99-2	0.5	mg/kg	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5
Indeno(1,2,3-cd)pyrene	193-39-5	0.5	mg/kg	<0.5
Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5
Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5
^ Sum of polycyclic aromatic hydrocarbons				
^ Benzo(a)pyrene TEQ (zero)		0.5	mg/kg	<0.5
^ Benzo(a)pyrene TEQ (half LOR)		0.5	mg/kg	0.6



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 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)		Sample ID		QC01A	
Compound	CAS Number	LOR	Unit	Sampling date / time	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued					
^ Benzo(a)pyrene TEQ (LOR)		0.5	mg/kg	10-Dec-2021 00:00	ES2145418-001
EP080/071: Total Petroleum Hydrocarbons					
C6 - C9 Fraction		10	mg/kg		<10
C10 - C14 Fraction		50	mg/kg		120
C15 - C28 Fraction		100	mg/kg		1520
C29 - C36 Fraction		100	mg/kg		420
^ C10 - C36 Fraction (sum)		50	mg/kg		2060
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
C6 - C10 Fraction	C6_C10	10	mg/kg		<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10
>C10 - C16 Fraction		50	mg/kg		450
>C16 - C34 Fraction		100	mg/kg		1490
>C34 - C40 Fraction		100	mg/kg		350
^ >C10 - C40 Fraction (sum)		50	mg/kg		2290
^ >C10 - C16 Fraction minus Naphthalene (F2)		50	mg/kg		450
EP080: BTEXN					
Benzene	71-43-2	0.2	mg/kg		<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5
meta- & para-Xylene	108-38-3	106-42-3	0.5	mg/kg	<0.5
ortho-Xylene	95-47-6		0.5	mg/kg	<0.5
^ Sum of BTEX			0.2	mg/kg	<0.2
^ Total Xylenes			0.5	mg/kg	<0.5
Naphthalene	91-20-3	1	mg/kg		<1
EP075(SIM)S: Phenolic Compound Surrogates					
Phenol-d6	13127-88-3	0.5	%		89.3
2-Chlorophenol-D4	93951-73-6	0.5	%		90.0
2,4,6-Tribromophenol	118-79-6	0.5	%		84.4
EP075(SIM)T: PAH Surrogates					
2-Fluorobiphenyl	321-60-8	0.5	%		102
Anthracene-d10	1719-06-8	0.5	%		109
4-Terphenyl-d14	1718-51-0	0.5	%		97.7



Page : 5 of 6
 Work Order : ES2145418
 Client : GREENCAP-NAA PTY LTD
 Project : J168829-05 ORA Diesel Spill

Analytical Results

Compound	CAS Number	LOR	Sample ID		QC01A	Result
			Sampling date / time	Unit		
Sub-Matrix: SOIL (Matrix: SOIL)						
EP080S: TPH(V)/BTEX Surrogates						
1,2-Dichloroethane-D4	17060-07-0	0.2	%	10-Dec-2021 00:00	113	
Toluene-D8	2037-26-5	0.2	%	ES2145418-001	99.2	
4-Bromofluorobenzene	460-00-4	0.2	%		88.8	



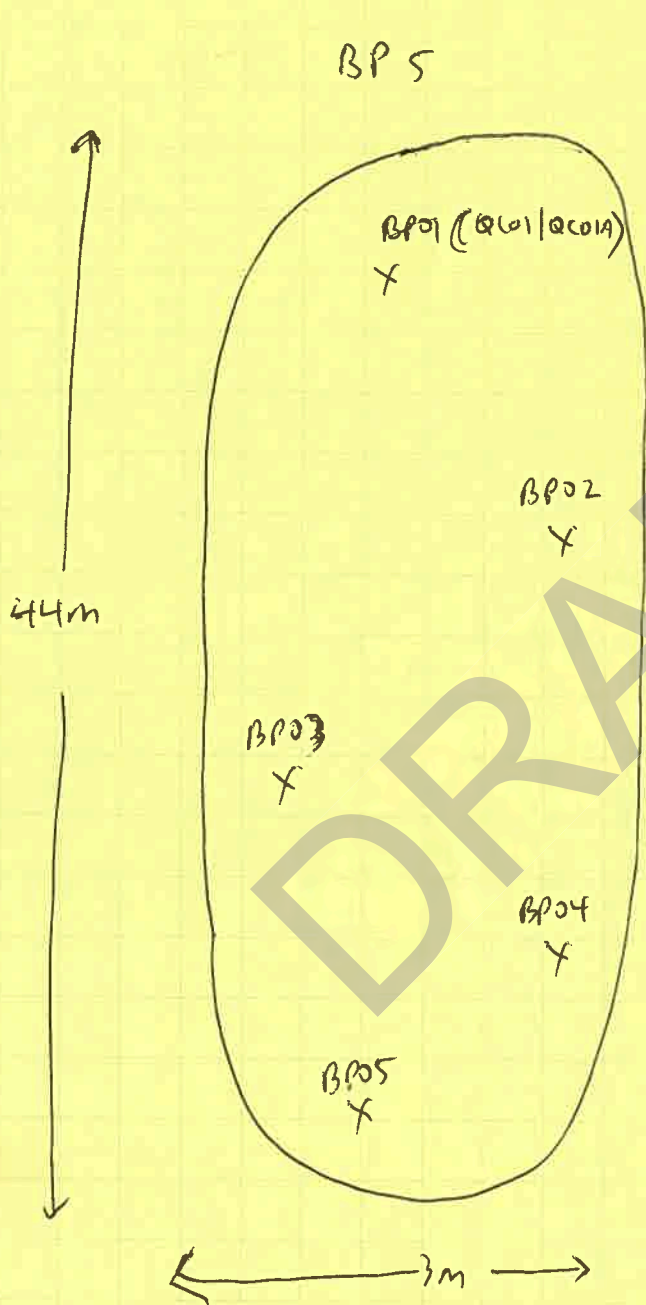
Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2,4,6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

AEC Environmental

Client: ORA
 Project: DIESEL SPILL

Date: 10/12/21
 Job No: J168829
 Page: 1 of 1



BP5 ~ 0.6m IN HEIGHT

P10
 BP01 = 17.9 ppm

BP02 = 37.3 ppm

BP03 = 61.4 ppm

BP04 = 12.8 ppm

BP05 = 29.6 ppm

Fill - Gravelly Silty SAND,
 f-m graded sand, f-m sized
 gravel throughout, brown. Strong
 HC odour from all samples.
 No staining observed.

Diesel Spill – Detailed Site Investigation

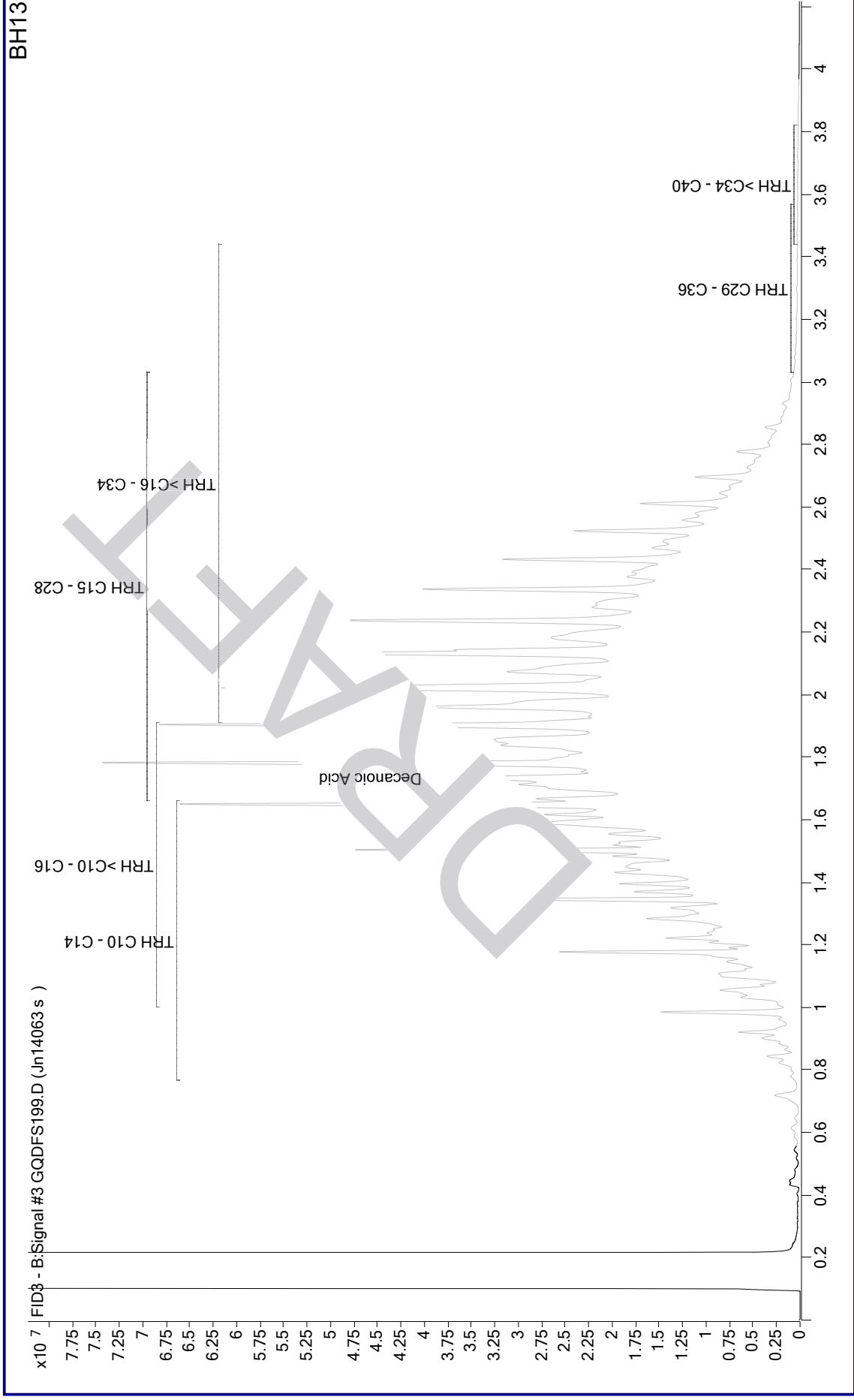
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Berrimah Freight Terminal, Export Drive, Berrimah NT

Appendix B CHROMATOGRAMS

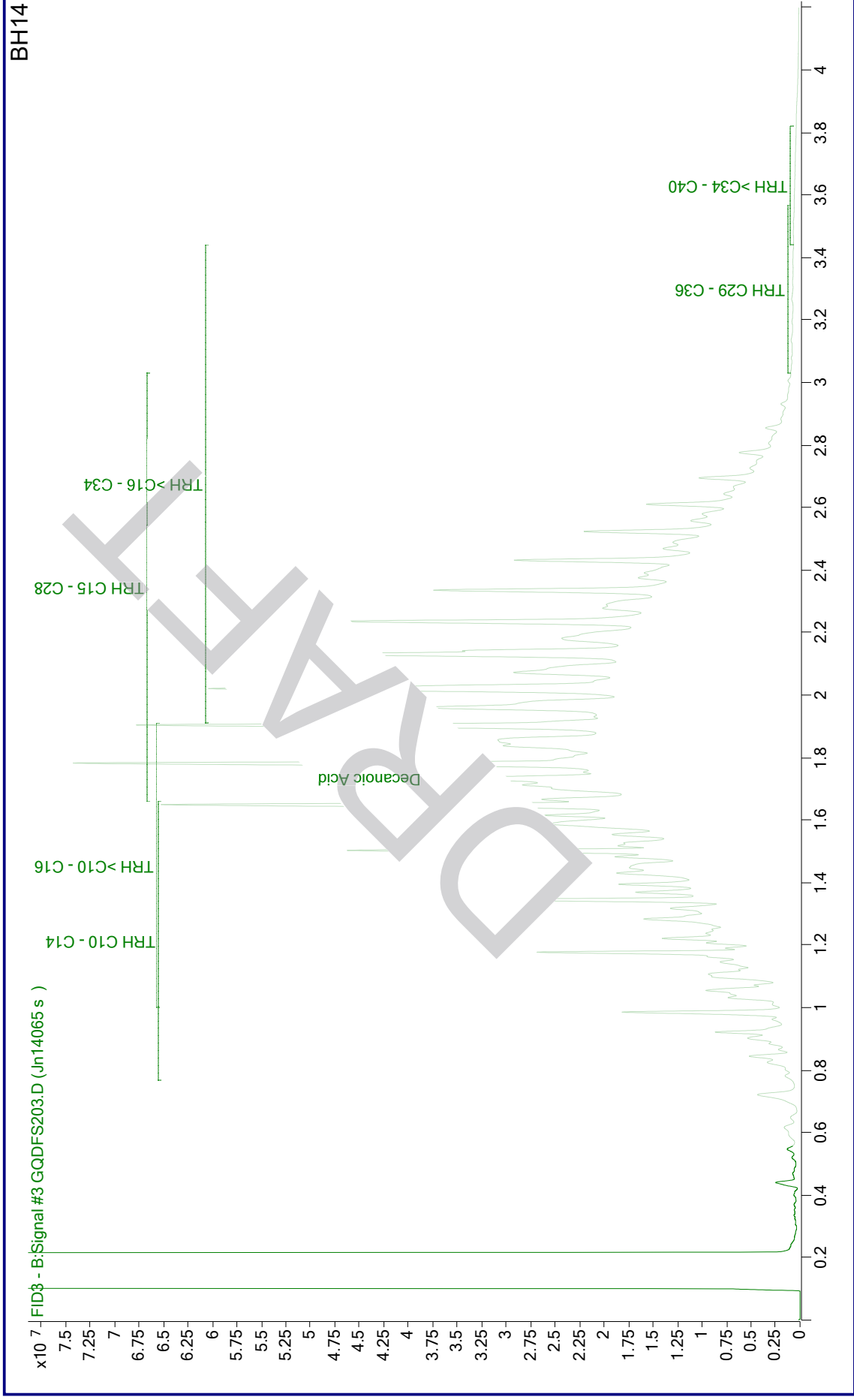
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Instrument Name GQ-LTM



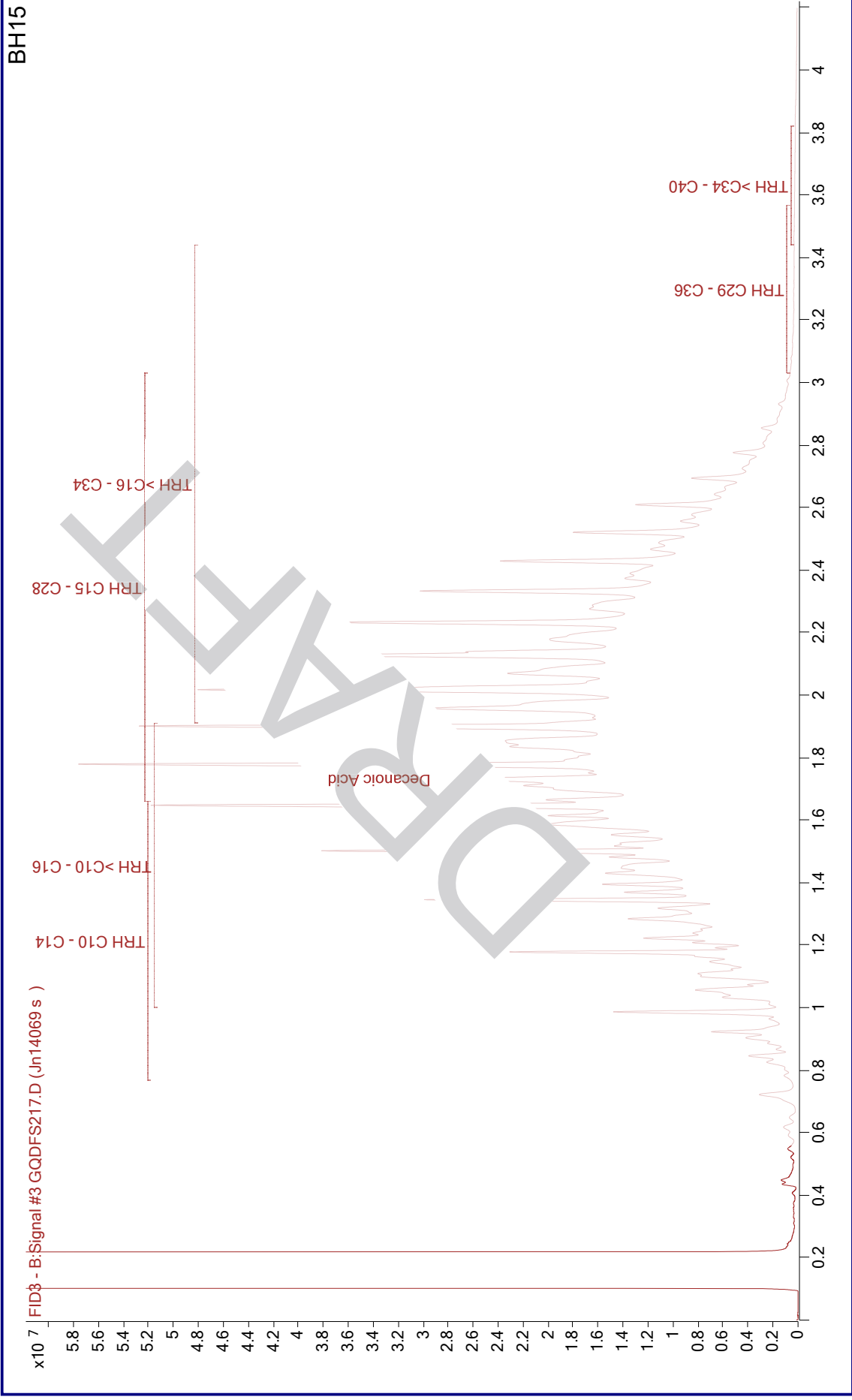
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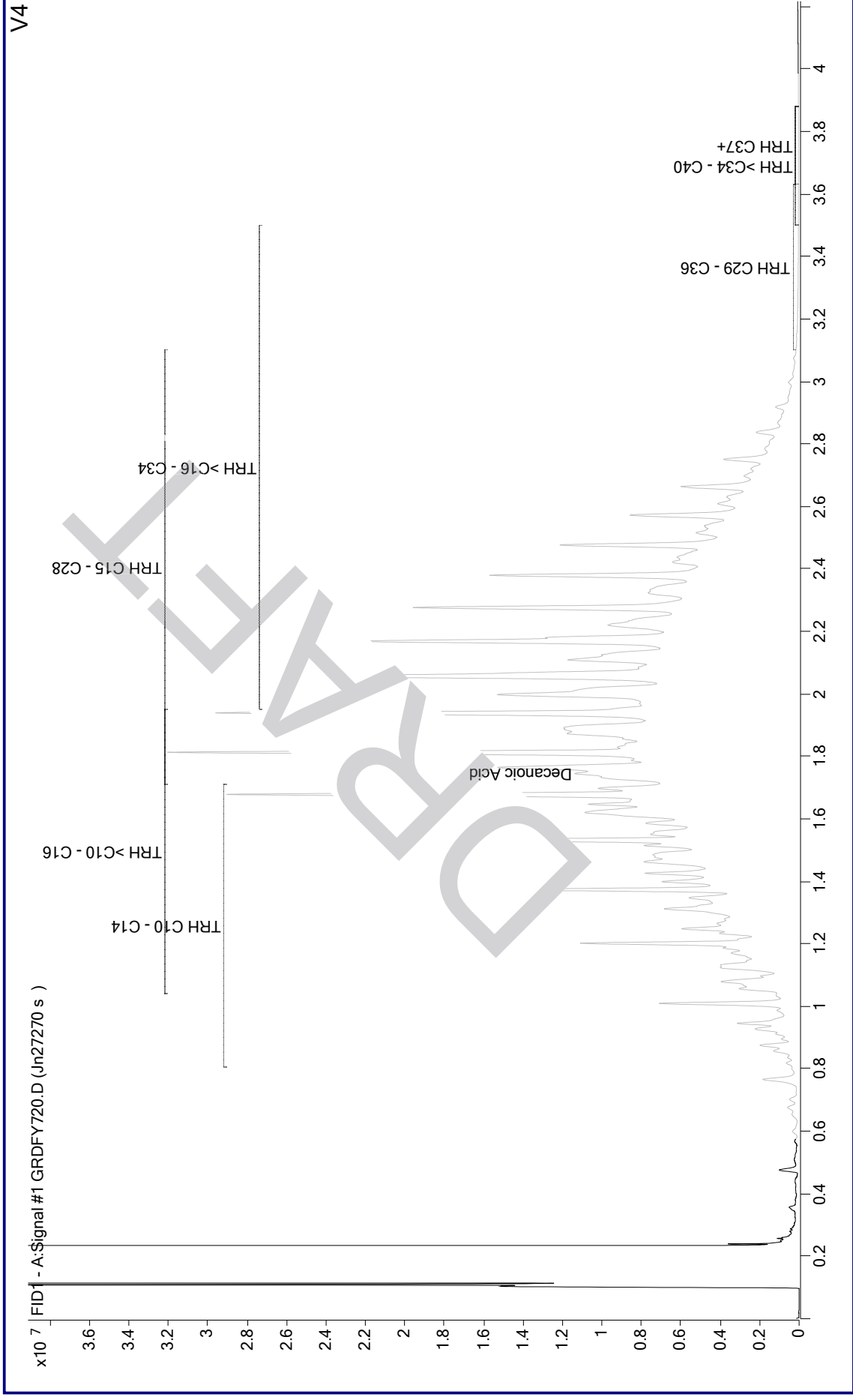
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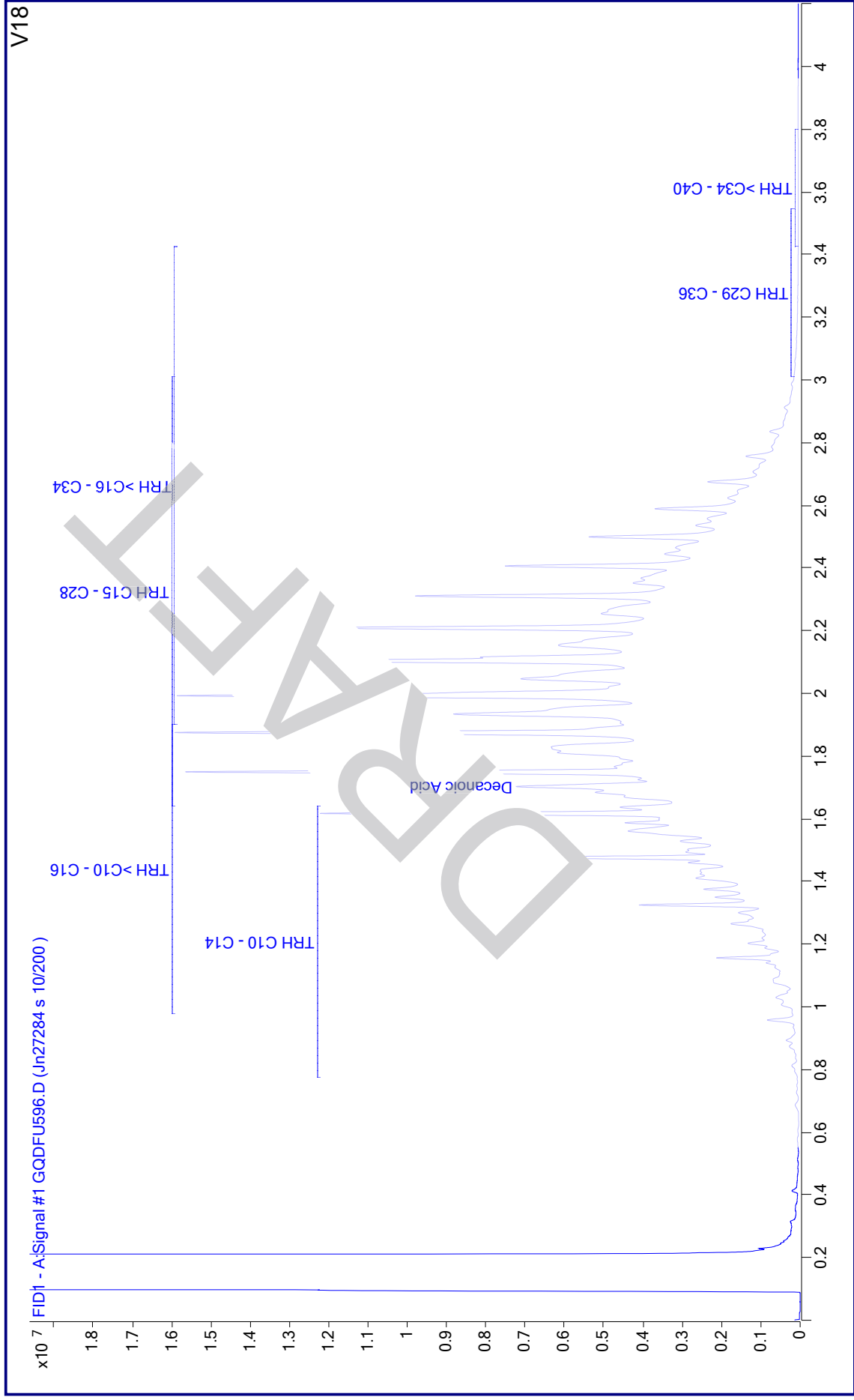


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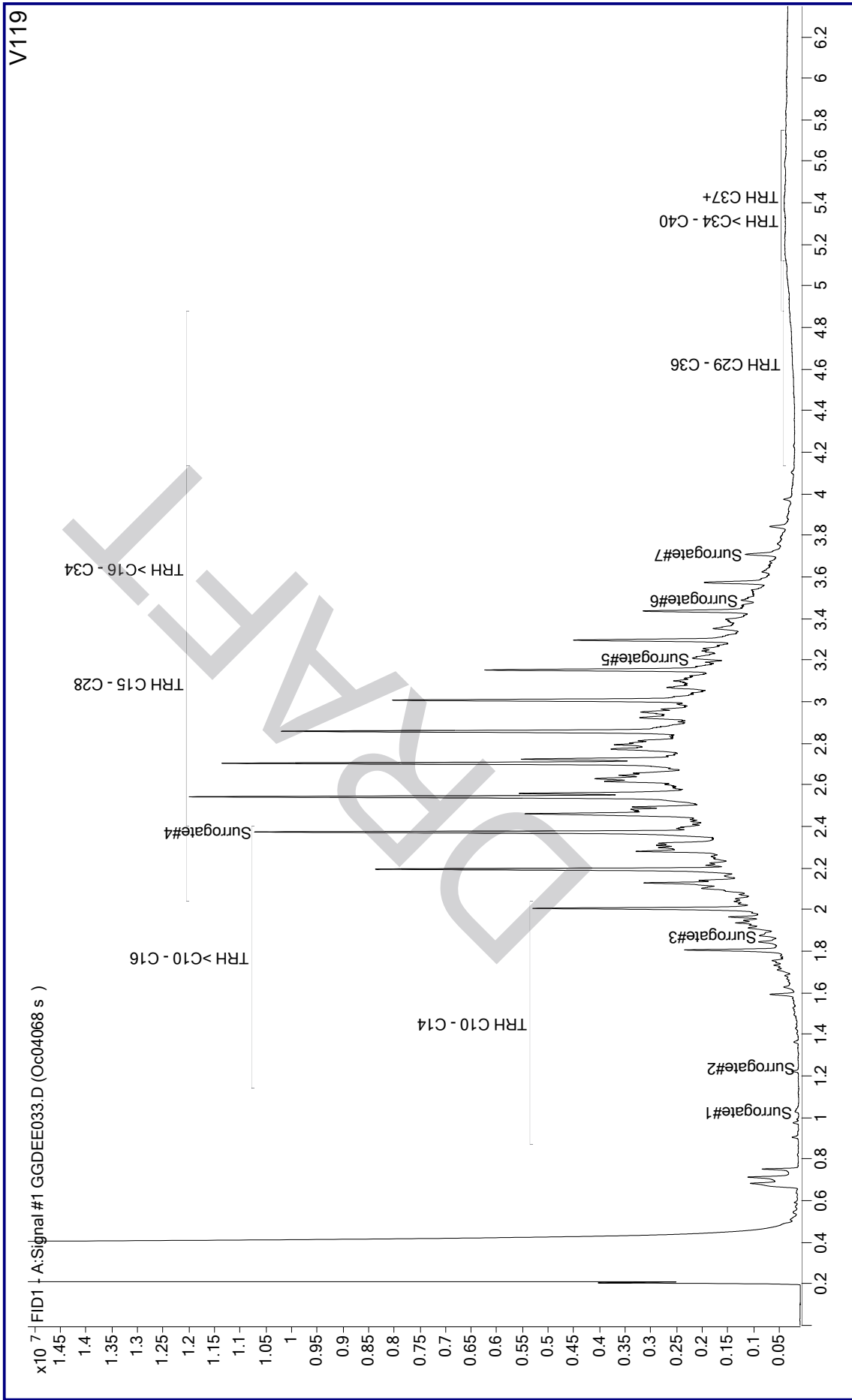
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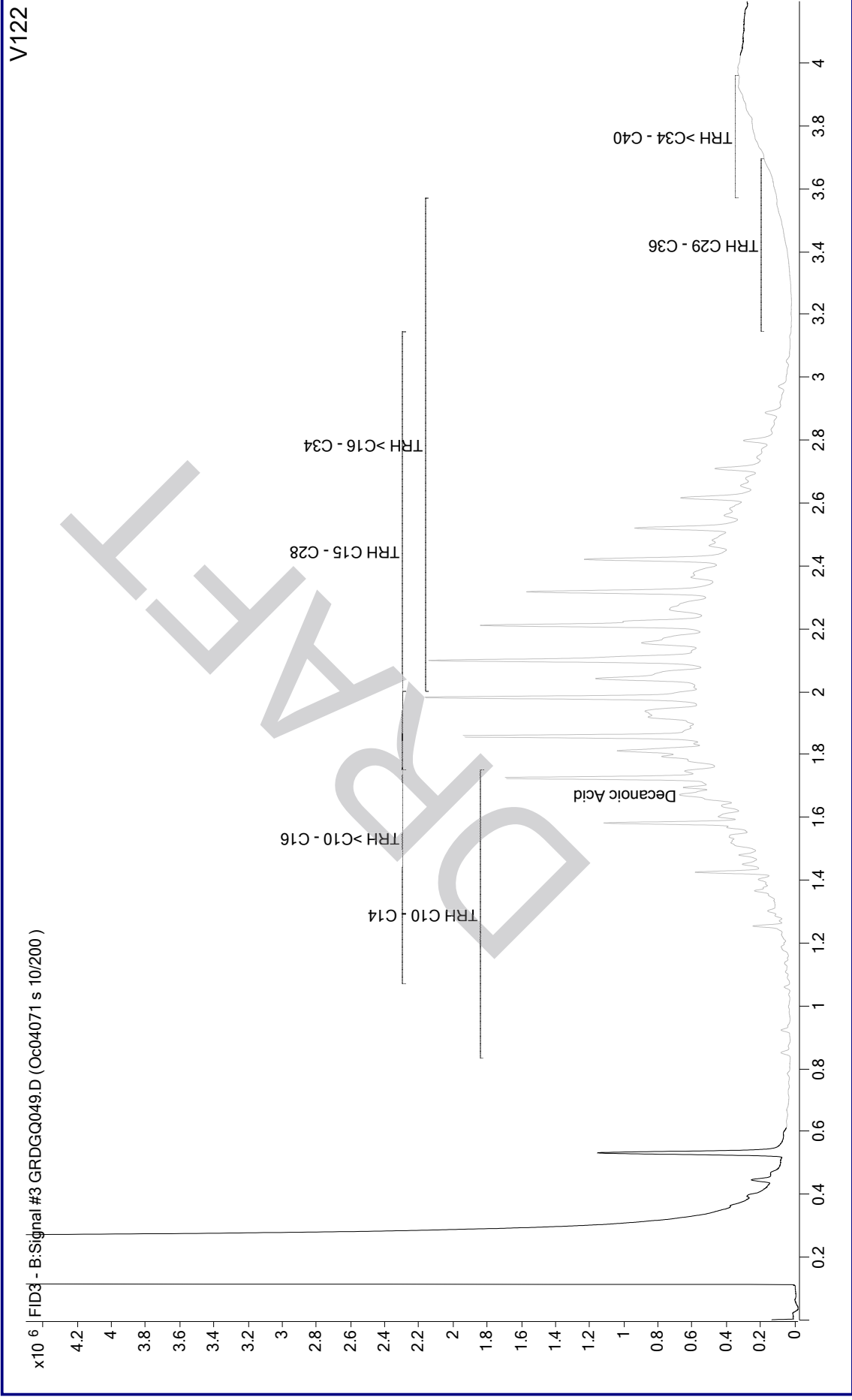


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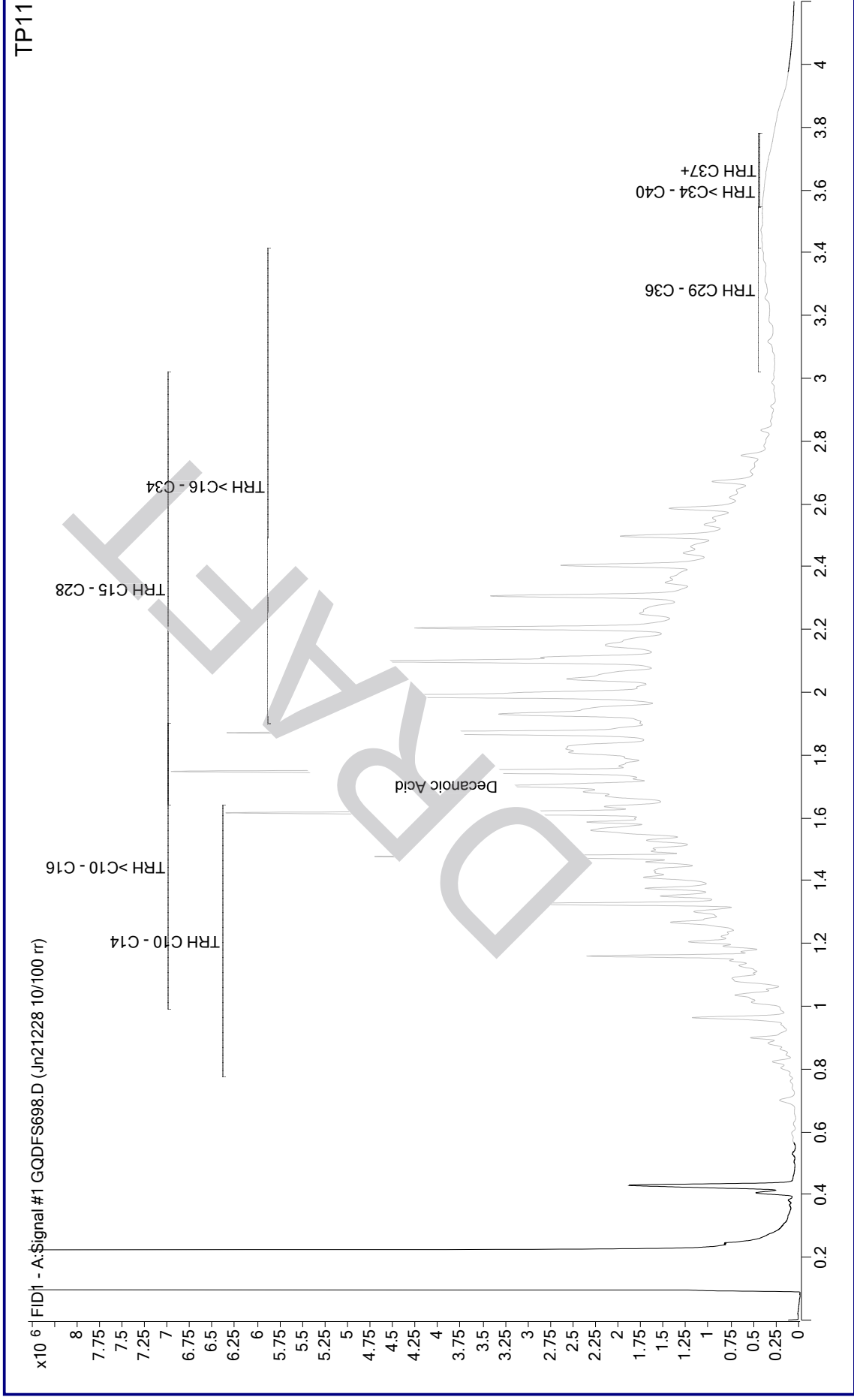
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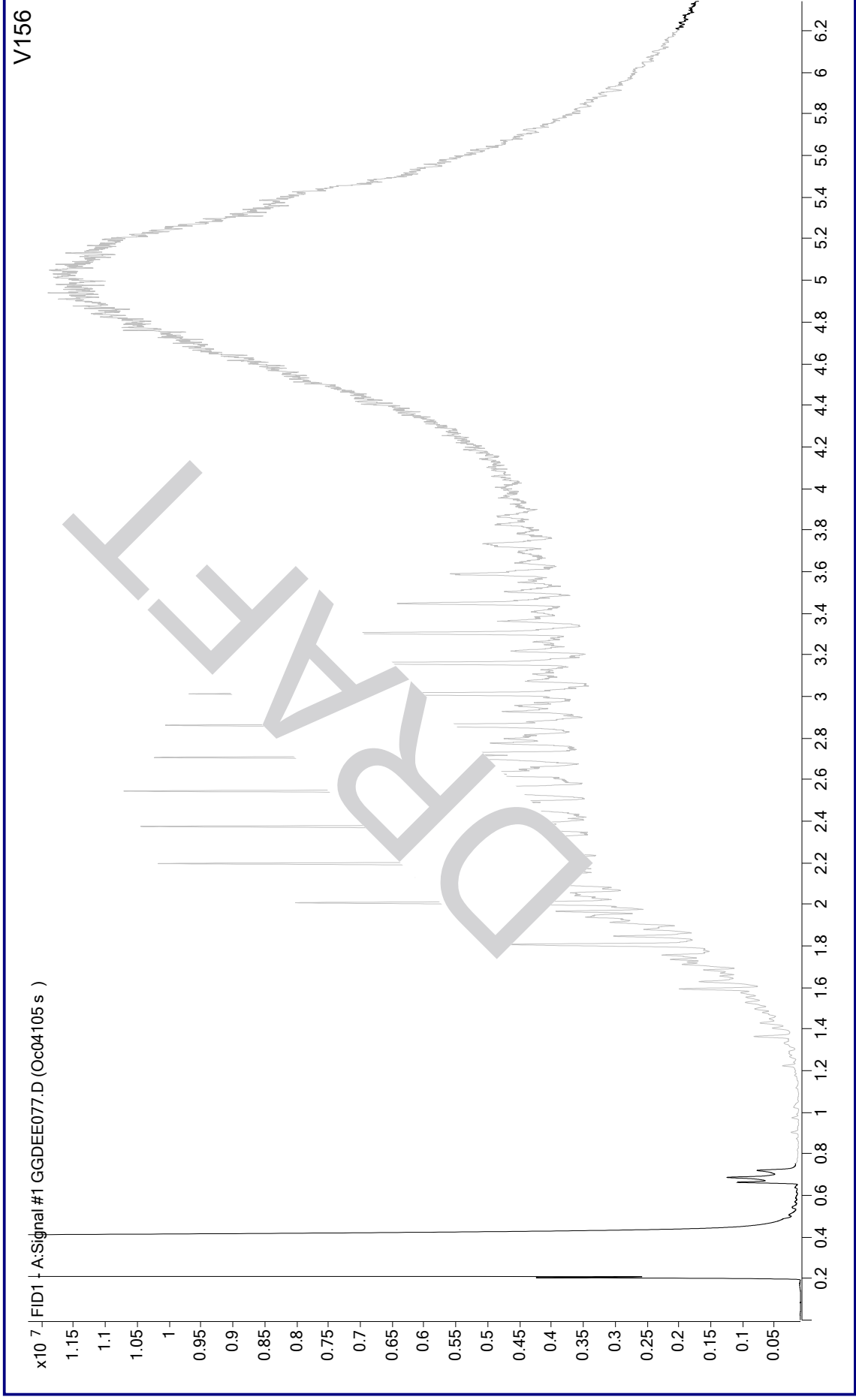
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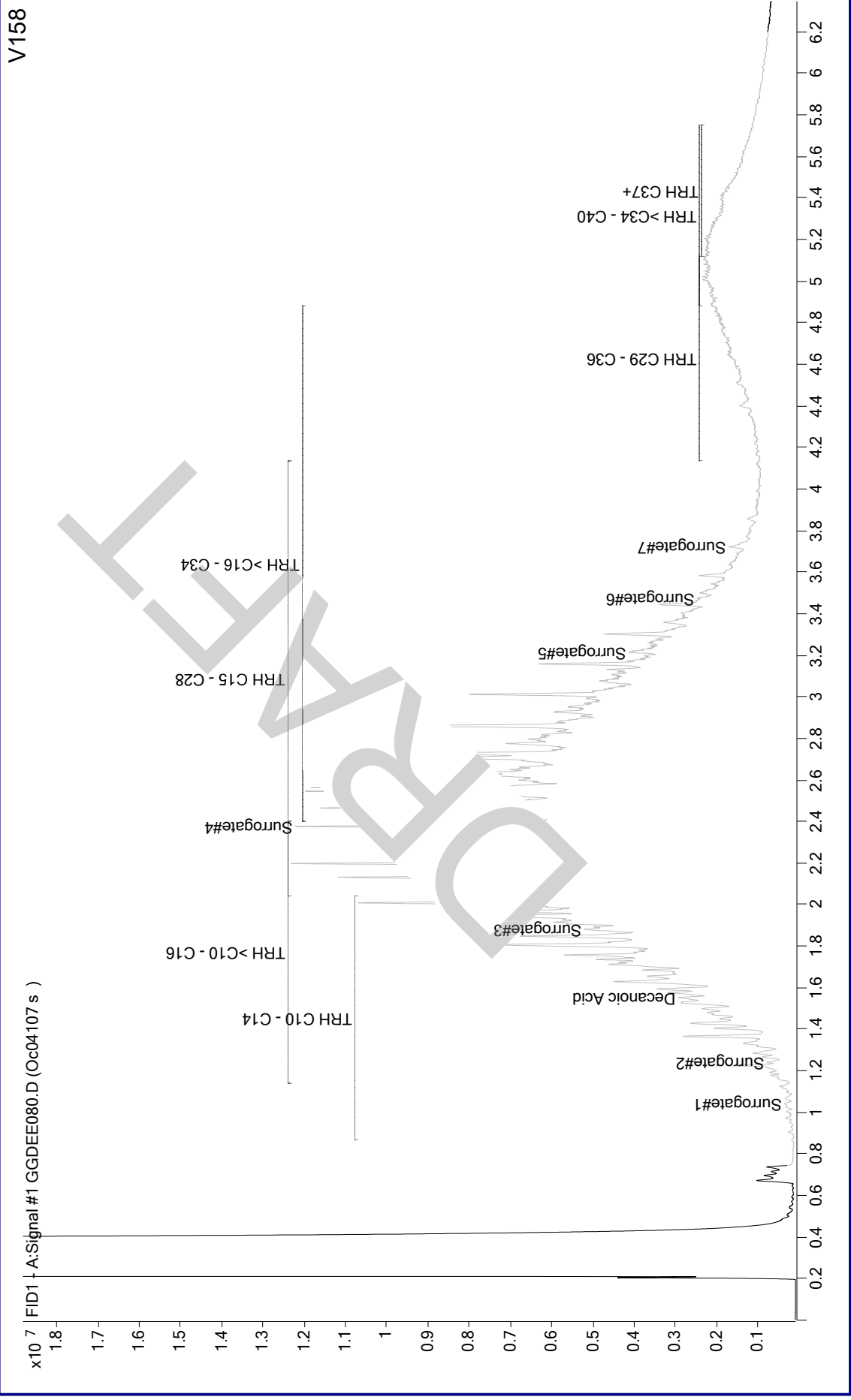
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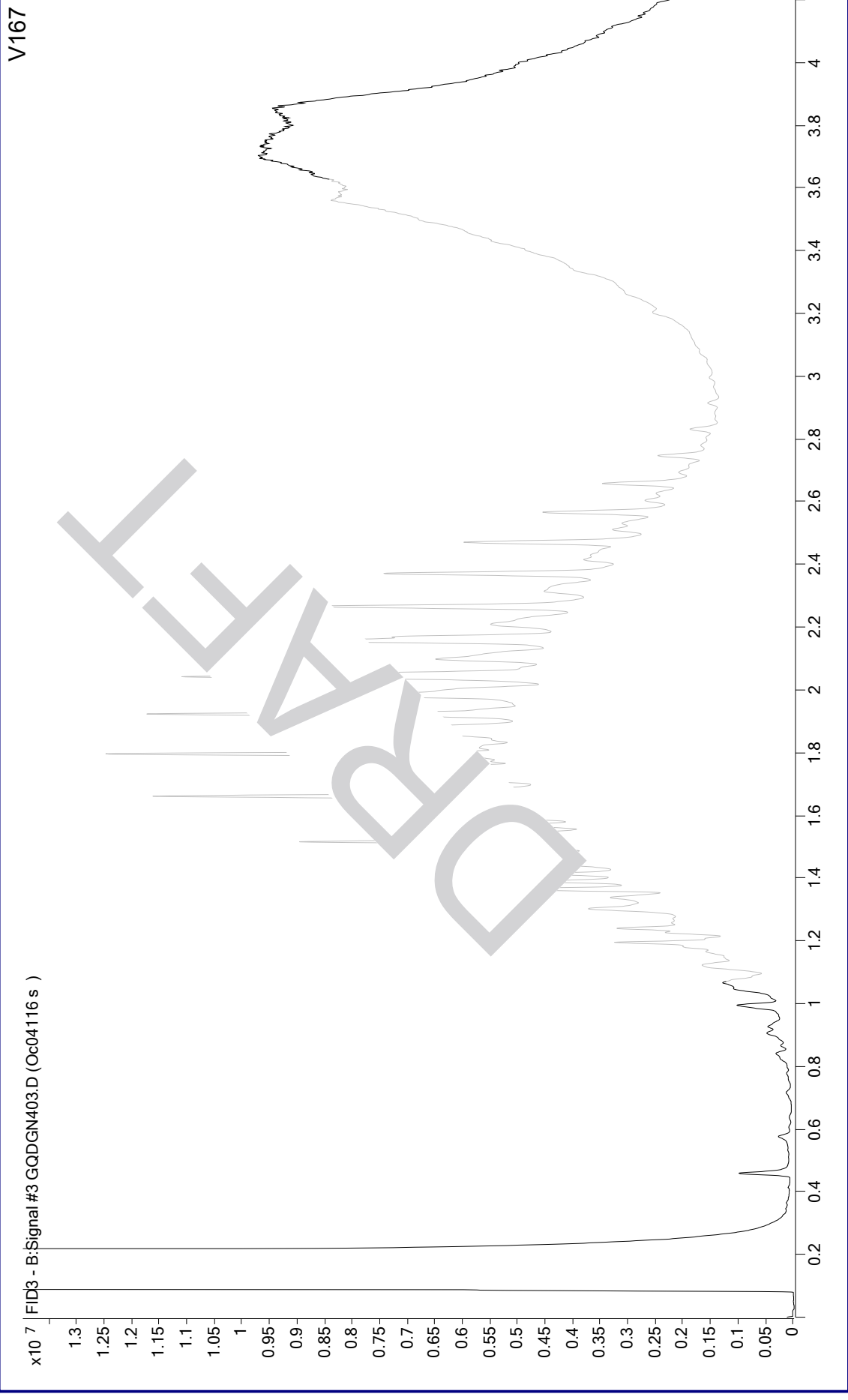
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Diesel Spill – Detailed Site Investigation

Aurizon

Berrimah Freight Terminal, Export Drive, Berrimah NT

**Appendix C SEPT/DEC 2021 GROUNDWATER MONITORING
EVENT REPORT**

GROUNDWATER
MONITORING EVENTS -
SEPTEMBER AND DECEMBER
2021

February 2023
J168829

ONE RAIL AUSTRALIA
Berrimah Freight Terminal

Document Control

Document Quality Management Details		
Report Name:	Groundwater Monitoring Events – September and December 2021	
Site Details:	Berrimah Freight Terminal	
Project Number:	J168829	
Client Name:	One Rail Australia	
Signatures:	Prepared By:  Varun Bhagwat Environmental Consultant	Reviewed By:  Alex Sereda Principal Hydrogeologist
	Approved By:  Dylan Burford Practice Manager - Environmental & Contaminated Land Management	

Issue Status

Version No.	Status	Date	Creator	Reviewer
1	Draft	17 March 2022	VB	DB/AS
2	Final	24 March 2022	VB	DB/AS
3	Final	30 June 2022	VB	DB/AS
4	Final	22 December 2022	VB/AS	DB
5	Final	23 February 2023	VB/AS	DB

Document Circulation

Version	Company
5	Aurizon

Groundwater Monitoring Events - September and December 2021

One Rail Australia

Berrimah Freight Terminal

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1 INTRODUCTION AND BACKGROUND

1.1 Introduction

Grencap Pty Ltd (Grencap) was commissioned by One Rail Australia (One Rail) to conduct two groundwater monitoring events (GMEs) in general accordance with the Groundwater Monitoring and Management Plan¹ (GMMP) and Sampling, Analytical and Quality Plan² (SAQP) developed for the Berrimah Freight Terminal, 75 O'Sullivan Circuit, Berrimah, Northern Territory (the Site).

A diesel spill estimated at approximately 20,000 litres occurred on the Site during automatic refuelling of a diesel locomotive in mid-2020. Various assessment and remedial activities followed, including the development of a groundwater monitoring network.

Six GMEs have been conducted at the Site since the spill occurred, in July 2020³, October 2020⁴, January 2021⁵, April/May 2021⁶, September 2021 and December 2021. This report details the results of the two most recent GMEs conducted in September and December 2021.

1.2 GMMP

The GMMP was prepared as a response measure to a diesel spill. The GMMP was developed to accomplish the following primary objectives:

- To conduct regular monitoring of groundwater underlying soils with residual diesel impacts in order to advise if impacts in soil cause groundwater contamination.
- If diesel impacts to groundwater become evident, to confirm whether or not they present a risk to offsite receptors located down inferred groundwater hydraulic gradient of the site (assessed to be to the north-west towards mangroves area and one of East Arm inlets).
- To establish mechanisms and management measures should unacceptable risk to human health and/or the environment be identified.

The GMMP included a set of trigger levels designed to assess a change in risk to on-site and down-gradient receptors as follows:

- On-site receptors – onsite workers and site visitors.
- Down-gradient receptors - the ecosystem of Darwin Harbor.

¹ Grencap (2021), Groundwater Management and Monitoring Plan, One Rail Australia Berrimah Freight Terminal. March 2021. Ref: J168829-01

² Grencap (2022), Sampling, Analytical and Quality Plan, One Rail Australia Berrimah Freight Terminal. February 2022. Ref: J168829

³ Grencap (2020), Berrimah Freight Terminal Diesel Spill - Groundwater Monitoring Event, July 2020. 21 August 2020. Ref: J168829-01

⁴ Grencap (2020), Berrimah Freight Terminal Diesel Spill - Groundwater Monitoring Event (October 2020). 10 December 2020. Ref: J168829-01

⁵ Grencap (2021), Berrimah Freight Terminal Diesel Spill - Groundwater Monitoring Event (January 2021). 12 March 2021. Ref: J168829-01

⁶ Grencap (2021), Groundwater Monitoring Event – Annual Report. One Rail Australia Berrimah Freight Terminal. 19 August 2021. Ref: J168829-01

In addition, the SAQP dated February 2021 (refer Section 4.4.3) included an updated suite of guidelines which were adopted further to the criteria presented in the current GMMP. The following guidelines have been adopted based on the GMMP and SAQP:

- NEPM 2013 Table 1A(4) Health Screening Levels (HSLs) (D) for Vapour Intrusion – Commercial/Industrial land use, 2m to <4m.
- NEPM 2013 Table 1C Groundwater Investigation Levels (GILs) – Marine Waters.
- NHMRC 2008 Guidelines for Managing Risks in Recreational Water.
- Australian Drinking Water Guidelines (ADWG) (2019).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 and ANZG 2018).
- California Water Boards (2019) – San Francisco Bay Regional Water ESLs – Aquatic Habitat Goal Levels (Saltwater Ecotox).
- CRC Care Technical Report 10 (September 2011) – For Intrusive Worker HSLs for Groundwater.
- World Health Organisation. Petroleum Products in Drinking Water 2008.

In the absence of the groundwater being of suitable quality for potable use, WHO (2008) – Drinking Water Values have been excluded. Total dissolved solids levels exceed the ADWG limit on 1,200mg/L.

Therefore, based on the site-specific receptors identified in the GMMP the environmental values of groundwater relevant to the site include primary contact recreation (PCR) and the protection of marine aquatic ecosystems.

The adopted trigger levels and additional environmental values for the groundwater monitoring program are included in **Table 1**.

Table 1 – Adopted Trigger Levels and other Environmental values (µg/L)

Analyte	Trigger Levels		Marine Aquatic Ecosystem	Primary contact Recreation (Health)		Primary Contact Recreation (Aesthetic)
	Groundwater HSL for vapour intrusion – Commercial/Industrial (2 m to <4 m)	NEPM Groundwater investigation level (GIL) (marine water)	ANZECC 2000	California Water Board Environmental Screening Levels for Gasoline and Diesel	10 x WHO 2008 and ADWG 2011	ADWG 2011
Petroleum Hydrocarbons						
C ₆ -C ₁₀ less BTEX (F1)	6,000	-	-	-	100	-
>C ₁₀ -C ₁₆ less naphthalene (F2)	NL	-	-	640	900	-
>C ₁₆ -C ₃₄ less BTEX (F3)	-	-	-	640	900	-
>C ₃₄ -C ₄₀ less BTEX (F4)	-	-	-	640	900	-
Benzene	5,000	500	-	-	10	-

Analyte	Trigger Levels		Marine Aquatic Ecosystem	Primary contact Recreation (Health)	Primary Contact Recreation (Aesthetic)	
	Groundwater HSL for vapour intrusion – Commercial/Industrial (2 m to <4 m)	NEPM Groundwater investigation level (GIL) (marine water)	ANZECC 2000	California Water Board Environmental Screening Levels for Gasoline and Diesel	10 x WHO 2008 and ADWG 2011	ADWG 2011
Toluene	NL	110*	-	-	8,000	25
Ethylbenzene	NL	50*	-	-	3,000	-
m-xylene	NL	50*	-	-	6,000	20
o-xylene	NL	350**	-	-	6,000	-
p-xylene	NL	200**	-	-	6,000	-
Naphthalene	NL	50	-	-	-	-
Attenuation Parameters						
Ferrous Iron	-	-	-	-	-	-
Iron	-	-	-	-	-	-
Nitrate (as NO ₃)	-	-	700	-	500,000	-
Alkalinity	-	-	-	-	-	-
Manganese	-	1,900	-	-	5,000	100
Methane	-	-	-	-	-	-
Sulphate	-	-	-	-	5,000	250,000
Phenols						
2,4,6-trichlorophenol	-	-	-	-	-	2
2,4-dichlorophenol	-	-	-	-	-	0.3
2-chlorophenol	-	-	-	-	-	0.1

* ANZG 2018 (99% protection)

**GIL for marine water not available, GIL for freshwater adopted as alternative

It is noted that no trigger levels / environmental values have been set for the physico-chemical parameters measured during groundwater sampling as these are only considered indicators to assess groundwater conditions.

A protocol for the application of trigger levels included two levels of contingency measures as follows:

Level 1 – Additional Monitoring, Assessment and Review

If the result exceeds an adopted trigger level, then the groundwater well(s) which showed the exceedance should be re-sampled within 2 weeks to verify the result. If the elevated result is confirmed, the following protocol applies:

1. Increase frequency of groundwater monitoring events to monthly for the well(s) in which an exceedance was reported;
2. If results are below trigger levels during two subsequent consecutive monthly rounds, continue with the original scheduled monitoring; and
3. If results exceed trigger levels in two subsequent monthly monitoring events, implement Level 2 actions.

Level 2 – Implement Contingency Measures

1. Review the historical data and any change in the on-site and off-site activities.
2. Consider installation of additional groundwater monitoring wells, subsequent sampling and assessments.
3. Assess risks to human health and the environment based on any additional information available.
4. Consider implementation of groundwater contamination control measures e.g., skimming, pump and treat.

DRAFT

1.3 SAQP

The SAQP was completed in February 2022 following Auditor review of the works completed to date (inclusive of DSI and GMEs). The proposed environmental investigations presented in the SAQP were intended to satisfy the requirements of the appointed Site Contamination Auditor, Mr Graeme Miller of Senversa, with the aim of addressing data gaps to:

- Inform the understanding of the nature and extent of contamination; and
- Develop and implement an appropriate remedial / management strategy; and
- Allow completion of the audit program.

Data gaps relating to groundwater identified following the Auditor review (refer email dated 5 November 2021) and are listed below:

- A significant mass of hydrocarbons remains in soil at and surrounding the spill area and to a lesser extent near the collection sump – which may form an ongoing source of groundwater contamination. This item is addressed under separate cover in an addendum to the DSI.
- Sampling under the temporary location of the stockpile of excavated contaminated soils is required to determine the presence and extent of contamination in this area. This item is addressed under a separate cover in the Remediation Management Plan (RMP).
- Remediation of excavated material is yet to be completed. This item is addressed under a separate cover in the RMP.
- No monitoring wells are located directly down hydraulic gradient of the spill area and other areas where significant residual contamination remains. Additional monitoring wells were installed prior to the December 2021 GME, further details are presented in **Section 2.2**.
- The potential for contaminated groundwater to migrate towards (and impact upon) the down gradient receptor in the future requires assessment. This is addressed in the trend analyses provided in **Section 2.3.3** and in further detail in the addendum to the DSI presented under separate cover.
- Previous testing of soil and groundwater samples have been limited to TRH and BTEXN analysis. PAH and phenols are known to be present in diesel and have been analysed in the December 2021 GME, further details are presented in **Section 2.3.3**.

As stated in the SAQP, in addition to the GMMP, the selected additional groundwater assessment criteria are as follows for the chemicals which do not have Australian guideline values:

- California Water Boards (2019) – San Francisco Bay Regional Water Environmental Screening Levels (ESL).
- World Health Organisation (WHO) (2008) – Drinking Water Values.

2 GROUNDWATER MONITORING EVENTS

This section provides a summary of GMEs conducted to date. The results of GMEs conducted in July 2020, October 2020, January 2021 and April/May 2021 are included in the monitoring letter reports submitted under separate cover.

An interim GME was conducted in September 2021 and a quarterly GME was conducted in December 2021. Results for these two GMEs are presented in sections below.

On 6 December 2021 (prior to the December 2021 GME), three additional groundwater monitoring wells, MW09, MW10 and MW11 were installed to address the data gaps identified following the Audit review.

Groundwater monitoring well locations are presented in **Figure 1**.

2.1 Previous Sampling Events

2.1.1 July 2020

Groundwater monitoring wells MW01 to MW04 and MW01A, MW03A and MW04A were constructed, surveyed, gauged and sampled during the first GME in July 2020.

The groundwater flow direction was inferred to be to the northwest towards mangrove intertidal zone. Hydrocarbons likely associated with diesel impacts were reported for two groundwater wells (MW01 and MW04) with results below GMMP specific trigger values.

2.1.2 October 2020

Four additional groundwater monitoring wells MW05 to MW08 were installed in October 2020 to further delineate the extent of the hydrocarbon impacts towards the nearest sensitive receptor being the tidal mangrove zone.

No discernible direction of groundwater flow could be inferred based on the gauging results of the October 2020 GME. This has been attributed to be wet season influence on the water table.

Approximately 6cm of floating light nonaqueous phase liquid (LNAPL) associated with leaked diesel fuel was measured in MW01 located in the vicinity of the temporary sump excavated during spill recovery activities. Due to the presence of LNAPL in MW01, MW01A located in near proximity to MW01 was sampled instead of MW01 during this GME and the presence of dissolved diesel range hydrocarbons was reported.

No trigger value exceedances were reported in October 2020 for the nine wells sampled. The concentrations of hydrocarbons in MW04 were noted to be higher in October compared to July results. The October results generally indicated potential subsurface migration of LNAPL as well as potential spread of the groundwater plume.

2.1.3 January 2021

Apart from the LNAPL present in MW01, all groundwater results were reported to be below the GMMP trigger levels in January 2021.

Previously reported hydrocarbon impacts in MW01A and MW04 were not repeated during the January 2021 GME. The thickness of the LNAPL in MW01 was smaller than that measured in October 2020. The presence of dissolved phase petroleum hydrocarbons was reported for two groundwater monitoring wells (MW03 and MW08) located in the immediate vicinity of the spill-impact area.

Groundwater flow was inferred to be to the north, north-west consistent with July 2020 results.

2.1.4 April/May 2021

The reported hydrocarbon impacts at MW03 and MW08 in January 2021 were not repeated during the April/May 2021 GME with hydrocarbon concentrations reported below laboratory reporting limits.

Several centimetres of LNAPL was again observed in MW01. The presence of LNAPL in MW01, however, has not resulted in the development of a contaminated plume that has the potential to reach the closest downgradient monitoring wells MW01A and MW07 beyond which lies in intertidal mangrove zone.

No trigger value exceedances were reported during the April 2021 GME.

Groundwater flow was inferred to be to the north, north-west, consistent with previous event.

2.2 Additional Monitoring Wells Installation

The additional groundwater monitoring wells were installed based on the following rationale:

- MW09 and MW10 – additional downgradient monitoring locations along the mangrove fringe to assess potential migration of contamination offsite.
- MW11 – located immediately adjacent spill location to assess any local impact.

The monitoring wells were installed using solid flight auger drilling techniques to depths of approximately 4 – 5 metres below ground level. The wells were typically installed with three metre screened intervals at the base. A sand filter pack was installed to a minimum of 0.5m above the top of the screened interval and bentonite was used to seal the wells to the surface. After installation, the monitoring wells were surveyed to determine the well head elevations. Monitoring well installation logs and the survey report are presented in **Appendix A**. The groundwater monitoring well network is presented in **Figure 1**.

2.3 September 2021 and December 2021 GMEs

The most recent groundwater monitoring events were conducted on 9 September 2021 and on 8 and 10 December 2021. The sampling methodology and results are presented in sections below.

2.3.1 Sampling Methodology

Groundwater samples were collected using a peristaltic pump for low-flow sampling, which is a technique in accordance with GMMP requirements. The following methodology was applied:

- Measuring standing water levels (SWL) from the surveyed point at the top of the casings using water/product interface water level meter prior to sampling.
- Monitoring physicochemical parameters (pH, temperature, electrical conductivity, oxidation-reduction potential and dissolved oxygen) during purging using a calibrated water quality meter (refer calibration details included in **Appendix B**). Sampling occurred when the drawdown and these parameters had stabilised within the ranges presented in NT Department of Mines and Energy Methodology for the Sampling of Ground Waters (2009).
- The sampler was wearing a clean pair of disposable nitrile gloves when collecting each sample.
- All groundwater samples were collected in appropriate bottles/containers provided by analytical laboratories and placed in a chilled esky for transportation immediately after collection.
- Collection of appropriate QA/QA samples including intra- and inter-laboratory duplicates and rinsate and trip blanks as per the GMMP and SAQP requirements.

2.3.2 Field Observations

Physicochemical field parameters measured at each monitoring well during groundwater purging are summarised in **Table 2**. The field record sheets are attached in **Appendix B**.

Table 2 – September 2021 and December 2021 GME Field Observations

Well ID	Sampling Date	Temperature (°C)	Electrical Conductivity (µS/cm)	pH	ORP (mV)	Dissolved Oxygen (% saturation)
MW01	09/09/21	28.4	14,436	3.78	77.3	64.3
	10/12/21	36.8	57.9*	5.53	53.2	104.9*
MW01A	09/09/21	34.4	61,531	5.99	38.3	80.5
	08/12/21	35.9	56,517	5.21	45.8	110.6*
MW02	09/09/21	32.5	17,250	5.33	69.6	17.2
	10/12/21	34.7	11,753	5.30	36.4	87.9
MW03	09/09/21	34.5	22,999	5.06	136.2	82.3
	08/12/21	36.4	1,802	5.35	45.0	45.0
MW04	09/09/21	34.2	19,017	5.78	115.7	81.4
	08/12/21	36.2	15,234	5.30	38.1	50.9
MW05	09/09/21	37.8	32,836	4.75	82.2	4.8
	10/12/21	34.1	37,248	6.02	-0.8	85.8
MW06	09/09/21	32.4	20,840	5.48	62.0	13.6
	10/12/21	32.0	22,999	5.36	8.5	114.1*
MW07	09/09/21	34.8	29,446	5.62	42.4	68.1
	08/12/21	36.7	12,285	6.57	-9.3	5.9
MW08	09/09/21	34.8	30,281	5.83	0.9	95.3*
	08/12/21	34.8	11,555	5.28	27.2	99.6*
MW09	10/12/21	34.2	24,025	6.21	-44.0	101.9*
MW10	10/12/21	35.0	14,735	5.94	-77.2	87.3
MW11	08/12/21	36.7	20,156	5.61	-13.9	55.2

*Parameters are likely to be influenced by the presence of air bubbles in purging tubing

As shown in **Table 2**, the groundwater beneath the area is generally saline (with variations between the end of dry season in September and the beginning of wet season in December) and slightly acidic. Measured ORP and dissolved oxygen levels are generally indicative of oxidising conditions, potentially favourable for natural biodegradation of petroleum hydrocarbons. The measured negative ORPs at MW07 and MW11 may be indicative of hydrocarbon biodegradation processes which may be occurring at these locations. Negative ORPs at MW09 and MW10 may be indicative natural groundwater conditions typical for mangroves environment. The salinity variation noted at MW03 appeared to be consistent with previously observed variation at this location during 2020/21 wet season (refer previous GME reports).

The depth to groundwater levels gauged in September is summarised in **Table 3**. Due to significant groundwater salinity variations density adjustments were made as also shown in **Table 3**. Groundwater level gauging results are presented in **Figure 2**.

Table 3 - September 2021 GME Groundwater Levels

Well ID	Easting	Northing	Well Elevation (mAHD)	Standing Water Level (mbtoc)	SWL Elevation (mAHD)	Calculated Water Density* (kg/m ³)	Density corrected levels (mAHD)
MW01	708423.825	8620973.001	5.958	3.054	2.904	1002.75	2.915
MW01A	708416.945	8620986.556	5.921	3.018	2.903	1019.10	2.947
MW02	708491.822	8620929.677	5.026	1.736	3.290	1002.68	3.312
MW03	708498.128	8621016.708	5.891	2.989	2.902	1000.55	2.910
MW04	708460.568	8621002.703	5.931	3.041	2.890	1002.91	2.892
MW05	708374.723	8621004.469	5.249	2.350	2.899	1009.79	2.913
MW06	708470.486	8621039.916	5.262	2.369	2.893	1004.34	2.908
MW07	708398.119	8620980.232	5.906	3.006	2.900	1007.65	2.922
MW08	708521.037	8621025.589	5.970	3.071	2.899	1008.01	2.924

*Calculated based on field measured salinity and temperature

Based on the gauging results the direction of groundwater flow was assessed to be to the north, north-west towards mangroves which is consistent with the majority of the previous GMEs.

The depth to groundwater gauged in December 2021 and density adjusted groundwater levels are summarised in **Table 4** and illustrated in **Figure 3**.

Table 4 - December 2021 GME Groundwater Levels

Well ID	Easting	Northing	Well Elevation (mAHD)	Standing Water Level (mbtoc)	SWL Elevation (mAHD)	Calculated Water Density* (kg/m ³)	Density corrected levels (mAHD)
MW01	708423.825	8620973.001	5.958	2.517	3.441	996.11	3.443
MW01A	708416.945	8620986.556	5.921	2.459	3.462	1014.02	3.508
MW02	708491.822	8620929.677	5.026	1.583	3.443	999.49	3.456
MW03	708498.128	8621016.708	5.891	2.434	3.457	994.48	3.456
MW04	708460.568	8621002.703	5.931	2.472	3.459	1000.49	3.464
MW05	708374.723	8621004.469	5.249	1.806	3.443	1011.20	3.467
MW06	708470.486	8621039.916	5.262	1.816	3.446	1005.46	3.469
MW07	708398.119	8620980.232	5.906	2.441	3.465	998.96	3.474
MW08	708521.037	8621025.589	5.970	2.514	3.456	999.46	3.467
MW09	708501.4	8621051.3	5.177	1.742	3.435	1005.34	3.463
MW10	708422.1	8621021.8	5.179	1.756	3.423	1000.80	3.438
MW11	708511.5	8621022.4	5.894	2.441	3.453	1002.61	3.473

*Calculated based on field measured salinity and temperature

As shown in **Table 4** and **Figure 3** the density adjusted groundwater levels in December 2021 were very close, and no discernible direction of groundwater flow could be determined. It is important to note that groundwater level gauging for the December 2021 GME was conducted over three days (between 8 and 10 December) due to the safety requirement involving One Rail representative supervision during groundwater monitoring and sampling on the terminal pad. Consequently, the gauging could not be undertaken as a 'snap shot' and therefore the water level pattern presented on **Figure 3** may be marginally influenced by tidal movements and/or rainfall (19mm of rain was reported by BOM between 9am 9 December and 9am 10 December). These gauging results cannot be used to accurately assess the direction of groundwater flow at the time. One Rail will be consulted prior to the next event to ensure representative water levels are collected. Groundwater salinity (i.e. total dissolved solids, TDS) is also to be included in the analytical suite to be verified by analytical laboratories due to the required density adjustments.

It is also observed that groundwater level in December was approximately 0.5m higher compared to September levels likely indicative of the results of wet season recharge. The water level rise in December is supported by some decrease in groundwater salinity further confirming the water level rise is a result of rainwater seasonal recharge.

2.3.3 Analytical Results

Groundwater samples collected in September and December 2021 were analysed for chemicals of concern included in the GMMP i.e. associated with the diesel spill and included:

- total recoverable hydrocarbons (TRH);
- benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN); and
- Samples were also analysed for natural attenuation parameters to assess whether natural biodegradation of diesel is occurring.

In addition, in the December 2021 GME, groundwater samples were also analysed for polycyclic aromatic hydrocarbons (PAHs) and phenols which can be typical additives to diesel fuels.

The petroleum hydrocarbons and BTEXN results are tabulated in **Appendix C**. The reported concentrations of PAHs and phenols were below laboratory limits of reporting (LORs) and are not discussed further. Laboratory certificates for September and December 2021 events are included in **Appendix D**.

The detectable levels of petroleum hydrocarbons likely attributable to the recent diesel spill and reported exceedances for other tested chemicals are summarised in **Table 5**. It is noted that the laboratory limits of reporting for benzo(a)pyrene and pentachlorophenol were higher than the adopted environmental criteria. However, these chemicals are not used as diesel fuel additives and therefore cannot be associated with the diesel spill impacts. They are not included in **Table 5**.

Table 5 – Analytical Results (µg/L)

Monitoring Well	Sampling Dates	F1: TRH (C ₆ -C ₁₀ less BTEX)	F2: TRH (C ₁₀ -C ₁₆ less naphthalene)	F3: TRH (>C ₁₆ -C ₃₄)	F4: TRH (>C ₃₄ -C ₄₀)	Diesel Range TRH (>C ₁₀ -C ₃₄)
Groundwater HSL		6,000	NL	-	-	-
GIL/ANZECC - Marine Aquatic Ecosystem		-	-	-	-	-
ESL CWB - Aquatic Ecosystem		440	640	640	640	640
Primary Contact Recreational		100	900	900	900	900
GMMP Trigger Value		NL	NL	-	-	-
MW01	Jul-20	<20	140	<100	<100	140
	Oct-20	Not sampled due to presence of ~6cm of LNAPL				
	Jan-21	Not sampled due to presence of ~2cm of LNAPL				
	May-21	Not sampled due to presence of ~5cm of LNAPL				
	Sep-21	<20	270	200	<100	200
	Dec-21	<20	860	900	<100	1760
MW01A	Oct-20	<20	<50	600	<100	600
	Jan-21	<20	<50	<100	<100	<100
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	100	<100	<100
MW02	Jul-20	<20	<50	<100	<100	<100
	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	<100	<100	<100
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	<100	<100	<100
MW03	Jul-20	<20	<50	<100	<100	<100
	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	300	<100	300
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	400	<100	400
MW04	Jul-20	<20	240	400	<100	640
	Oct-20	<20	520	1,300	<100	1,820
	Jan-21	<20	<50	300	<100	<100
	May-21	<20	240	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	400	<100	400
MW05	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	<100	<100	<100
	May-21	<20	<50	<100	<100	<100

Monitoring Well	Sampling Dates	F1: TRH (C ₆ -C ₁₀ less BTEX)	F2: TRH (C ₁₀ -C ₁₆ less naphthalene)	F3: TRH (>C ₁₆ -C ₃₄)	F4: TRH (>C ₃₄ -C ₄₀)	Diesel Range TRH (>C ₁₀ -C ₃₄)
Groundwater HSL		6,000	NL	-	-	-
GIL/ANZECC - Marine Aquatic Ecosystem		-	-	-	-	-
ESL CWB - Aquatic Ecosystem		440	640	640	640	640
Primary Contact Recreational		100	900	900	900	900
GMMP Trigger Value		NL	NL	-	-	-
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	<100	<100	<100
MW06	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	<100	<100	<100
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	<100	<100	<100
MW07	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	<100	<100	<100
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	500	<100	500
MW08	Oct-20	<20	<50	<100	<100	<100
	Jan-21	<20	<50	100	<100	<100
	May-21	<20	<50	<100	<100	<100
	Sep-21	<20	<50	<100	<100	<100
	Dec-21	<20	<50	200	<100	200
MW09	Dec-21	<20	<50	<100	<100	<100
MW10	Dec-21	<20	<50	<100	<100	<100
MW11	Dec-21	<20	<50	300	<100	300

As shown in Error! Reference source not found., LNAPL was not observed in any of the groundwater monitoring wells during both GMEs (including MW01) having been reported previously in October 2020, January and May 2021.

Hydrocarbon concentrations were reported in the September and December 2021 GMEs at the following locations:

- MW01 and MW01A – reported in September 2021 and December 2021 as well as one or more previous GMEs with the concentrations reported to exceed the aquatic ecosystem and recreational use criteria at MW01 in Dec 2021.
- MW03, MW04 and MW08 – reported in December 2021 but not September 2021 having been reported in one or more previous GMEs.
- MW07 and MW11 – reported in December 2021 for the first time.

No hydrocarbon impacts were reported in MW05, MW06, MW09 or MW10.

Previously reported concentrations exceeding screening criteria reported in MW04 have not been repeated.

Considering that the impacts in groundwater were only identified in the monitoring wells located in the vicinity of the spill area or at areas where spilled diesel travelled along an existing surface drainage line there is no evidence of any significant plume having developed.

As hydrocarbon concentrations demonstrate some degree of fluctuation it may be assumed that these impacts are likely to be a result of seasonal groundwater interaction with a smear zone developed as a result of wet/dry season water level fluctuation.

As per the GMMP plume stability should be evaluated via Mann-Kendall statistical analysis. This can only be used for the groundwater monitoring wells which have statistically a viable dataset, i.e., four results above laboratory limits of reporting (LOR). It is important to note that based on the reported concentrations, seasonal variation is evident which may be due to potential presence of a smear zone. Therefore, to appropriately assess concentration trends wet and dry season variations should be assessed separately to enable adequate comparison. The groundwater monitoring conducted covers two dry and two wet seasons indicating that statistical analyses by season can be undertaken when two additional wet and dry season datasets become available.

At a cursory level, an indicative increase in hydrocarbon concentrations appears to have occurred at MW01, MW07, MW08 and MW11 (albeit the latter only monitoring for the first time in the December 2021 GME), a potential result of interaction within the smear zone near the source(s) being the locations of the original spill and temporary sump. Indicative reductions are noted for MW01A, MW04. No clear change is noted for MW03. No fuel-related impacts have been recorded for MW02, MW05, MW06, MW09 and MW10.

During the January, April, September and December 2021 GMEs, groundwater samples were also analysed for a suite of analytes to assess potential natural attenuation of petroleum hydrocarbons in groundwater. This analytical suite includes:

- Methane (CH₄);
- Ferrous iron (Fe²⁺);
- Manganese (Mn);
- Nitrate (NO₃);
- Sulphate (SO₄); and
- Alkalinity as CaCO₃.

Results in comparison to adopted assessment criteria are presented in **Table 6**.

Table 6 – January/April/September/December 2021 Natural Attenuation Parameter Results (mg/L)

Well ID	Sample Date	Fe ²⁺	NO ₃	SO ₄	Alkalinity as CaCO ₃	Manganese	Methane
Aquatic Ecosystem	-	-	-	-	-	1.2	-
Recreational Use		-	500	5,000	-	5	-
Primary Contact (Aesthetic)				250		0.1	
Marine Ecosystem			0.7				
MW01	9-Sep-21	29	0.02	640	<20	2	<0.05
	10-Dec-21	33	<0.02	320	230	2	<0.05
MW01A	21-Jan-21	20	0.63	2,900	90	1.2	<0.05
	5-May-21	7.6	0.11	2,800	87	2.2	<0.05
	9-Sep-21	12	<0.02	3,100	85	2.1	<0.05
	8-Dec-21	10	0.38	2,900	52	1.5	<0.05
MW02	21-Jan-21	<0.05	0.46	480	<20	3.8	<0.05
	30-Apr-21	0.08	0.11	920	<20	9.8	<0.05
	9-Sep-21	0.07	<0.02	860	<20	16	<0.05
	10-Dec-21	0.12	0.23	490	<20	5.2	<0.05
MW03	21-Jan-21	<0.05	1	180	<20	1.1	<0.05
	5-May-21	0.4	1.7	190	<20	1.1	<0.05
	9-Sep-21	2.5	0.06	700	<20	2.6	<0.05
	8-Dec-21	0.1	0.68	110	<20	1.8	<0.05
MW04	21-Jan-21	0.18	1.2	290	21	1.2	<0.05
	5-May-21	0.36	0.78	410	24	2.4	<0.05
	9-Sep-21	4.8	<0.02	800	<20	2	<0.05
	8-Dec-21	2.5	<0.02	660	<20	1.8	<0.05
MW05	21-Jan-21	5.8	<0.02	2,100	35	0.88	<0.05
	30-Apr-21	2.6	0.13	1,600	28	0.96	<0.05
	9-Sep-21	7.4	<0.02	1,700	55	0.88	<0.05
	10-Dec-21	6	<0.02	2,100	55	1.1	<0.05
MW06	21-Jan-21	<0.05	1.1	320	<20	1	<0.05
	30-Apr-21	0.08	0.66	490	<20	1.5	<0.05
	9-Sep-21	1.1	0.09	1,100	26	1.3	<0.05
	10-Dec-21	0.25	0.26	610	<20	1.3	<0.05
MW07	21-Jan-21	3.8	0.69	850	37	1	<0.05
	5-May-21	6.2	0.7	530	21	1.4	<0.05
	9-Sep-21	18	0.13	1,600	40	1.1	<0.05
	8-Dec-21	0.75	0.35	580	97	1.2	<0.05

Well ID	Sample Date	Fe ²⁺	NO ₃	SO ₄	Alkalinity as CaCO ₃	Manganese	Methane
MW08	21-Jan-21	1	1.2	290	<20	1.3	<0.05
	5-May-21	2.3	1.3	430	24	1.6	<0.05
	9-Sep-21	5.3	<0.02	1,600	390	1.6	<0.05
	8-Dec-21	1.4	1.1	500	<20	1.5	<0.05
MW09	10-Dec-21	3.1	0.21	1,100	36	1.3	<0.05
MW10	10-Dec-21	7.6	<0.02	590	31	2.4	<0.05
MW11	08-Dec-21	1.9	<0.02	870	34	2.3	<0.05

As shown in **Table 6** exceedances were reported for manganese in all wells with the highest concentrations at MW02 located upgradient of the spill area (refer DSI).

Generally, during the biodegradation of hydrocarbons in groundwater, bacterial activity consumes oxygen, creating a reducing environment which may be characterized by a reduction in nitrate and sulphate and an increase in iron, manganese and methane concentrations. Based on the data presented in **Table 6**, some indications of natural attenuation of hydrocarbons may be illustrated by increases in iron (Fe²⁺) at MW04 and MW07 as well as minor decreases in nitrate (NO₃) concentrations at the majority of locations.

A comparison of the concentrations of attenuation indicators reported for background well MW02 with the wells located within and in the vicinity of the spill area does not show clear evidence of hydrocarbon degradation. This includes low concentrations of nitrate, presence of iron and a high level of manganese in MW02 which would potentially be indicative of biodegradation, however, appears to be representative of natural groundwater quality in the area. Similarly, the measured negative OPRs at MW09 and MW10 are likely to be indicative of natural groundwater conditions within the mangrove environment rather than an indication of plume biodegradation.

Whilst not strictly evident as occurring as yet, natural degradation is likely to occur via dilution as a product of the high volumes of rainfall and infiltration.

Further GMEs and an increased data set is required to assess the occurrence of natural attenuation.

2.3.4 QA/QC Results

Groundwater Duplicate Analysis

Field duplicates (QC01 and QC01A, duplicates of MW01A) were collected during the September and December 2021 sampling event and analysed at the primary (Eurofins) and secondary (ALS) laboratories for TRH, BTEXN and natural attenuation parameters.

Duplicate analytical results were assessed by calculating relative percent differences between primary sample results and duplicate sample results. All of the inter and intra laboratory duplicate groundwater analyses had RPD values below the recommended comparison criteria of 50% as the results in both inter and intra laboratory duplicates were reported to be below LORs

A table summarising the duplicate sample results is presented at the end of this report (refer to **Appendix C**).

Blank Analyses

Rinsate blank samples (RB01) was collected on 9 September, 8 and 10 December (RB02) and analysed at the primary laboratory for TRH and BTEXN. The rinsate blank samples were collected from decontaminated sampling equipment to ensure adequate cleaning has occurred.

Trip blank samples (TB01 – 9 September & 8 December, TB02 – 10 December) were prepared and kept with the portable sample cooler for the duration of the and delivered to the primary laboratory for TRH and BTEXN analysis. The trip blanks were prepared using de-ionised water to detect potential cross-contamination throughout the sampling and sample delivery stages of the GMEs.

A table summarising the rinsate and trip blanks sample results is presented at the end of this report (refer to **Appendix C**).

Greencap notes that on the September 2021 GME sample receipt advice provided by the primary laboratory, it notes that no attempt to chill the samples was evident. If samples are not provided to the laboratory below a certain temperature, this could result in potential volatilisation of volatiles. However, given the fact that the fuel type is diesel in this investigation, the volatile component is minimal and therefore any loss is deemed negligible based on the consistency with the previous results.

DRAFT

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

The results of groundwater monitoring undertaken in September and December 2021 generally showed that although groundwater impacts relating to the diesel spill remain, the reported impacts were limited to the immediate vicinity of the actual spill area and the temporary drain and sump along which spilled diesel flowed.

No elevated concentrations of hydrocarbons indicative of diesel fuel were reported adjacent the sensitive receptor areas represented by the mangrove community located to the north of the spill site, indicating no significant migration or expansion of a groundwater plume (if any).

As detailed in the SAQP, three additional groundwater monitoring wells were installed, and additional environmental screening criteria were adopted along with some previously adopted criteria being excluded. Exceedances of the criteria were limited to the December 2021 for MW01 only.

Hydrocarbon impacts (below screening criteria) were detected in MW07 and MW08 for the first time in December 2021.

Hydrocarbon impacts were noted to be varied, likely as a result of seasonal groundwater level fluctuating attributable wet and dry seasons. Groundwater samples collected in December 2021 were also analysed for polycyclic aromatic hydrocarbons (PAH) and phenols with results reported below laboratory limits of reporting.

It is noted that the laboratory limits of reporting for benzo(a)pyrene and pentachlorophenol were higher than the adopted environmental screening criteria. However, these chemicals are not used as diesel fuel additives and therefore cannot be associated with the diesel spill impacts.

A review of attenuation parameters indicated a potential for early stage natural degradation of petroleum hydrocarbons in groundwater at the site, however, further data capture is required to monitor this trend.

3.2 Recommendations

Following an adoption of additional environmental criteria for the most recent GME results it is recommended that the trigger levels and their application is reviewed as part of the GMMP review due after the December 2021 GME.

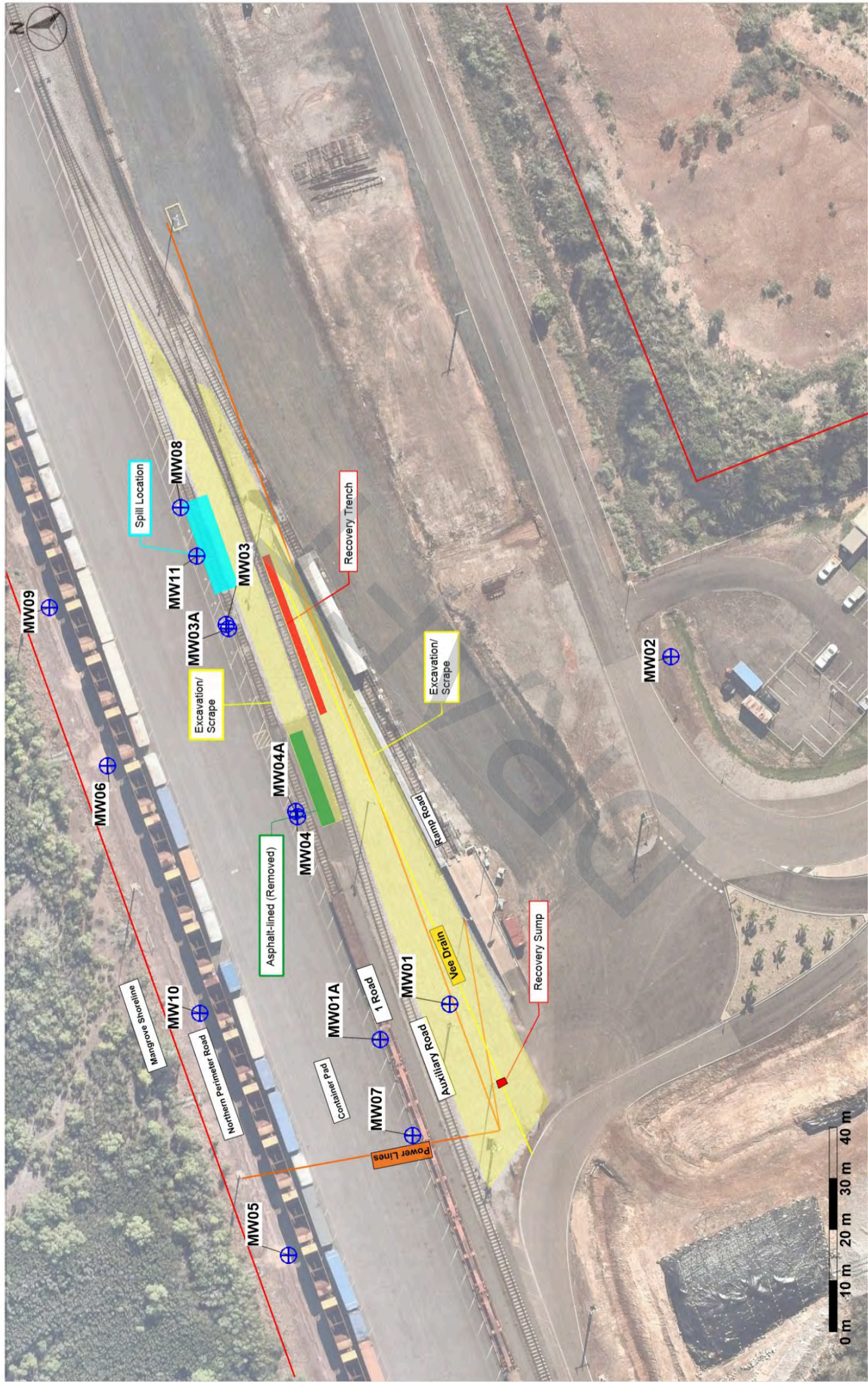
The next groundwater monitoring event is to be scheduled.

Groundwater Monitoring Event and Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Figure 1: Groundwater Monitoring Well Location Plan



Legend

- Site boundary
- Existing Groundwater Monitoring Well

Date Data Collected: 30 Oct 2020
 Source: Background Photograph, Courtesy of nearmap.com

Client: One Rail Australia
Client No.: C105292
Project: Diesel Spill Targeted Site Contamination Investigation
Job No.: J1-68829

Title: Groundwater Monitoring Plan 0
Address: Berrimah Freight Terminal - Export Drive, Berrimah NT
Project: Groundwater Monitoring Well Locations

Drawn: AS
PM: DB
Date: 14/02/2022
File Name: J1-68829 GW Plan

Figure No.: 1

Approximate Scale: 20 m

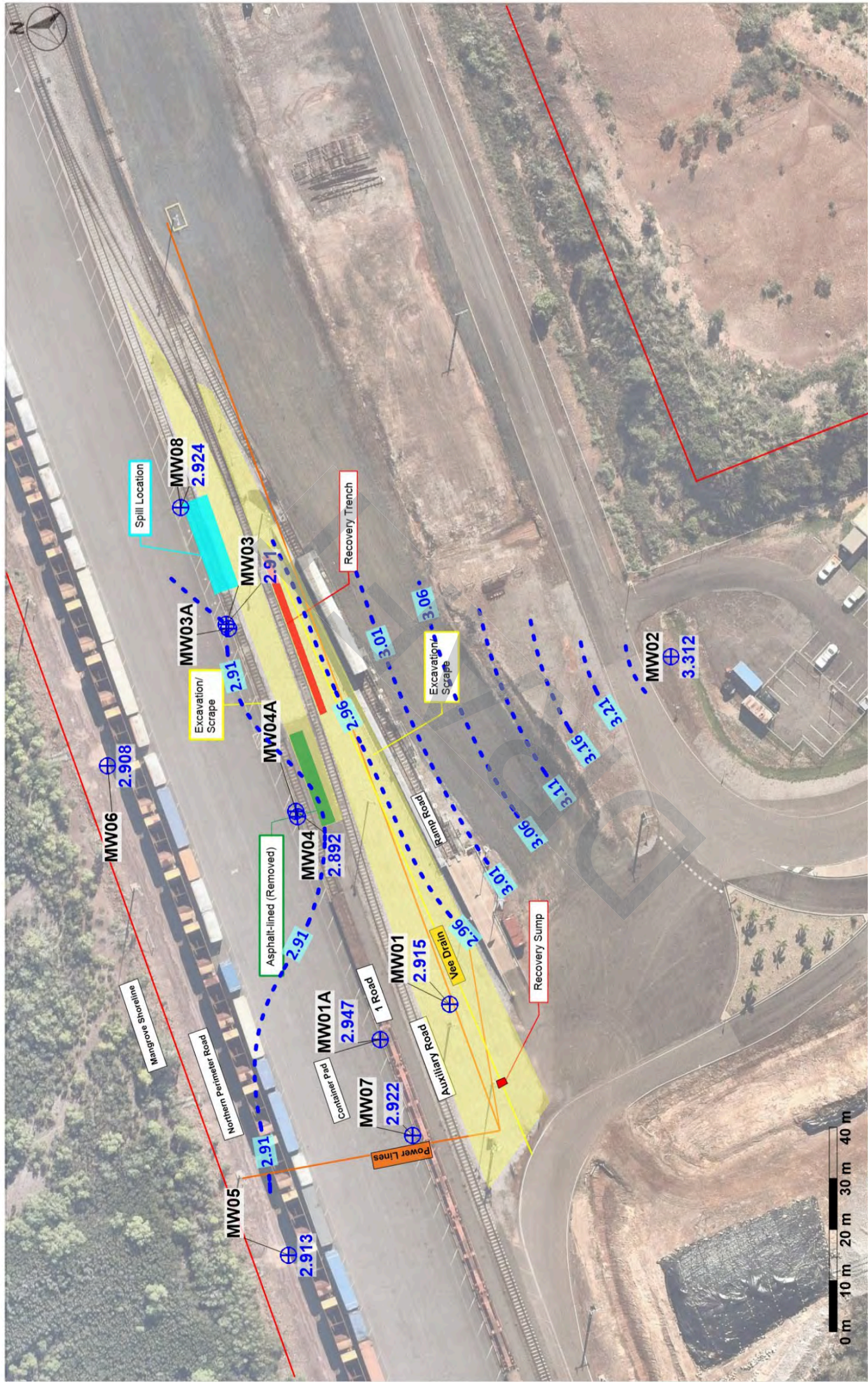
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Groundwater Monitoring Event and Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Figure 2: Groundwater Elevation Figure (September 2021)



Legend

- Site boundary
- Existing Groundwater Monitoring Well
- 3.25 Groundwater Level Elevation (mASL)
- Groundwater Level Contours (mASL)

Date Data Collected: 30 Oct 2020
Source: Background Photomap, courtesy of nearmap.com

Client: One Rail Australia
Client No.: C105292
Project: Diesel Spill Targeted Site Contamination Investigation
Job No.: J1-68829

Title: Groundwater Monitoring Plan 0
Address: Berrimah Freight Terminal - Export Drive, Berrimah NT
Groundwater Levels - September 2021

Drawn: PM: AS DB
Date: 14/02/2022
File Name: J1-68829 GW Plan

Figure No.: 2

Approximate Scale: 20 m

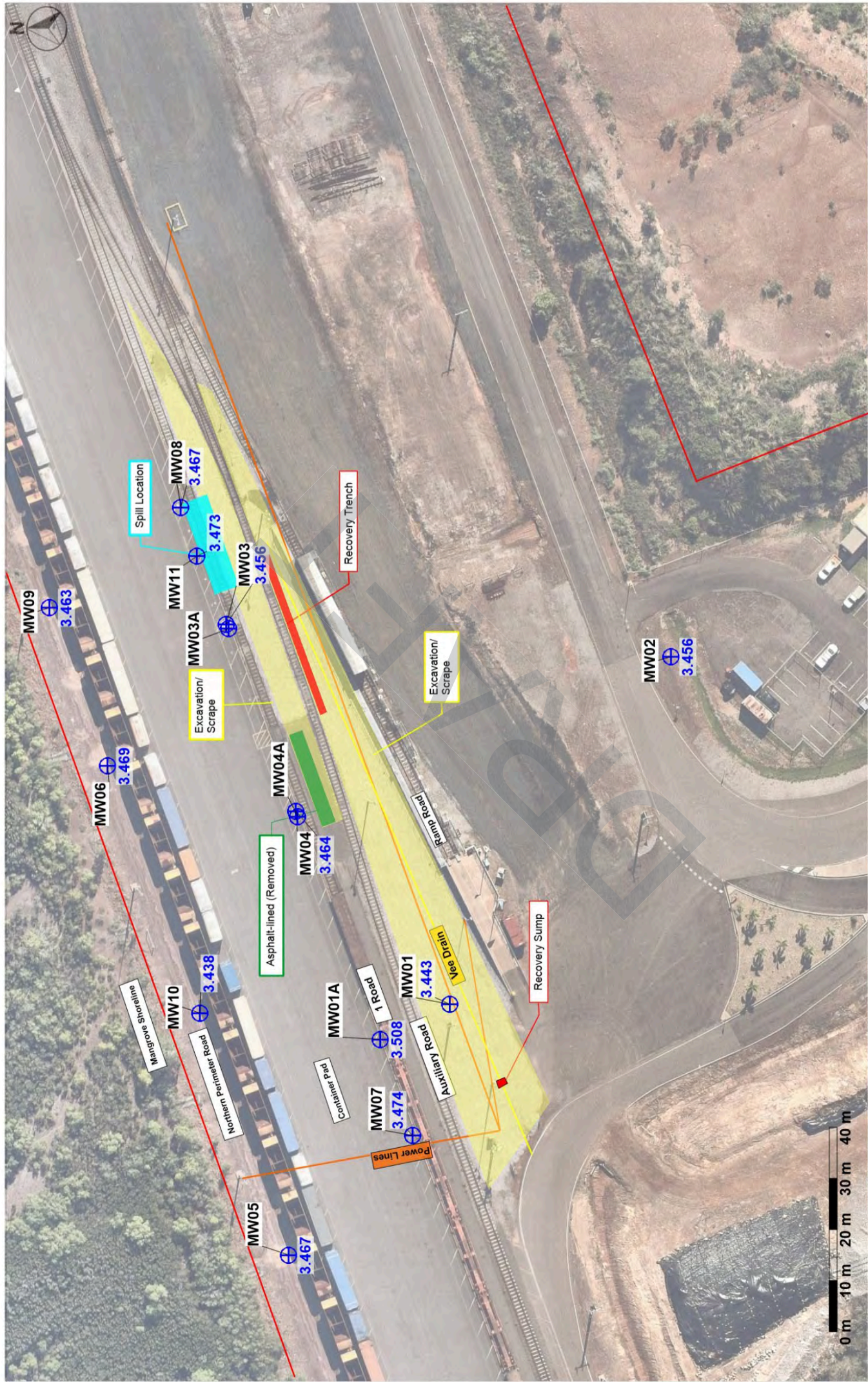
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Groundwater Monitoring Event and Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Figure 3: Groundwater Elevation Figure (December 2021)



Legend

- Site boundary
- Existing Groundwater Monitoring Well
- Groundwater Level Elevation (mAHD)

Client: One Rail Australia
Client No.: C105292
Project: Diesel Spill Targeted Site Contamination Investigation
Job No.: J1-68829

Title: Groundwater Monitoring Plan 0
Address: Berrimah Freight Terminal - Export Drive, Berrimah NT
Groundwater Levels - December 2021

Drawn: AS
DB
Date: 14/02/2022
File Name: J1-68829 GW Plan

Approximate Scale: 20 m
Figure No.: 3

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Date Data Collected: 30 Oct 2020
 Source: Background Photomap, courtesy of nearmap

Groundwater Monitoring Event and Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Appendix A: Groundwater Monitoring Well Installation Logs & Survey Report

Client: One Rail Australia Project: Diesel Spill Project No: J168829 Location: Berrimah, NT	Date Drilled: 6/12/2021 Drilling Co: Proactive Drilling Services Total Depth (m): 4.738 Diameter (mm): 150	Bore No.: MW09 Easting: Northing: Logged by: VB Checked by: AS
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COMMENTS Well collapsed twice when attempting to put PVC in.



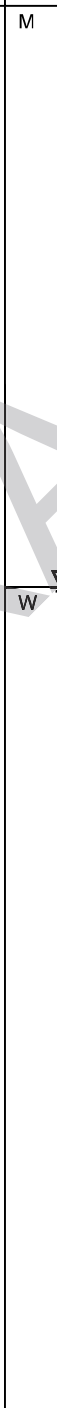
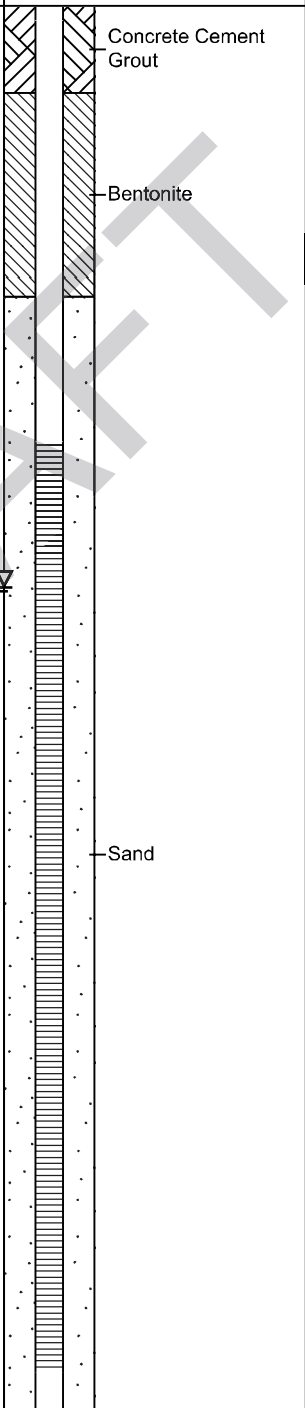
WATER STRIKE	Graphic Log	SOIL DESCRIPTION	Moisture	Well Diagram	Comment	Depth (m)
K	K	FILL: Silty SAND, fine to medium grained sand, fine to coarse sized gravels throughout, light brown.	M			1 2 3 4 5
		MW09 Terminated at 4.738m bgl.				5

Client: One Rail Australia
Project: Diesel Spill
Project No: J168829
Location: Berrimah, NT

Date Drilled: 6/12/2021
Drilling Co: Proactive Drilling Services
Total Depth (m): 4.841
Diameter (mm): 150

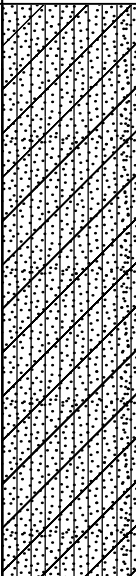
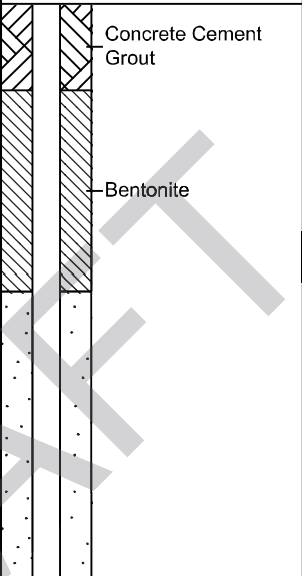
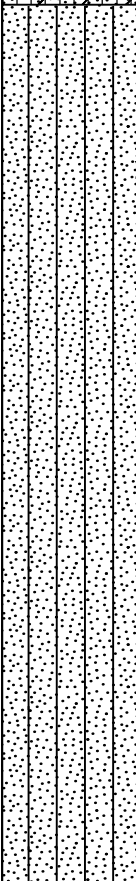
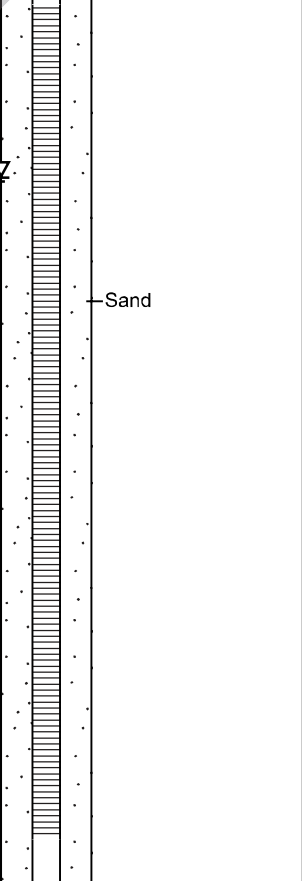
Bore No.: MW10
Easting:
Northing:
Logged by: VB
Checked by: AS

COMMENTS

WATER STRIKE	Graphic Log	SOIL DESCRIPTION	Moisture	Well Diagram	Comment	Depth (m)
		<p>REWORKED NATURAL: Silty SAND, fine to medium grained sand, fine to coarse sized gravel throughout, light brown.</p>	<p>M</p> 			<p>1</p> <p>2</p> <p>3</p> <p>4</p>
		<p>MW10 Terminated at 4.841m bgl.</p>				<p>5</p>

Client: One Rail Australia	Date Drilled: 6/12/2021	Bore No.: MW11
Project: Diesel Spill	Drilling Co: Proactive Drilling Services	Easting:
Project No: J168829	Total Depth (m): 5.061	Northing:
Location: Berrimah, NT	Diameter (mm): 150	Logged by: VB
		Checked by: AS

COMMENTS

WATER STRIKE	Graphic Log	SOIL DESCRIPTION	Moisture	Well Diagram	Comment	Depth (m)
		BITUMEN LAYER (0-0.05m bgl) FILL - Silty Clayey SAND, fine to medium grained sand, low to medium plasticity, fine to coarse sized gravel throughout, red / brown.	M			1
		NATURAL - Silty SAND, fine to medium grained sand, fine to coarse naturally occurring gravels throughout.	W			2 3 4 5
		MW11 Terminated at 5.061m bgl.				

Darwin Corporate Park
Tenancy 412
Building 4, Level 1
631 Stuart Highway
Berrimah NT 0828

PO Box 1726
Berrimah NT 0828
T 61 8 8944 7888

Fyfe Pty Ltd
ABN 57 008 116 130
fyfe.com.au



Our Ref 73488-1

11th February 2022

Adam Reed
Environment Manager
One Rail Australia
Level 3
33 Richmond Road
Keswick South Australia 5035

Dear Adam,

BERRIMAH RAIL TERMINAL – MONITORING WELL LOCATIONS

Please see table below showing additional monitoring well locations and elevations at both the top of PVC casing and adjacent surface. The poly pipes have been marked with a blue line at the exact spot where the elevation refers to.

Well ID	Easting	Northing	Well Elev	Surface Elev
MW09	708501.421	8621051.257	5.177	5.28
MW10	708422.087	8621021.848	5.179	5.291
MW11	708511.515	8621022.397	5.894	5.994

Origin for both Horizontal (MGA94) and Vertical Datum (AHD) was CRM S97185066, on the corner of O-Sullivan CCT and Export Dr.

Kind Regards

Thomas St John
Surveyor

Groundwater Monitoring Event Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Appendix B: Field Records

Client: ORA		Job No: J168829
Project: Diesel Spill		Gauged by: VB
Location: Berrimah, NT		Date: 9/9/21

Water Level Dipper Type (interphase, length etc): 1P

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0841	MW05	—	2.350	—	3.293	
0935	MW06	—	2.369	—	4.002	
1015	MW02	—	1.736	—	5.230	
1125	MW01	—	3.054	—	4.482	
1240	MW07	—	3.006	—	4.655	
1315	MW01A	—	3.018	—	4.888	
1433	MW04	—	3.041	—	3.806	
1435	MW04A	—	2.952	—	3.104	
1500	MW03	—	2.989	—	4.345	
1545	MW08	—	3.071	—	5.019	
1315	MW01A	—	3.01	—	4.888	

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY & SLIGHT WIND

Groundwater Sampling Record



Client: ORA Job No: J168829 Well ID: Mwo1
 Project: Diesel Spill Sampled by: VB
 Location: Berrimah Date: 9/9/21

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth:	<u>4.482</u> (m)	Device:	<u>micropurge</u> <u>peristaltic</u> footvalve bailer		
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u> 4-well-volume purged dry		
Casing type:	<u>PVC</u> steel / other	WQM Make:	<u>YSI</u>		
Depth to product	— (m bTOC)	WL Meter:	<u>interface</u> non-interface		
Depth to water:	<u>3.054</u> (m bTOC)	Screen (from - to), m	<u>1.482 - 4.482</u>		
Product thickness	— (m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & SLIGHT WIND

Purging instructions:

Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Time	Cumulative Volume purged (L)	Drawdown stable <0.1m Water Level (m bTOC)	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
			Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %	
1136	3.082 INT	3.082 3.082	7.7	4.16	61677	29.6	490.4	L-m turb, clear, no sheen, slight inc odor
1139	2	3.086	25.6	4.26	38610	33.5	207.9	
1148	4	3.086	25.6	4.15	34803	73.1	190.6	
1152	6	3.091	27.3	4.03	18447	86.5	98.5	
1155	8	3.091	28.2	3.82	17109	88.2	85.3	
1158	10	3.093	28.3	3.80	16035	79.0	81.1	
1201	12	3.093	28.3	3.79	15507	80.7	71.5	
1204	14	3.096	28.6	3.78	14800	78.5	67.6	
1207	16	3.096	28.4	3.78	14436	77.3	64.3	

Observations during Sampling: - eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 16L PURGED, SEMI QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1			
Plastic ()				
Plastic ()	<u>7</u>			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: ORA Job No: J168829 Well ID: MW01A
 Project: Diesel Spill Sampled by: VB
 Location: Berrimah Date: 9/9/21

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.888</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product: <u>—</u> (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>				
Depth to water: <u>3.018</u> (m bTOC)	Screen (from - to), m: <u>1.888 - 4.888</u>				
Product thickness: <u>—</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & MODERATE WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Time	Cumulative Volume purged (L)	Drawdown stable <0.1m Water Level (m bTOC)	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
			Temp °C	pH Units	Sp. Cond <u>µS/cm</u> <u>mS/cm</u>	ORP mV	DO mg/L / ppm / %	
1327	1NT	3.156	34.4	5.84	61206	23.2	88.4	L-m turb, clear, no sheen/odour
1330	2L	3.316	34.3	5.95	60783	18.2	90.8	
1333	4L	3.446	34.5	6.00	58687	21.2	93.4	
1336	6L	3.638	34.5	6.04	54877	16.7	81.5	
1348	12L	3.297	34.5	6.05	59567	3.6	91.8	
1630	14L	4.213	34.4	5.99	61531	38.3	80.5	M-h turb, brown, no sheen/odour
			SAMPLED					

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments <u>* Purged well only</u> R SAMPLED <u>RX SAMPLED AFTER WELL PURGED ONLY</u>
Glass amber (100-250ml)	3	none	Duplicate ID <u>Q201</u>	
Glass vial (40mL)	6	HCl	Triplicate ID <u>Q201A</u>	
Plastic (60mL) - metals*	3	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*	3	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	3	H2SO4		
Plastic (500mL) - inorganics	3	none		
Plastic () <u>FE</u>	3			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: ORA Job No: J168829 Well ID: MW02
 Project: Diesel Spill Sampled by: VB
 Location: Berrimah Date: 9/9/21

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth:	<u>5.230</u> (m)	Device:	<u>micropurge</u> <u>peristaltic</u> footvalve bailer		
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u> 4-well-volume purged dry		
Casing type:	<u>VC</u> / steel / other	WQM Make:	<u>YSI</u>		
Depth to product	(m bTOC)	WL Meter:	<u>interface</u> non-interface		
Depth to water:	<u>1.736</u> (m bTOC)	Screen (from - to), m	<u>2.230 - 5.230</u>		
Product thickness	(m)	Pump Depth (m bTOC)			

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & LIGHT WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Time	Cumulative Volume purged (L)	Drawdown stable <0.1m (m bTOC)	Stabilisation Criteria (3 readings within ranges)	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
			Water Level	Temp	pH	Sp. Cond	ORP	DO	
			(m bTOC)	°C	Units	<u>µS/cm</u> mS/cm	mV	mg/L / ppm / %	
1025	1N7	1.736	32.4	5.58	18855	89.8	10.2		L-m turbidity, clear, no sheen/odour
1027	2	1.736	32.4	5.52	17793	71.9	10.6		
1030	4	1.736	32.5	5.47	17219	70.8	11.9		
1033	6	1.736	32.5	5.41	17030	72.1	12.2		
1036	8	1.736	32.5	5.36	17109	71.1	14.6		
1039	10	1.736	32.5	5.35	17177	70.3	16.6		
1042	12	1.736	32.5	5.33	17250	69.6	17.2		
					SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 12L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*	1	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1			
Plastic ()	1			
Plastic ()	1			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>MW03</u>
Location: <u>Berrimah</u>	Date: <u>9/9/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>4.345</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry	
Casing type: <u>PVC</u> steel / other	WQM Make: <u>YSI</u>	
Depth to product: <u>—</u> (m bTOC)	WL Meter: <u>interface</u> non-interface	
Depth to water: <u>2.989</u> (m bTOC)	Screen (from - to), m <u>1.345 - 4.345</u>	
Product thickness: <u>—</u> (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2" diameter - 2 L/metre; 100mm (4" diameter - 8 L/metre; 150mm (6" diameter - 18 L/metre)

Time	Cumulative Volume purged (L)	Drawdown stable <0.1m (m bTOC)	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>	
			Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %		
1510	INT	3.137 3.137	35.2	4.92	5485	194.1	50.2	M-H turb, light brown, no sheen/odour	
1514	2L	3.285	35.4	3.77	7529	229.1	54.0	↓	
1523	8L	3.397	35.0	4.04	9929	199.2	59.6		
1527	7L	3.504	35.0	4.00	12103	189.2	52.6		
1530	9L	3.618	34.9	4.02	14096	186.03	58.3		
1534	11L	3.634	35.5	4.03	15305	189.4	73.7		
1723	13L	3.536	34.5	5.06	22999	136.2	82.3		L-m turb, clear, no sheen/odour

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments <u>* WENT DRY AFTER 11L PURGED</u> <u>** SAMPLED AFTER 13L PURGED</u>
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () <u>PE</u>	1			

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>Mw04</u>
Location: <u>Berrimah</u>	Date: <u>9/9/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>3806</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry	
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface	
Depth to water: <u>3.041</u> (m bTOC)	Screen (from - to), m <u>0.806 - 3.806</u>	
Product thickness (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume. 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond μS/cm / mS/cm	ORP mV	DO mg/L / ppm / %	
1440	<u>WT</u>	<u>3.546</u>	<u>34.7</u>	<u>6.20</u>	<u>10292</u>	<u>-15.3</u>	<u>72.7</u>	<u>low turb, clear, no sheen/odour</u>
1443	<u>2</u>	<u>3.708</u>	<u>35.3</u>	<u>6.57</u>	<u>7077</u>	<u>-22.2</u>	<u>64.0</u>	↓
1450	<u>6</u>							
1702	<u>8</u>	<u>3.037</u>	<u>34.2</u>	<u>5.78</u>	<u>19017</u>	<u>115.7</u>	<u>81.4</u>	<u>high turb, brown, no sheen/odour</u>
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments <u>WENT ONE AFTER GL PURGED</u> <u>DE XE SAMPLED AFTER WELL PURGED ONE</u>
Glass amber (100-250ml)	<u>1</u>	none	Duplicate ID	
Glass vial (40mL)	<u>2</u>	HCl	Triplicate ID	
Plastic (60mL) - metals*	<u>1</u>	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID	
Plastic (60mL) - nutrients	<u>1</u>	H2SO4		
Plastic (500mL) - inorganics	<u>1</u>	none		
Plastic () <u>FE</u>	<u>1</u>			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>		Job No: <u>J168829</u>		Well ID <u>MW05</u>				
Project: <u>Diesel Spill</u>		Sampled by: <u>VB</u>						
Location: <u>Berrimah</u>		Date: <u>9/9/21</u>						
WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	<u>3.293</u> (m)	Device:	<u>micropurge</u> peristaltic footvalve bailer	*Other Sampling Equipment / Method				
Casing diameter:	<u>50</u> (mm)	Method:	low-flow 4-well-volume purged dry					
Casing type:	<u>RVD</u> / steel / other	WQM Make:	<u>ES1</u>					
Depth to product	— (m bTOC)	WL Meter:	<u>interface</u> non-interface					
Depth to water:	<u>2.350</u> (m bTOC)	Screen (from - to), m	<u>0.295 - 3.293</u>					
Product thickness	— (m)	Pump Depth (m bTOC)						
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY, SLIGHT WIND</u>								
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.								
Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.								
4-well volume: Well volume 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre								
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
0845	1NT	2.347	32.1	15.36	24882	-376.4	34.5	L-M TURB, CLEAR, NO SHEEN/ODOUR
0850	2	2.349	32.3	8.83	27145	-91.2	10.8	
0854	4	2.349	32.3	6.85	28301	-5.3	5.1	
0857	6	2.349	32.3	6.09	29047	26.9	4.3	
0900	8	2.349	32.3	5.60	30344	44.9	4.2	
0903	10	2.349	32.3	5.34	30605	55.2	3.9	
0906	12	2.349	32.3	5.11	31311	63.0	3.6	
0910	14	2.349	32.3	4.85	31807	73.0	4.0	
0913	16	2.349	32.3	4.77	32175	76.7	4.2	
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc		0918 18 2.349 32.3		4.75	32836	82.2	4.8	↓
<u>SAMPLED AFTER 18L PURGED, QUICK RECHARGE</u>								
Container Volume (L)	No of containers	Preservative	Duplicates				Other Comments	
Glass amber (100-250ml)	1	none	Duplicate ID					
Glass vial (40mL)	2	HCl						
Plastic (60mL) - metals*	1	HNO3	Triplicate ID					
Plastic (60mL) - cyanide, CrVI*		NaOH						
Plastic (60mL) - nutrients	1	H2SO4	Blanks					
Plastic (500mL) - inorganics	1	none						
Plastic () Fe	1		Rinsate ID					
Plastic ()								
	(7)		RBA					
			TBA					

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: ORA Job No: J168829 Well ID: MW06
 Project: Diesel Spill Sampled by: VB
 Location: Berrimah Date: 9/9/21

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.002</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVE</u> / steel / other	WQM Make: <u>ESI</u>				
Depth to product (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>2.369</u> (m bTOC)	Screen (from - to), m <u>1.002 - 4.002</u>				
Product thickness (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & MODERATE WIND

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Time	Cumulative Volume purged (L)	Drawdown stable <0.1m (m bTOC)	Water Level (m bTOC)	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
				Temp °C	pH Units	Sp. Cond <u>µS/cm</u> mS/cm	ORP mV	DO mg/L / ppm / %	
0942	1NT	2.369	32.3	32.3	5.49	18126	97.7	7.8	L-m turb, clear, no sheen/odour
0945	2	2.368	32.3	32.3	5.59	19295	81.9	13.0	
0948	4	2.368	32.3	32.3	5.53	20007	75.2	9.7	
0951	6	2.368	32.3	32.3	5.50	20307	71.3	11.1	
0954	8	2.368	32.3	32.3	5.49	20696	67.1	13.1	
0957	10	2.368	32.3	32.3	5.49	20717	64.1	14.0	
1000	12	2.368	32.4	32.4	5.48	20840	62.0	13.6	

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 12L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl	Triplicate ID	
Plastic (60mL) - metals*	1	HNO3	Blanks	
Plastic (60mL) - cyanide CrVI*	1	NaOH	Rinsate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1			
Plastic ()	1			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: ORA Job No: J168829 Well ID: MC507
 Project: Diesel Spill Sampled by: VB
 Location: Berrimah Date: 9/9/21

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.655</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>Exc</u> / steel / other	WQM Make: <u>ES</u>				
Depth to product: <u>-</u> (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>3.006</u> (m bTOC)	Screen (from - to), m: <u>1.655 - 4.655</u>				
Product thickness: <u>-</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY & MODERATE WIND

Purging instructions:

Low Flow: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.

Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1244	1NT	3.006	34.8	6.23	34487	-19.8	119.4	↓ 1m turb, clear, no sheen/odour
1247	2L	3.045	34.7	6.07	30943	23.4	90.9	
1251	4L	3.044	34.8	5.87	29337	41.3	77.5	
1254	6L	3.044	34.8	5.74	29290	45.0	71.3	
1257	8L	3.044	34.8	5.68	29467	44.9	68.7	
1300	10L	3.044	34.8	5.64	29551	43.2	67.0	
1303	12L	3.044	34.8	5.62	29446	42.4	68.1	
				SAMPLED				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

SAMPLED AFTER 12L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none		
Glass vial (40mL)	2	HCl	Duplicate ID	
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none	Blanks	
Plastic () <u>FR</u>	1		Rinsate ID	
Plastic ()				
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID <u>Mw08</u>
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	
Location: <u>Berrimah</u>	Date: <u>9/9/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>5.019</u> (m)	Device: <u>micropurge</u> peristaltic <u>footvalve</u> <u>bailer</u>				
Casing diameter: <u>50</u> (mm)	Method: low-flow <u>4-well-volume</u> <u>purged dry</u>				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>C31</u>				
Depth to product: <u>—</u> (m bTOC)	WL Meter: interface <u>non-interface</u>				
Depth to water: <u>3.071</u> (m bTOC)	Screen (from - to), m: <u>2.019 - 5.019</u>				
Product thickness: <u>—</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater) Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2" diameter - 2 L/metre, 100mm (4" diameter - 8 L/metre; 150mm (6" diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>	
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %		
1550	1NT	3362	35.3	5.97	8000	-50.8	54.8	M-H TUB, BROWN, NO SHEEN/ODOUR ↓	
1553	2	3724	35.4	5.99	13241	-20.6	65.8		
1601	5	4063	35.7	5.95	26242	3.0	74.6		
1607	6	4081	36.0	6.07	27490	-7.9	86.8		
1610	7	4344	35.3	6.08	30573	-22.6	81.4		
1617	10	33							
1742	12	3109	34.8	5.83	30281	09	95.3		
			SAMPLED						

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments <u>* PURGED DRY</u> <u>** SAMPLED AFTER 12L PURGED</u>
Glass amber (100-250ml)	1	none		
Glass vial (40mL)	2	HCl	Duplicate ID	
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none	Blanks	
Plastic () <u>Fe</u>	1		Rinsate ID	
Plastic ()				
Plastic ()	<u>7</u>			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Client: ORA	Job No: J168829
Project: Diesel Spill	Gauged by: VB
Location: ORA Berrimah	Date: 8/12/21 & 10/12/21

Water Level Dipper Type (interphase, length etc): **IP**

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0834	Mw07	—	2.441	—	4.655	
0917	Mw01A	—	2.459	—	4.888	
1004	Mw04	—	2.472	—	3.809	
1040	Mw03	—	2.434	—	4.346	
1030	Mw11	—	2.441	—	5.061	
1210	Mw08	—	2.514	—	5.018	
0213	Mw05	—	1.806	—	3.296	
0859	Mw10	—	1.756	—	4.248	
0946	Mw06	—	1.816	—	4.000	
1045	Mw09	—	1.742	—	4.371	
1139	Mw02	—	1.583	—	5.227	
1221	Mw01	—	2.517	—	4.482	SLIGHT HL DROP ON PROBE

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY, HOT

Client: ORA		Job No: J168829
Project: Diesel Spill		Gauged by: VB
Location: ORA Berrimah		Date: 8/12/21 & 10/12/21

Water Level Dipper Type (interphase, length etc): **IP**

Time	Well Name	Depth to Product (m)	Depth to water (m)	Product Thickness (mm)	Depth of Well (m)	Comments
0834	Mw07	—	2.441	—	4.655	
0917	Mw01A	—	2.459	—	4.888	
1004	Mw04	—	2.472	—	3.809	
1040	Mw03	—	2.434	—	4.346	
1030	Mw11	—	2.441	—	5.061	
1210	Mw08	—	2.514	—	5.018	
0213	Mw05	—	1.806	—	3.296	
0859	Mw10	—	1.756	—	4.248	
0946	Mw06	—	1.816	—	4.000	
1045	Mw09	—	1.742	—	4.371	
1139	Mw02	—	1.583	—	5.227	
1221	Mw01	—	2.517	—	4.482	SLIGHT HL DROP ON PROBE

Observations / Comments:
Weather Conditions (e.g. cloudy, sunny, windy etc), Pumping, etc

SUNNY, HOT

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID <u>MW01A</u>
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	
Location: <u>ORA Berrimah</u>	Date: <u>8/12/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.886</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product: <u>-</u> (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>				
Depth to water: <u>2.459</u> (m bTOC)	Screen (from - to), m <u>1.886 - 4.886</u>				
Product thickness: <u>-</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, WARM

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2" diameter - 2 L/metre; 100mm (4" diameter - 8 L/metre; 150mm (6" diameter - 18 L/metre)

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (S/cm) mS/cm	ORP mV	DO mg/L / ppm / %	
0919	1NT	2.532	35.5	5.78	65921	7.3	9.2	↓
0923	2.5	2.906	35.8	5.97	57583	-13.8	17.8	
0926	4.5	3.191	35.7	6.10	48947	-22.4	26.0	
0929	6.5	3.389	35.7	6.10	47216	-21.1	46.1	
0932	8.5	3.633	35.6	6.18	42103	-23.6	47.5	
0935	10.5	3.914	35.7	6.20	36645	-19.3	46.7	
* 0944	14.5	DRY	35.4	5.99	50260	-10.3	70.3	
* 1253	14.5	3.472	35.9	5.21	56517	45.8	110.6	
		SAMPLED						

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
L-m turb, clear, no sheen/odour

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments <u>WE WENT DRY AFTER 14.5L PURGED</u> <u>SA SAMPLED AFTER 3HOURS SINCE PURGED DRY</u>
Glass amber (100-250ml)	3	none	Duplicate ID <u>QCO1</u>	
Glass vial (40mL)	6	HCl	Triplicate ID <u>QCO1A</u>	
Plastic (60mL) - metals*	3	HNO3	Blanks	
Plastic (60mL) - cyanide, CrVI*		NaOH	Rinsate ID	
Plastic (60mL) - nutrients	3	H2SO4		
Plastic (500mL) - inorganics	3	none		
Plastic () <u>PE</u>	3			
Plastic ()				
	(21)			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>MW01</u>
Location: <u>ORA Berrimah</u>	Date: <u>10/12/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>4.482</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry	
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product: <u>-</u> (m bTOC)	WL Meter: <u>interface</u> non-interface	
Depth to water: <u>2.517</u> (m bTOC)	Screen (from - to), m <u>1.482 - 4.482</u>	
Product thickness: <u>-</u> (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre; 100mm (4") diameter - 8 L/metre; 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1223	1NT	2.521	37.7	5.68	72.2	45.9	93.5	L-m turb, clear, no sheen, slight blue colour ↓
1226	2	2.521	37.4	5.61	67.7	43.8	89.8	
1229	4	2.521	37.2	5.60	65.3	44.8	89.3	
1232	6	2.521	37.2	5.60	64.8	44.9	89.2	
1235	8	2.521	37.1	5.59	60.5	48.2	104.5	
1238	10	2.521	36.9	5.57	59.8	49.8	103.8	
1242	12	2.521	36.8	5.53	57.9	53.2	104.9	
			SAMPLED					

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 12L PURGED, QUICK RECHARGES
L-m turb, clear, no sheen/odour

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	TriPLICATE ID	
Plastic (60mL) - cyanide, CrVI*	1	NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1		Rinsate ID	
Plastic () <u>7</u>	1			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>		Job No: <u>J168829</u>		Well ID <u>M102</u>				
Project: <u>Diesel Spill</u>		Sampled by: <u>VB</u>						
Location: <u>ORA Berrimah</u>		Date: <u>10/12/21</u>						
WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	<u>5.227</u> (m)	Device:	<u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method				
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u> 4-well-volume purged dry					
Casing type:	<u>PVC</u> / steel / other	WQM Make:	<u>YSI</u>					
Depth to product	— (m bTOC)	WL Meter:	<u>interface</u> non-interface					
Depth to water:	<u>1.583</u> (m bTOC)	Screen (from - to), m	<u>2.227 - 5.227</u>					
Product thickness	— (m)	Pump Depth (m bTOC)						
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY SLIGHT WIND</u>								
Purging instructions: Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below. Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. <i>Well volume: 50mm (2" diameter - 2 L/metre, 100mm (4" diameter - 8 L/metre, 150mm (6" diameter - 18 L/metre)</i>								
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (S/cm) / mS/cm	ORP mV	DO mg/L / ppm / (%)	
<u>1145</u>	<u>1NT</u>	<u>1.585</u>	<u>34.5</u>	<u>5.71</u>	<u>17105</u>	<u>50.4</u>	<u>90.3</u>	L-M turbid, clear, no sheen/odour ↓
<u>1148</u>	<u>2</u>	<u>1.585</u>	<u>34.6</u>	<u>5.43</u>	<u>14496</u>	<u>41.9</u>	<u>92.8</u>	
<u>1151</u>	<u>4</u>	<u>1.585</u>	<u>34.7</u>	<u>5.39</u>	<u>12629</u>	<u>39.8</u>	<u>92.0</u>	
<u>1154</u>	<u>6</u>	<u>1.585</u>	<u>34.7</u>	<u>5.35</u>	<u>11846</u>	<u>38.2</u>	<u>90.4</u>	
<u>1157</u>	<u>8</u>	<u>1.585</u>	<u>34.7</u>	<u>5.32</u>	<u>11748</u>	<u>37.4</u>	<u>89.0</u>	
<u>1200</u>	<u>10</u>	<u>1.585</u>	<u>34.7</u>	<u>5.30</u>	<u>11753</u>	<u>36.4</u>	<u>87.9</u>	
<u>SAMPLED</u>								
Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc <u>SAMPLED AFTER 10L PURGED, QUICK RECHARGE L-M TURB, CLEAR, NO SHEEN/ODOUR</u>								
Container Volume (L)	No of containers	Preservative	Duplicates				Other Comments	
Glass amber (100-250ml)	<u>1</u>	none	Duplicate ID					
Glass vial (40mL)	<u>2</u>	HCl						
Plastic (60mL) - metals*	<u>1</u>	HNO3	TriPLICATE ID					
Plastic (60mL) - cyanide, CrVI*		NaOH						
Plastic (60mL) - nutrients	<u>1</u>	H2SO4	Blanks					
Plastic (500mL) - inorganics	<u>1</u>	none						
Plastic () <u>FE</u>	<u>1</u>		Rinsate ID					
Plastic ()								

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>		Job No: <u>J168829</u>		Well ID <u>MWD3</u>				
Project: <u>Diesel Spill</u>		Sampled by: <u>VB</u>						
Location: <u>ORA Berrimah</u>		Date: <u>8/12/21</u>						
WELL DETAILS			SAMPLING EQUIPMENT					
Well depth:	<u>4.346</u> (m)	Device:	<u>micropurge</u> <u>peristaltic</u> footvalve bailer	*Other Sampling Equipment / Method				
Casing diameter:	<u>50</u> (mm)	Method:	<u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>					
Casing type:	<u>PVC</u> / steel / other	WQM Make:	<u>YSI</u>					
Depth to product	<u>-</u> (m bTOC)	WL Meter:	<u>interface</u> <u>non-interface</u>					
Depth to water:	<u>2.434</u> (m bTOC)	Screen (from - to), m	<u>1.346 - 4.346</u>					
Product thickness	<u>-</u> (m)	Pump Depth (m bTOC)						
Field observations: eg. well condition, nearby activities, weather, vegetation, etc <u>SUNNY, PARTLY OVERCAST, SLIGHT WIND TRAIN PARKED ADJACENT TO WELL</u>								
Purging instructions: Start purging and stabilise the water level at ~0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below. Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart. 4-well volume Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre								
Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment Turbidity, Colour, Odour, Sheen, etc
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / <u>ppm</u>	
1042	1NT	2.5006	36.6	5.19	2938	72.6	57.0	L-M TURB, CLEAR, NO SHEEN/ODOUR ↓
1045	2	2.676	36.9	4.63	1972	91.0	58.1	
1048	4	2.772	36.7	4.66	2160	85.4	50.4	
1051	6	2.809	36.6	4.78	2252	76.2	44.7	
1056	7.5	2.809	36.6	5.23	1896	510	41.0	
1103	9.0	2.809	36.5	5.28	1848	47.3	41.0	
110	10.5	2.809	36.4	5.35	1802	45.0	45.0	
				SAMPLED				
Observations during Sampling: - eg. odours, sheens, turbidity, water colour, etc <u>MED RECHARGE, SAMPLED AFTER 10.5L PURGED</u> <u>L-M TURB, CLEAR, NO SHEEN/ODOUR</u>								
Container Volume (L)		No of containers	Preservative	Duplicates			Other Comments	
Glass amber (100-250ml)		1	none	Duplicate ID				
Glass vial (40mL)		2	HCl					
Plastic (60mL) - metals*		1	HNO3	Triplicate ID				
Plastic (60mL) - cyanide, CrVI*			NaOH					
Plastic (60mL) - nutrients		1	H2SO4	Blanks				
Plastic (500mL) - inorganics		1	none					
Plastic () FC		1		Rinsate ID				
Plastic ()								
		①						
*samples for dissolved metals to be filtered in the field prior to filling sampling container								

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID <u>Mwell</u>
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	
Location: <u>ORA Berrimah</u>	Date: <u>8/12/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	
Well depth: <u>3.809</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>	*Other Sampling Equipment / Method
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>	
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>	
Depth to water: <u>2.472</u> (m bTOC)	Screen (from - to), m <u>0.809 - 3.809</u>	
Product thickness (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, PARTLY CLOUDY, TRAW STOPPED ADJACENT TO WELL

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond (µS/cm / mS/cm)	ORP mV	DO mg/L / ppm / %	
1007	1NT	2.479	36.0	6.05	15022	40.6	48.3	L-m turb, L-brown, no sheen odour
1010	2	2.477	36.1	5.59	15123	43.4	48.4	↓
1013	4	2.477	36.0	5.43	15176	42.1	48.9	
1016	6	2.477	36.0	5.36	15187	40.6	49.5	
1019	8	2.477	36.2	5.32	15214	39.2	50.3	
1021	10	2.477	36.2	5.30	15234	38.1	50.9	
			SAMPLED					

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 10L PURGED, QUICK RECHARGE
L-M TURB, L. BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1		Rinsate ID	
Plastic ()				

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID <u>MW05</u>
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	
Location: <u>ORA Berrimah</u>	Date: <u>10/12/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>3.296</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product <u>—</u> (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>1.806</u> (m bTOC)	Screen (from - to), m <u>0.296 - 3.296</u>				
Product thickness <u>—</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %	
0820	INT	1.813	33.8	7.24	36785	-46.8	78.1	Low turb, clear, no sheen odour
0823	2	1.813	34.0	7.19	36797	-25.4	80.2	↓
0826	4	1.813	34.0	6.82	36873	-28.7	80.0	
0829	6	1.813	34.1	6.55	36725	-25.7	80.9	
0832	8	1.813	34.0	6.33	36756	-17.9	82.3	
0835	10	1.813	34.0	6.20	37044	-10.6	83.5	
0838	12	1.813	34.0	6.10	37369	-6.3	85.5	
0841	14	1.813	34.0	6.06	37476	-3.1	86.0	
0844	16	1.813	34.0	6.02	37248	-0.8	85.8	

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 16L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>FE</u>	1		Rinsate ID	
Plastic ()	①		<u>FB02</u>	
			<u>TB02</u>	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>MW06</u>
Location: <u>ORA Berrimah</u>	Date: <u>16/12/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.000</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product _____ (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>1.816</u> (m bTOC)	Screen (from - to), m <u>1.000 - 4.000</u>				
Product thickness _____ (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume: 50mm (2" diameter - 2 L/metre; 100mm (4" diameter - 8 L/metre; 150mm (6" diameter - 18 L/metre)

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %	
0958	1 NT	1.824	32.7	7.24	22737	-47.4	109.9	<i>1-m turb, clear, no sheen odour</i>
1001	2	1.822	32.0	6.45	22639	-11.7	122.0	
1004	4	1.822	32.0	6.58	21818	-7.7	122.0	
1007	6	1.822	32.0	5.77	22407	-5.6	120.8	
1010	8	1.822	32.0	5.63	21792	-3.4	119.8	
1015	10	1.822	32.0	5.56	22922	-4.8	118.0	
1018	12	1.822	32.0	5.41	23005	5.7	118.4	
1021	14	1.822	32.1	5.39	22998	7.1	113.9	
1024	16	1.822	32.0	5.36	22999	8.5	114.1	

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 16L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1		Rinsate ID	
Plastic ()	<u>7</u>			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>MW07</u>
Location: <u>ORA Berrimah</u>	Date: <u>8/12/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.653</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>				
Depth to product <u>-</u> (m bTOC)	WL Meter: <u>interface</u> non-interface				
Depth to water: <u>2.441</u> (m bTOC)	Screen (from - to), m <u>1.653 - 4.653</u>				
Product thickness <u>-</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, WARM

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

Low Flow: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2" diameter - 2 L/metre; 100mm (4" diameter - 8 L/metre; 150mm (6" diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / <u>6</u>	
0841	1NT	2.443	36.0	7.80	30846	531.9	30.0	L-m turbid, clear, no sheen/odour ↓
0844	2	2.443	36.4	7.93	14774	-28.9	17.7	
0848	4	2.443	36.5	7.59	13811	-30.7	14.8	
0851	6	2.443	36.6	7.19	12712	-27.3	10.5	
0854	8	2.443	36.6	6.86	12382	-21.6	6.3	
0858	10	2.443	36.6	6.63	12387	-17.1	5.6	
0901	12	2.443	36.6	6.59	12049	-13.7	5.8	
0904	14	2.443	36.7	6.57	12285	-9.3	5.9	
SAMPLED								

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 14L PURGING, QUICK RECHARGE
L-M TURBIDITY, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none		
Glass vial (40mL)	2	HCl	Duplicate ID	
Plastic (60mL) - metals*	1	HNO3		
Plastic (60mL) - cyanide, CrVI*		NaOH	Triplicate ID	
Plastic (60mL) - nutrients	1	H2SO4		
Plastic (500mL) - inorganics	1	none	Blanks	
Plastic () <u>FR</u>	1		Rinsate ID	
Plastic ()	<u>7</u>		<u>RB01</u>	
			<u>TB01</u>	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>MW08</u>
Location: <u>ORA Berrimah</u>	Date: <u>8/12/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>5.018</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>	
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>	
Depth to water: <u>2.514</u> (m bTOC)	Screen (from - to), m <u>2.618 - 5.018</u>	
Product thickness (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, PARTLY CLOUDY, SLIGHT WIND

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.
Low Flow:

The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm</u> / mS/cm	ORP mV	DO mg/L / ppm / %	
1216	1	2.562	34.4	6.00	17055	25.9	80.5	6-m turb, L brown, no sheen/odour
1219	2	2.565	34.5	5.68	16019	28.2	84.6	
1222	4	2.568	34.7	5.48	14268	25.6	88.9	
1226	6	2.564	34.8	5.40	12721	27.9	93.3	
1229	8	2.564	35.0	5.33	12496	28.6	96.9	
1233	10	2.564	35.0	5.28	11861	27.3	99.4	
1236	12	2.565	34.8	5.28	11555	27.2	99.6	
<u>SAMPLED</u>								

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 12L PURGING, QUICK RECHANGE
6-m TURB, L. BROWN, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40ml)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>FR</u>	1			
Plastic ()			Rinsate ID	
Plastic ()				
	<u>(7)</u>			

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	Mw09
Location: <u>ORA Berrimah</u>	Date: <u>10/12/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>4.371</u> (m)	Device: micropurge <u>peristaltic</u> footvalve bailer	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry	
Casing type: <u>EVO</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product _____ (m bTOC)	WL Meter: <u>interfac</u> non-interface	
Depth to water: <u>1.742</u> (m bTOC)	Screen (from - to), m <u>1.371 - 4.371</u>	
Product thickness _____ (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume 50mm (2") diameter - 2 L/metre 100mm (4") diameter - 8 L/metre 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %	
1048	1NT	1.743	31.8	8.85	23632	-100.4	118.6	} m-h turb, b.o-w no sheen factor
1101	2	1.743	31.9	7.78	24261	-69.7	119.2	
1104	4	1.743	31.9	7.33	24377	-76.4	116.5	
1108	6	1.743	31.9	6.88	24424	-64.8	114.3	
1111	8	1.743	31.9	6.61	24219	-59.1	110.1	
1114	10	1.743	33.9	6.48	24138	-55.3	104.7	
1117	12	1.743	34.2	6.31	23935	-52.6	98.4	
1120	14	1.743	34.1	6.23	24140	-46.1	102.1	
1124	16	1.743	34.2	6.21	24025	-44.0	101.9	

Observations during Sampling: eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 16L PURGED, QUICK RECHARGE

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>PC</u>	1			
Plastic ()			Rinsate ID	
Plastic ()				

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID <u>MW10</u>
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	
Location: <u>ORA Berrimah</u>	Date: <u>10/12/21</u>	

WELL DETAILS		SAMPLING EQUIPMENT			*Other Sampling Equipment / Method
Well depth: <u>4.248</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> <u>footvalve</u> <u>bailer</u>				
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> <u>4-well-volume</u> <u>purged dry</u>				
Casing type: <u>PVC</u> / steel / other	WQM Make: <u>751</u>				
Depth to product: <u>-</u> (m bTOC)	WL Meter: <u>interface</u> <u>non-interface</u>				
Depth to water: <u>1.756</u> (m bTOC)	Screen (from - to), m: <u>1.248 - 4.248</u>				
Product thickness: <u>-</u> (m)	Pump Depth (m bTOC)				

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, SLIGHT WIND

Purging instructions:
Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
Well volume 50mm (2") diameter - 2 L/metre, 100mm (4") diameter - 8 L/metre, 150mm (6") diameter - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond $\mu\text{S/cm}$ / mS/cm	ORP mV	DO mg/L / ppm / %	
0913	1NT	1.761	34.7	7.46	16906	-68.7	80.5	<u>L-m turb, L-brown, NO sheen/odour</u>
0916	2	1.757	34.9	6.95	15224	-43.6	82.2	↓
0919	4	1.757	35.0	6.58	15095	-46.6	82.3	<u>L-m turbid clear, NO sheen/odour</u>
0922	6	1.757	35.0	6.38	15006	-52.4	82.6	↓
0925	8	1.757	35.1	6.20	14910	-61.6	83.0	
0928	10	1.757	35.0	6.10	14903	-68.2	84.3	
0931	12	1.757	35.0	6.01	14839	-73.1	85.1	
0934	14	1.757	35.0	5.96	14754	-77.5	86.4	
0937	16	1.757	35.0	5.94	14735	-77.2	87.3	

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 16 L PURGED, QUICK RECHARGE L-m turb, clear, NO sheen/odour

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	1	none	Duplicate ID	
Glass vial (40mL)	2	HCl		
Plastic (60mL) - metals*	1	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	1	H2SO4	Blanks	
Plastic (500mL) - inorganics	1	none		
Plastic () <u>Fe</u>	1			
Plastic ()	(7)		Rinsate ID	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

Groundwater Sampling Record

Client: <u>ORA</u>	Job No: <u>J168829</u>	Well ID
Project: <u>Diesel Spill</u>	Sampled by: <u>VB</u>	<u>Mwell</u>
Location: <u>ORA Berrimah</u>	Date: <u>8/12/21</u>	

WELL DETAILS	SAMPLING EQUIPMENT	*Other Sampling Equipment / Method
Well depth: <u>5.061</u> (m)	Device: <u>micropurge</u> <u>peristaltic</u> footvalve bailer	
Casing diameter: <u>50</u> (mm)	Method: <u>low-flow</u> 4-well-volume purged dry	
Casing type: <u>Eve</u> / steel / other	WQM Make: <u>YSI</u>	
Depth to product: <u>-</u> (m bTOC)	WL Meter: <u>interface</u> non-interface	
Depth to water: <u>2.441</u> (m bTOC)	Screen (from - to), m <u>2.061 - 5.061</u>	
Product thickness: <u>-</u> (m)	Pump Depth (m bTOC)	

Field observations: eg. well condition, nearby activities, weather, vegetation, etc
SUNNY, PARTLY CLOUDY, SLIGHT WIND

Purging instructions:
 Start purging and stabilise the water level at ~ 0.1m drawdown. Once water level stabilises start taking water quality readings. Readings are to be taken every 3 minutes or every flow-through-cell volume (whichever is greater). Purging finishes when the three consecutive readings are within the ranges below.

4-well volume: The purging will continue until at least 4 well volumes and three consecutive readings are within the ranges below. Water quality readings are to be taken at half-well-volume apart.
 Well volume: 50mm (2" diameter) - 2 L/metre, 100mm (4" diameter) - 8 L/metre, 150mm (6" diameter) - 18 L/metre

Stabilisation Criteria (3 readings within ranges)		Drawdown stable <0.1m	± 0.2 °C	± 0.1 pH unit	± 5%	± 10mv	± 10%	Comment <i>Turbidity, Colour, Odour, Sheen, etc</i>
Time	Cumulative Volume purged (L)	Water Level (m bTOC)	Temp °C	pH Units	Sp. Cond <u>µS/cm / mS/cm</u>	ORP mV	DO mg/L / ppm / %	
<u>1140</u>	2.442 <u>1.217</u>	<u>2.442</u>	<u>36.5</u>	<u>5.11</u>	<u>21380</u>	<u>39.1</u>	<u>30.8</u>	<u>L-m turb, clear, no sheen/odour</u>
<u>1145</u>	<u>2.5</u>	<u>2.441</u>	<u>36.7</u>	<u>5.51</u>	<u>20411</u>	<u>13.5</u>	<u>30.2</u>	↓
<u>1150</u>	<u>5.0</u>	<u>2.441</u>	<u>36.8</u>	<u>5.59</u>	<u>19869</u>	<u>-0.5</u>	<u>39.6</u>	
<u>1154</u>	<u>6.5</u>	<u>2.441</u>	<u>36.7</u>	<u>5.60</u>	<u>19695</u>	<u>-7.9</u>	<u>45.5</u>	
<u>1157</u>	<u>8.5</u>	<u>2.441</u>	<u>36.7</u>	<u>5.61</u>	<u>20065</u>	<u>-11.6</u>	<u>49.4</u>	
<u>1200</u>	<u>10.5</u>	<u>2.441</u>	<u>36.7</u>	<u>5.61</u>	<u>20156</u>	<u>-13.9</u>	<u>55.2</u>	
				<u>SAMPLED</u>				

Observations during Sampling:- eg. odours, sheens, turbidity, water colour, etc
SAMPLED AFTER 10.5L PURGING, QUICK RECHARGE
L-M TURB, CLEAR, NO SHEEN/ODOUR

Container Volume (L)	No of containers	Preservative	Duplicates	Other Comments
Glass amber (100-250ml)	<u>1</u>	none	Duplicate ID	
Glass vial (40mL)	<u>2</u>	HCl		
Plastic (60mL) - metals*	<u>1</u>	HNO3	Triplicate ID	
Plastic (60mL) - cyanide, CrVI*		NaOH		
Plastic (60mL) - nutrients	<u>1</u>	H2SO4	Blanks	
Plastic (500mL) - inorganics	<u>1</u>	none		
Plastic () <u>PE</u>	<u>1</u>			
Plastic ()	<u>1</u>		Rinsate ID	

*samples for dissolved metals to be filtered in the field prior to filling sampling container

YSI Calibration Register - Environmental Impact Monitoring Program



Going Further in Managing Risk

Please record Initial value (indicates YSI reading when placed in buffer solution prior to calibrating) and final value (indicates any variation post-calibration).

Date	ID	Temp	EC		pH 4		pH 7		ORP		DO 100% Sat		Solution replaced? Y/N	Initials
			Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final		
28/9	YS12	22.9	12905	12888	4.09	7.06	231	2274	93.4	99.9	Y	SC		
Comments: YS1-1														
14/10	YS1A	23.0	1215	12884	4.08	7.07	224.3	228.0	98.1	99.9	Y	SC		
Comments:														
29/10/20	YS11	23.1	12908	12883	4.06	7.06	229.4	230.1	95.2	99.8	Y	VB		
Comments:														
27/08/21	YS11	23.0	12911	12883	4.07	7.06	230.4	229.6	96.4	99.9	Y	VB		
Comments:														
27/09/21	YS11	23.2	12909	12885	4.08	7.07	231.2	229.5	93.6	99.7	Y	VB		
Comments:														
18/10/21	YS11	23.0	12912	12881	4.04	7.05	230.9	230.4	97.2	99.6	Y	VB		
Comments:														
21/11/21	YS11	23.1	12915	12884	4.05	7.08	231.1	230.9	98.2	99.9	Y	VB		
Comments:														
12/12/21	YS11	23.1	12906	12883	4.02	7.03	229.4	230.2	97.8	99.9	Y	VB		
Comments:														
Comments:														

Groundwater Monitoring Event Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Appendix C: Results Summary Tables

Groundwater Monitoring Event Annual Review

One Rail Australia

BERRIMAH FREIGHT RAIL TERMINAL DIESEL SPILL

Appendix D: NATA Laboratory Certificates of Analysis

CHAIN OF CUSTODY RECORD



Greencap NT P/L
 Unit 11 14 Winnellie Road Winnellie, NT 0820
 Varun Bhagwat
 0428 829 444
 PO281975

- Springy Laboratory
117 Balfour Street, Springy, NT 0820
- Brisbane Laboratory
Unit 21, The Wood Park, Brisbane, QLD 4102
- Perth Laboratory
281 Leakey Way, Perth, WA 6008
- Melbourne Laboratory
6 Springvale Drive, Melbourne, VIC 3048

Project No	Project Name	Project Manager	Analyst	Receptor Code	VB					
J16826	Diesel Spill	Varun Bhagwat	Esdat	VB on 90921						
B1: TR4, BTEXN	B16: Natural Attenuation Suite RA: SO4, CH4, NO3, Fe2+	BTEXN	Alkalinity	500mL Plastic	Varun.Bhagwat@greencap.com.au Evsat.Burford@greencap.com.au					
MW01	Water	X	X	1	3	1	2	500mL PEAS Bottle	Other (Specify AS284, VA, Outline)	<input type="checkbox"/> Overnight (specify by date) <input type="checkbox"/> Some dry <input type="checkbox"/> 1 day <input type="checkbox"/> 2 days <input type="checkbox"/> 3 days <input type="checkbox"/> Other
MW01A	Water	X	X	1	3	1	2	200mL Amber Glass	Jar (Class or HDPE)	
MW02	Water	X	X	1	3	1	2	250mL Plastic	40mL VOA Vial	
MW03	Water	X	X	1	3	1	2	500mL Plastic	125mL Plastic	
MW04	Water	X	X	1	3	1	2	500mL Plastic	200mL Amber Glass	
MW05	Water	X	X	1	3	1	2	500mL Plastic	500mL PEAS Bottle	
MW06	Water	X	X	1	3	1	2	500mL Plastic	40mL VOA Vial	
MW07	Water	X	X	1	3	1	2	500mL Plastic	200mL Amber Glass	
MW08	Water	X	X	1	3	1	2	500mL Plastic	500mL PEAS Bottle	
QC01	Water	X	X	1	3	1	2	500mL Plastic	40mL VOA Vial	
RB01	Water	X	X	1	3	1	2	500mL Plastic	200mL Amber Glass	
TS01	Water	X	X	1	3	1	2	500mL Plastic	500mL PEAS Bottle	
Total Counts				11	30	11	24			

Signature: *[Signature]*
 Date: 10/09
 Time: 9:00 AM
 Temperature: 20.5 °C = 20.3

824079
 L. Bayart

Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261 Site # 1254

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins ARL Pty Ltd

ABN: 91 05 0159 898

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 6253 4444
NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Varun
Project name: DIESEL SPILL
Project ID: J168829
Turnaround time: 5 Day
Date/Time received: Sep 10, 2021 9:00 AM
Eurofins reference: 824079

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:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Varun

Report 824079-W
Project name DIESEL SPILL
Project ID J168829
Received Date Sep 10, 2021

Client Sample ID			MW01 Water M21-Se25032 Sep 09, 2021	MW01A Water M21-Se25033 Sep 09, 2021	MW02 Water M21-Se25034 Sep 09, 2021	MW03 Water M21-Se25035 Sep 09, 2021
Sample Matrix	LOR	Unit				
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	0.15	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.4	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.55	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	0.27	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	0.27	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.2	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.47	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	113	109	110	111
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Heavy Metals						
Ferrous Iron - Fe2+	0.05	mg/L	29	12	0.07	2.5
Nitrate (as N)	0.02	mg/L	0.02	< 0.02	< 0.02	0.06
Sulphate (as SO4)	5	mg/L	640	3100	860	700
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	< 20	85	< 20	< 20
Heavy Metals						
Manganese (filtered)	0.005	mg/L	2.0	2.1	16	2.6

Client Sample ID			MW04 Water M21-Se25036 Sep 09, 2021	MW05 Water M21-Se25037 Sep 09, 2021	MW06 Water M21-Se25038 Sep 09, 2021	MW07 Water M21-Se25039 Sep 09, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	103	107	108	109
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Iron and Nitrogen						
Ferrous Iron - Fe2+	0.05	mg/L	4.8	7.4	1.1	18
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	0.09	0.13
Sulphate (as SO4)	5	mg/L	800	1700	1100	1600
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	< 20	55	26	40
Heavy Metals						
Manganese (filtered)	0.005	mg/L	2.0	0.88	1.3	1.1

Client Sample ID			MW08 Water M21-Se25040 Sep 09, 2021	QC01 Water M21-Se25041 Sep 09, 2021	RB01 Water M21-Se25042 Sep 09, 2021	TB01 Water M21-Se25043 Sep 09, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	-

Client Sample ID			MW08 Water M21-Se25040 Sep 09, 2021	QC01 Water M21-Se25041 Sep 09, 2021	RB01 Water M21-Se25042 Sep 09, 2021	TB01 Water M21-Se25043 Sep 09, 2021
Sample Matrix	LOR	Unit				
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	110	110	105	106
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
Dissolved Metals						
Ferrous Iron - Fe2+	0.05	mg/L	5.3	12	< 0.05	-
Nitrate (as N)	0.02	mg/L	< 0.02	< 0.02	< 0.02	-
Sulphate (as SO4)	5	mg/L	1600	3100	< 5	-
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	390	78	< 20	-
Heavy Metals						
Manganese (filtered)	0.005	mg/L	1.6	2.1	< 0.005	-

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Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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 B1			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Sep 14, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Sep 14, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Sep 14, 2021	7 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Sep 14, 2021	14 Days
Eurofins Suite B16A: SO₄, CH₄, NO₃, Fe²⁺			
Dissolved Gases - Method: LTM-ORG-2070 by Headspace GC-FID	Melbourne	Sep 14, 2021	14 Days
Ferrous Iron - Fe ²⁺ - Method: LTM-INO-4190 Ferrous Iron in Water by Discrete Analyser	Melbourne	Sep 14, 2021	7 Days
Nitrate (as N) - Method: LTM-INO-4120 Analysis of NO _x NO ₂ NH ₃ by FIA	Melbourne	Sep 14, 2021	28 Days
Sulphate (as SO ₄) - Method: LTM-INO-4110 Sulfate by Discrete Analyser	Melbourne	Sep 14, 2021	28 Days
Alkalinity (speciated) - Method: LTM-INO-4250 Alkalinity by Electrometric Titration	Melbourne	Sep 14, 2021	14 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Sep 14, 2021	180 Days

DRAFT

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: DIESEL SPILL
Project ID: J168829

Order No.: PO29175
Report #: 824079
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Sep 10, 2021 9:00 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	Eurofins Suite B16A: SO4, CH4, NO3, Fe2+	
						X	X
1	MW01	Sep 09, 2021		Water	M21-Se25032	X	X
2	MW01A	Sep 09, 2021		Water	M21-Se25033	X	X
3	MW02	Sep 09, 2021		Water	M21-Se25034	X	X
4	MW03	Sep 09, 2021		Water	M21-Se25035	X	X
5	MW04	Sep 09, 2021		Water	M21-Se25036	X	X
6	MW05	Sep 09, 2021		Water	M21-Se25037	X	X
7	MW06	Sep 09, 2021		Water	M21-Se25038	X	X
8	MW07	Sep 09, 2021		Water	M21-Se25039	X	X
9	MW08	Sep 09, 2021		Water	M21-Se25040	X	X
Eurofins Suite B1							
BTEX and Naphthalene							
Total Alkalinity (as CaCO3)							
Manganese (filtered)							

External Laboratory
Melbourne Laboratory - NATA # 1261 Site # 1254
Sydney Laboratory - NATA # 1261 Site # 18217
Brisbane Laboratory - NATA # 1261 Site # 20794
Mayfield Laboratory - NATA # 1261 Site # 25079
Perth Laboratory - NATA # 2377 Site # 2370



Environment Testing

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261 Site # 1254

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarie QLD 4172
Phone : +61 7 3802 4600
NATA # 1261 Site # 20794

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Perth
46-48 Banksia Road
Weshpool WA 6106
Phone : +61 8 6253 4444
NATA # 2377 Site # 2370

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Eurofins Environment Testing NZ Limited
NZBN: 9429046024954

Company Name: Greencap NT P/L
Address: 11/14 Winnellie Road
Winnellie
NT 0800

Project Name: DIESEL SPILL
Project ID: J168829

Order No.: PO29175
Report #: 824079
Phone: 61 8 8984 4244
Fax: 61 8 8984 3105

Received: Sep 10, 2021 9:00 AM
Due: Sep 17, 2021
Priority: 5 Day
Contact Name: Varun

Eurofins Analytical Services Manager : Michael Morrison

Sample Detail

	Melbourne Laboratory - NATA # 1261 Site # 1254	Sydney Laboratory - NATA # 1261 Site # 18217	Brisbane Laboratory - NATA # 1261 Site # 20794	Mayfield Laboratory - NATA # 1261 Site # 25079	Perth Laboratory - NATA # 2377 Site # 2370	External Laboratory	10	11	12	Test Counts
Manganese (filtered)	X								11	11
Total Alkalinity (as CaCO3)	X						X	X		11
BTEX and Naphthalene	X								X	1
Eurofins Suite B1		X					X	X		11
Eurofins Suite B16A: SO4, CH4, NO3, Fe2+		X					X	X		11
							M21-Se25041	M21-Se25042	M21-Se25043	
							Water	Water	Water	
							Sep 09, 2021	Sep 09, 2021	Sep 09, 2021	

Internal Quality Control Review and Glossary
General

- 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.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

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

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

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

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

QC Data General Comments

- 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.
- 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.
- Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
- Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
- Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
- For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Method Blank						
Total Recoverable Hydrocarbons						
TRH C6-C9	mg/L	< 0.02		0.02	Pass	
TRH C10-C14	mg/L	< 0.05		0.05	Pass	
TRH C15-C28	mg/L	< 0.1		0.1	Pass	
TRH C29-C36	mg/L	< 0.1		0.1	Pass	
Naphthalene	mg/L	< 0.01		0.01	Pass	
TRH C6-C10	mg/L	< 0.02		0.02	Pass	
TRH >C10-C16	mg/L	< 0.05		0.05	Pass	
TRH >C16-C34	mg/L	< 0.1		0.1	Pass	
TRH >C34-C40	mg/L	< 0.1		0.1	Pass	
Method Blank						
BTEX						
Benzene	mg/L	< 0.001		0.001	Pass	
Toluene	mg/L	< 0.001		0.001	Pass	
Ethylbenzene	mg/L	< 0.001		0.001	Pass	
m&p-Xylenes	mg/L	< 0.002		0.002	Pass	
o-Xylene	mg/L	< 0.001		0.001	Pass	
Xylenes - Total*	mg/L	< 0.003		0.003	Pass	
Method Blank						
Dissolved Gases						
Methane	mg/L	< 0.05		0.05	Pass	
Method Blank						
Ferrous Iron - Fe2+	mg/L	< 0.05		0.05	Pass	
Nitrate (as N)	mg/L	< 0.02		0.02	Pass	
Sulphate (as SO4)	mg/L	< 5		5	Pass	
Method Blank						
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	mg/L	< 20		20	Pass	
Method Blank						
Heavy Metals						
Manganese (filtered)	mg/L	< 0.005		0.005	Pass	
LCS - % Recovery						
Total Recoverable Hydrocarbons						
TRH C6-C9	%	118		70-130	Pass	
TRH C10-C14	%	98		70-130	Pass	
Naphthalene	%	110		70-130	Pass	
TRH C6-C10	%	118		70-130	Pass	
TRH >C10-C16	%	101		70-130	Pass	
LCS - % Recovery						
BTEX						
Benzene	%	94		70-130	Pass	
Toluene	%	101		70-130	Pass	
Ethylbenzene	%	105		70-130	Pass	
m&p-Xylenes	%	109		70-130	Pass	
Xylenes - Total*	%	108		70-130	Pass	
LCS - % Recovery						
Dissolved Gases						
Methane	%	80		70-130	Pass	
LCS - % Recovery						
Ferrous Iron - Fe2+	%	113		70-130	Pass	
Nitrate (as N)	%	101		70-130	Pass	
Sulphate (as SO4)	%	110		70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C6-C9	M21-Se22712	NCP	%	122			70-130	Pass	
Naphthalene	M21-Se22712	NCP	%	129			70-130	Pass	
TRH C6-C10	M21-Se22712	NCP	%	122			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M21-Se22712	NCP	%	98			70-130	Pass	
Toluene	M21-Se22712	NCP	%	105			70-130	Pass	
Ethylbenzene	M21-Se22712	NCP	%	110			70-130	Pass	
m&p-Xylenes	M21-Se22712	NCP	%	113			70-130	Pass	
o-Xylene	M21-Se22712	NCP	%	110			70-130	Pass	
Xylenes - Total*	M21-Se22712	NCP	%	112			70-130	Pass	
Spike - % Recovery									
				Result 1					
Nitrate (as N)	M21-Se25032	CP	%	89			70-130	Pass	
Sulphate (as SO4)	S21-Se21058	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Manganese (filtered)	M21-Se22658	NCP	%	98			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M21-Se25034	CP	%	77			70-130	Pass	
TRH >C10-C16	M21-Se25034	CP	%	78			70-130	Pass	
Spike - % Recovery									
Dissolved Gases				Result 1					
Methane	M21-Se25035	CP	%	102			70-130	Pass	
Spike - % Recovery									
Dissolved Gases				Result 1					
Methane	M21-Se25042	CP	%	81			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Ferrous Iron - Fe2+	M21-Se25032	CP	mg/L	29	29	1.0	30%	Pass	
Nitrate (as N)	M21-Se25032	CP	mg/L	0.02	< 0.02	37	30%	Fail	Q15
Duplicate									
Alkalinity (speciated)				Result 1	Result 2	RPD			
Total Alkalinity (as CaCO3)	M21-Se10511	NCP	mg/L	410	**	2.3	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M21-Se25033	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	M21-Se25033	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	M21-Se25033	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C10-C16	M21-Se25033	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	M21-Se25033	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	M21-Se25033	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Manganese (filtered)	M21-Se25035	CP	mg/L	2.6	2.9	9.0	30%	Pass	
Duplicate									
Dissolved Gases				Result 1	Result 2	RPD			
Methane	M21-Se25036	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ferrous Iron - Fe2+	M21-Se25036	CP	mg/L	4.8	4.8	1.0	30%	Pass	

Duplicate									
				Result 1	Result 2	RPD			
Sulphate (as SO ₄)	M21-Se25041	CP	mg/L	3100	3100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Sulphate (as SO ₄)	M21-Se25042	CP	mg/L	< 5	< 5	<1	30%	Pass	

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

Emily Daos	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
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](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2132570

Client : GREENCAP-NAA PTY LTD
Contact : MR DYLAN BYFORD
Address : 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820
Laboratory : Environmental Division Sydney
Contact : Peter Ravlic
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail : dylan.byford@greencap.com.au
Telephone : +61 08 8299 9955
Facsimile : +61 08 8362 9776
Project : J168829 ORA Spill
Order number : PO291976
C-O-C number : ----
Site : Berrimah Freight Terminal
Sampler : VARUN BHAGWAT

Dates

Date Samples Received : 15-Sep-2021 10:00
Client Requested Due Date : 22-Sep-2021
Issue Date : 15-Sep-2021
Scheduled Reporting Date : 22-Sep-2021

Delivery Details

Mode of Delivery : Client Drop Off
No. of coolers/boxes : 1
Receipt Detail :
Security Seal : Not Available
Temperature : 9.6 C
No. of samples received / analysed : 1 / 1

General Comments

- This report contains the following information:
- Sample Container(s)/Preservation Non-Compliances
- Summary of Sample(s) and Requested Analysis
- Proactive Holding Time Report
- Requested Deliverables
Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.
Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).
Please direct any queries you have regarding this work order to the above ALS laboratory contact.
Analytical work for this work order will be conducted at ALS Sydney.
Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



Environmental

QUALITY CONTROL REPORT

Work Order : **ES2132570**

Page : 1 of 5

Client : **GREENCAP-NAA PTY LTD**
 Contact : **MR DYLAN BYFORD**
 Address : **11/14 Winnellie Road**
WINNELLIE NT, AUSTRALIA 0820
 Telephone : **+61 08 8299 9955**
 Project : **J168829 ORA Spill**
 Order number : **PO291976**
 C-O-C number : **----**
 Sampler : **VARUN BHAGWAT**
 Site : **Berrimah Freight Terminal**
 Quote number : **EN/333 - secondary work only**
 No. of samples received : **1**
 No. of samples analysed : **1**

Laboratory : **Environmental Division Sydney**
 Contact : **Peter Ravlic**
 Address : **277-289 Woodpark Road Smithfield NSW Australia 2164**
 Telephone : **+6138549 9645**
 Date Samples Received : **15-Sep-2021**
 Date Analysis Commenced : **15-Sep-2021**
 Issue Date : **21-Sep-2021**



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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, 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 moisture content, insufficient sample (reduced weight employed) or matrix interference.

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 sample ID	Sample ID	Method/Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report			Acceptable RPD (%)
						Original Result	Duplicate Result	RPD (%)	
ED037P: Alkalinity by PC Titrator (QC Lot: 3910019)									
ES2133733-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	31	28	12.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	31	28	12.2	0% - 20%
ES2133497-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	125	130	3.7	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	125	130	3.7	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3903451)									
ES2132224-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	100	99	0.0	0% - 20%
ES2132224-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	4090	4080	0.3	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3904630)									
ES2132224-001	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	0.001	0.0	No Limit
ES2132224-011	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.108	0.099	8.0	0% - 20%
EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 3910304)									
ES2132570-001	QC01A	EG051G: Ferrous Iron	---	0.05	mg/L	14.0	13.5	3.7	0% - 20%
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 3903437)									
EB2125730-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	7250	7220	0.5	0% - 20%
ES2133160-029	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3903951)									
ES2132570-001	QC01A	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0	No Limit
ES2133209-001	Anonymous	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3903951)									



Method Blank (MB) and Laboratory Control Sample (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 Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method/Compound	CAS Number	LOR	Unit	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report		
				Result	Concentration	Spike Recovery (%)	Acceptable Limits (%)	High
ED037P: Alkalinity by PC Titrator (QCLot: 3910019)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	104	81.0	111
				----	50 mg/L	112	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3903451)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	104	82.0	122
				<1	500 mg/L	95.9	82.0	122
EG020F: Dissolved Metals by ICP-MS (QCLot: 3904630)								
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	87.6	82.0	110
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3910304)								
EG051G: Ferrous Iron	----	0.05	mg/L	<0.05	2 mg/L	97.1	89.0	117
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3903437)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	105	86.0	114
EP080/074: Total Petroleum Hydrocarbons (QCLot: 3903077)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	82.4	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	87.7	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	102	56.0	121
EP080/074: Total Petroleum Hydrocarbons (QCLot: 3903951)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	81.1	75.0	127
EP080/074: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3903077)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	69.8	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	83.7	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	76.1	61.5	121
EP080/074: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3903951)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	84.6	75.0	127
EP080: BTEXN (QCLot: 3903951)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	109	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	93.7	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	92.5	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	91.0	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.7	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	92.5	70.0	120



Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%)	MS	Acceptable Limits (%)
				Low	High		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3903451)							
ES2132224-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3904630)							
ES2132224-002	Anonymous	EG020A-F: Manganese	7439-96-5	1 mg/L	90.9	70.0	130
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 3910304)							
ES2132570-001	QC01A	EG051G: Ferrous Iron	----	1 mg/L	# Not Determined	70.0	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 3903437)							
EB2125730-003	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	# Not Determined	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3903951)							
ES2132570-001	QC01A	EP080: C6 - C9 Fraction	----	325 µg/L	87.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3903951)							
ES2132570-001	QC01A	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	89.2	70.0	130
EP080: BTEXN (QCLot: 3903951)							
ES2132570-001	QC01A	EP080: Benzene	71-43-2	25 µg/L	109	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	97.4	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	97.2	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	95.4	70.0	130
		EP080: ortho-Xylene	106-42-3	25 µg/L	98.0	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	71.5	70.0	130



ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order : **ES2132570**

Page : 1 of 5

Client : **GREENCAP-NAA PTY LTD**
Contact : **MR DYLAN BYFORD**
Project : **J168829 ORA Spill**
Site : **Berrimah Freight Terminal**
Sampler : **VARUN BHAGWAT**
Order number : **PO291976**

Laboratory : **Environmental Division Sydney**
Telephone : **+6138549 9645**
Date Samples Received : **15-Sep-2021**
Issue Date : **21-Sep-2021**
No. of samples received : **1**
No. of samples analysed : **1**

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.



Page : 2 of 5
 Work Order : ES2132570
 Client : GREENCAP-NAA PTY LTD
 Project : J168829 ORA Spill

Outliers : Quality Control Samples
 Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2132224--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.
EG051G: Ferrous Iron by Discrete Analyser	ES2132570--001	QC01A	Ferrous Iron	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP033: C1 - C4 Hydrocarbon Gases	EB2125730--003	Anonymous	Methane	74-82-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Container / Client Sample ID(s)	Extraction / Preparation		Analysis	
		Date extracted	Due for extraction	Date analysed	Due for analysis
EG051G: Ferrous Iron by Discrete Analyser Clear Plastic Bottle - HCl QC01A		----	----	20-Sep-2021	10-Sep-2021

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Method	QC	Regular	Count	Rate (%)		Quality Control Specification
					Actual	Expected	
Laboratory Duplicates (DUP) TRH - Semivolatle Fraction		0	9	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS) TRH - Semivolatle Fraction		0	9	9	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	Date analysed	Due for extraction	Evaluation	Date analysed	Evaluation



Page : 3 of 5
 Work Order : ES2132570
 Client : GREENCAP-NAA PTY LTD
 Project : J168829 ORA Spill

Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation		Analysis		
		Date extracted	Due for extraction	Date analysed	Due for analysis	
ED037P: Alkalinity by PC Titrator						
Clear Plastic Bottle - Natural (ED037-P) QC01A	09-Sep-2021	----	----	19-Sep-2021	23-Sep-2021	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA						
Clear Plastic Bottle - Natural (ED041G) QC01A	09-Sep-2021	----	----	15-Sep-2021	07-Oct-2021	✓
EG020F: Dissolved Metals by ICP-MS						
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) QC01A	09-Sep-2021	----	----	16-Sep-2021	08-Mar-2022	✓
EG051G: Ferrous Iron by Discrete Analyser						
Clear Plastic Bottle - HCl (EG051G) QC01A	09-Sep-2021	----	----	20-Sep-2021	10-Sep-2021	✗
EP033: C1 - C4 Hydrocarbon Gases						
Clear glass VOC vial - HCl (EP033) QC01A	09-Sep-2021	----	----	15-Sep-2021	23-Sep-2021	✓
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved (EP071) QC01A	09-Sep-2021	15-Sep-2021	16-Sep-2021	17-Sep-2021	25-Oct-2021	✓
Clear glass VOC vial - HCl (EP080) QC01A	09-Sep-2021	17-Sep-2021	23-Sep-2021	17-Sep-2021	23-Sep-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Amber Glass Bottle - Unpreserved (EP071) QC01A	09-Sep-2021	15-Sep-2021	16-Sep-2021	17-Sep-2021	25-Oct-2021	✓
Clear glass VOC vial - HCl (EP080) QC01A	09-Sep-2021	17-Sep-2021	23-Sep-2021	17-Sep-2021	23-Sep-2021	✓
EP080: BTEXN						
Clear glass VOC vial - HCl (EP080) QC01A	09-Sep-2021	17-Sep-2021	23-Sep-2021	17-Sep-2021	23-Sep-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	Method	Count		Rate (%)		Evaluation	Quality Control Specification
		QC	Regular	Actual	Expected		
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
C1 - C4 Gases	EP033	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	0	9	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
C1 - C4 Gases	EP033	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
C1 - C4 Gases	EP033	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
C1 - C4 Gases	EP033	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ferrous Iron by Discrete Analyser	EG051G	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	0	9	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	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
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 0.45µm 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)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-ENEG020. 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.
Ferrous Iron by Discrete Analyser	EG051G	WATER	In house: Referenced to APHA 3500 Fe-B. A colorimetric determination based on the reaction between phenanthroline and ferrous iron at pH 3.2-3.3 to form an orange-red complex that is measured against a five-point calibration curve. 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)
C1 - C4 Gases	EP033	WATER	Technical Guidance for the Natural Attenuation Indicators: Methane, Ethane, and Ethene, US EPA - Region 1, EPA New England, July 2001. Automated static headspace, dual column GC/FID. A 12 mL sample is pipetted into a 20 mL headspace vial containing 3g of sodium chloride and sealed. Each sample is equilibrated with shaking at 40 degrees C for 10 minutes prior to analysis by GC/FID using a pair of PLOT columns of different polarity.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of 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)
Preparation Methods	Method	Matrix	Method Descriptions
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.



Environmental

CERTIFICATE OF ANALYSIS

Work Order : **ES2132570**
Client : **GREENCAP-NAA PTY LTD**
Contact : **MR DYLAN BYFORD**
Address : **11/14 Winnellie Road**
WINNELLIE NT, AUSTRALIA 0820
Telephone : **+61 08 8299 9955**
Project : **J168829 ORA Spill**
Order number : **PO291976**
C-O-C number : **----**
Sampler : **VARUN BHAGWAT**
Site : **Berrimah Freight Terminal**
Quote number : **EN/333 - secondary work only**
No. of samples received : **1**
No. of samples analysed : **1**

Page : **1 of 5**
Laboratory : **Environmental Division Sydney**
Contact : **Peter Ravlic**
Address : **277-289 Woodpark Road Smithfield NSW Australia 2164**
Telephone : **+6138549 9645**
Date Samples Received : **15-Sep-2021 10:00**
Date Analysis Commenced : **15-Sep-2021**
Issue Date : **21-Sep-2021 17:31**



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 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
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW



Page : 2 of 5
Work Order : ES2132570
Client : GREENCAP-NAA PTY LTD
Project : J168829 ORA Spill

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.

- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.



Analytical Results

Compound	CAS Number	Sample ID		QC01A
		LOR	Unit	
ED037P: Alkalinity by PC Titrator				
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	79
Total Alkalinity as CaCO3		1	mg/L	79
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA				
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2800
EG020F: Dissolved Metals by ICP-MS				
Manganese	7439-96-5	0.001	mg/L	1.72
EG051G: Ferrous Iron by Discrete Analyser				
Ferrous Iron		0.05	mg/L	14.0
EK058G: Nitrate as N by Discrete Analyser				
Nitrate as N	14797-55-8	0.01	mg/L	<0.01
EP033: C1 - C4 Hydrocarbon Gases				
Methane	74-82-8	10	µg/L	<10
EP080/071: Total Petroleum Hydrocarbons				
C6 - C9 Fraction		20	µg/L	<20
C10 - C14 Fraction		50	µg/L	<50
C15 - C28 Fraction		100	µg/L	<100
C29 - C36 Fraction		50	µg/L	<50
^ C10 - C36 Fraction (sum)		50	µg/L	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions				
C6 - C10 Fraction	C6_C10	20	µg/L	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20
>C10 - C16 Fraction		100	µg/L	<100
>C16 - C34 Fraction		100	µg/L	<100
>C34 - C40 Fraction		100	µg/L	<100
^ >C10 - C40 Fraction (sum)		100	µg/L	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)		100	µg/L	<100
EP080: BTEXN				
Benzene	71-43-2	1	µg/L	<1
Toluene	108-88-3	2	µg/L	<2
Ethylbenzene	100-41-4	2	µg/L	<2



Analytical Results

Compound	CAS Number	LOR	Sample ID		QC01A	Result
			Sampling date / time	Unit		
EP080: BTEXN - Continued						
meta- & para-Xylene	108-38-3	2	09-Sep-2021 00:00	µg/L	ES2132570-001	<2
ortho-Xylene	95-47-6	2		µg/L		<2
^ Total Xylenes		2		µg/L		<2
^ Sum of BTEX		1		µg/L		<1
Naphthalene	91-20-3	5		µg/L		<5
EP080S: TPH(V)/BTEX Surrogates						
1,2-Dichloroethane-D4	17060-07-0	2		%		131
Toluene-D8	2037-26-5	2		%		129
4-Bromofluorobenzene	460-00-4	2		%		123

DRAFT



Page : 5 of 5
Work Order : ES2132570
Client : GREENCAP-NAA PTY LTD
Project : J168829 ORA Spill

Surrogate Control Limits

Sub-Matrix: WATER			
Compound	CAS Number	Recovery Limits (%)	
		Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

DRAFT

J168829-05 - COC with Testing

Varun Bhagwat <Varun.Bhagwat@greencap.com.au>

Mon 13/12/2021 10:04 AM

To: Michael Morrison <MichaelMorrison@eurofins.com>

Cc: #AU09_EnviroSampleDRW <EnviroSampleDRW@eurofins.com>; #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>

EXTERNAL EMAIL*

Hi Michael,

Attached is the COC with testing for soil samples collected on 10/12/21.

The samples were dropped off to the Darwin Eurofins drop off point on 10/12/21.

Please let me know if you have any questions.

Thank you.

Cheers,

Varun Bhagwat

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820


M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)



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CHAIN OF CUSTODY RECORD

Enrolina | Environment Testing | ABN 50 005 085 521

Sydney Laboratory
Unit F3 Bld F 16 Mars Road Lane Cove West NSW 2066
02 9500 5400 EnviroSamplesNSW@enrolina.com

Brisbane Laboratory
Unit 1 21 Smallwood Place Marilee QLD 4172
07 3922 4600 EnviroSamplesQLD@enrolina.com

Perth Laboratory
Unit 2 91 Leach Highway Kewdale WA 6105
08 9251 9600 EnviroSamplesWA@enrolina.com

Melbourne Laboratory
6 Montrose Road Dandenong South VIC 3175
03 8564 5000 EnviroSamplesVic@enrolina.com

Company		Greencap NT P/L		Project No		Project Manager		Varun Bhagwat		Samplet(s)		VB	
Address		Unit 11 / 14 Winnellie Road Winnellie, NT 0820		Project Name		EDD Format ESet, EBUS etc		Eesat		Facility Code		VB on 8/12/21 and 10/12/21	
Contact Name		Varun Bhagwat		Diesel Spill		ESet, EBUS etc		Eesat		Email for Invoice		Varun.Bhagwat@greencap.com.au	
Phone No		0428 825 444		B16A : Natural Attenuation Site #A : SO4, CH4, NO3, NO2, Fe+2		ESet, EBUS etc		Eesat		Email for Results		Varun.Bhagwat@greencap.com.au	
Special Directions		TBA		B16A : Natural Attenuation Site #A : SO4, CH4, NO3, NO2, Fe+2		ESet, EBUS etc		Eesat		Change container type & size if necessary		Required Turnaround Time (TAT) Leadsheet will be 3 days if not ticked!	
Purchase Order		TBA		B16A : Natural Attenuation Site #A : SO4, CH4, NO3, NO2, Fe+2		ESet, EBUS etc		Eesat		Containers		Other (Asbestos AS4364, WA Outfalls)	
Quote ID No		TBA		B16A : Natural Attenuation Site #A : SO4, CH4, NO3, NO2, Fe+2		ESet, EBUS etc		Eesat		Change container type & size if necessary		Other (Asbestos AS4364, WA Outfalls)	
Client Sample ID		Sampled Date/Time dd/mm/yyyy hh:mm		Matrix Solid (S) Water (W)		ESet, EBUS etc		Eesat		500mL Plastic		Surcharge will apply	
1	MW01	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
2	MW01A	8/12/21	Water	X	X	X	X	X	X	1	3	1	2
3	MW02	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
4	MW03	8/12/21	Water	X	X	X	X	X	X	1	3	1	2
5	MW04	8/12/21	Water	X	X	X	X	X	X	1	3	1	2
6	MW05	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
7	MW06	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
8	MW07	8/12/21	Water	X	X	X	X	X	X	1	3	1	2
	MW08	8/12/21	Water	X	X	X	X	X	X	1	3	1	2
	MW09	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
	MW10	12/12/21	Water	X	X	X	X	X	X	1	3	1	2
	MW11	8/12/21	Water	X	X	X	X	X	X	1	3	1	2

DRAFT

849636
15/12/21

ID	QC01	8/12/21	Water	X		X		X		X		1		3		1		2			
				13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	RB01	8/12/21	Water																		
	RB02	10/12/21	Water																		
	TB01	8/12/21	Water																		
	TB02	12/10/21	Water																		
Add Rows				13	13	13	13	13	2	2											
Total Counts				13	13	13	13	13	2	2											

Method of Shipment	<input type="checkbox"/> Courier (#)	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Postal	Name	Signature	Date	Time	Report No
Laboratory Use Only	Received By	Received By						
	<i>Ketana</i>				<i>[Signature]</i>	10/12/21	03:45 PM	31.8°C

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Ingt Standard Terms and Conditions unless agreed otherwise. A copy of Eurofins | Ingt Standard Terms and Conditions is available on request.

DRAFT

849636


J168829 - COC with Testing

Varun Bhagwat <Varun.Bhagwat@greencap.com.au>

Mon 13/12/2021 10:03 AM

To: Michael Morrison <MichaelMorrison@eurofins.com>

Cc: #AU09_EnviroSampleDRW <EnviroSampleDRW@eurofins.com>; #AU_CAU001_EnviroSampleVic <EnviroSampleVic@eurofins.com>

EXTERNAL EMAIL*

Hi Michael,

Attached is the COC with testing for groundwater samples collected on 8/12/21 and 10/12/21.

The samples were dropped off to the Darwin Eurofins drop off point on their respective collection dates.

Please let me know if you have any questions.

Thank you.

Cheers,

Varun Bhagwat

Environmental Consultant | Greencap

Unit 11 / 14 Winnellie Road Winnellie, NT 0820

M: 0428 829 444 | E: Varun.Bhagwat@greencap.com.au | in: [LinkedIn](#)

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Eurofins Environment Testing Australia Pty Ltd

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NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited

NZBN: 9429046024954

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Phone : +64 9 526 45 51
IANZ # 1327

Christchurch

43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Greencap NT P/L
Contact name: Varun
Project name: DIESEL SPILL
Project ID: J168829
Turnaround time: 5 Day
Date/Time received: Dec 13, 2021 10:04 AM
Eurofins reference: 849636

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:

Michael Morrison on phone : 03 8564 5933 or by email: MichaelMorrison@eurofins.com

Results will be delivered electronically via email to Varun - varun.bhagwat@greencap.com.au.

Note: A copy of these results will also be delivered to the general Greencap NT P/L email address.

Greencap NT P/L
11/14 Winnellie Road
Winnellie
NT 0800



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reference materials producers reports and certificates.

Attention: **Varun**

Report **849636-W**
Project name **DIESEL SPILL**
Project ID **J168829**
Received Date **Dec 13, 2021**

Client Sample ID			MW01A Water M21-De29700 Dec 08, 2021	MW03 Water M21-De29701 Dec 08, 2021	MW04 Water M21-De29702 Dec 08, 2021	MW07 Water M21-De29703 Dec 08, 2021
Sample Matrix	LOR	Unit				
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.1	0.4	0.4	0.4
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.1	0.4	0.4	0.4
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.1	0.4	0.4	0.5
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.1	0.4	0.4	0.5
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	83	86	84	86
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID			MW01A	MW03	MW04	MW07
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M21-De29700	M21-De29701	M21-De29702	M21-De29703
Date Sampled			Dec 08, 2021	Dec 08, 2021	Dec 08, 2021	Dec 08, 2021
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	55	122	50	66
p-Terphenyl-d14 (surr.)	1	%	83	136	60	81
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	< 0.03
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	36	34	45	30
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Inorganic						
Ferrous Iron - Fe2+	0.05	mg/L	10	0.10	2.5	0.75
Nitrate (as N)	0.02	mg/L	0.38	0.68	< 0.02	0.35
Sulphate (as SO4)	5	mg/L	2900	110	660	580
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	52	< 20	< 20	97
Heavy Metals						
Manganese (filtered)	0.005	mg/L	1.5	0.54	1.8	1.2

Client Sample ID			MW08 Water M21-De29704 Dec 08, 2021	MW11 Water M21-De29705 Dec 08, 2021	QC01 Water M21-De29706 Dec 08, 2021	RB01 Water M21-De29707 Dec 08, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	0.2	0.3	0.2	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	0.2	0.3	0.2	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	0.2	0.3	0.2	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	0.2	0.3	0.2	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	83	89	93	84
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	83	136	78	-
p-Terphenyl-d14 (surr.)	1	%	106	111	73	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-

Client Sample ID			MW08 Water M21-De29704 Dec 08, 2021	MW11 Water M21-De29705 Dec 08, 2021	QC01 Water M21-De29706 Dec 08, 2021	RB01 Water M21-De29707 Dec 08, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Phenols (Halogenated)						
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4.6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4.6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2.4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2.4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	48	38	32	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Inorganic						
Ferrous Iron - Fe2+	0.05	mg/L	1.4	1.9	21	-
Nitrate (as N)	0.02	mg/L	1.1	< 0.02	0.29	-
Sulphate (as SO4)	5	mg/L	500	870	3100	-
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	< 20	34	49	-
Heavy Metals						
Manganese (filtered)	0.005	mg/L	1.5	2.3	1.5	-

Client Sample ID			TB01 Water M21-De29708 Dec 08, 2021	MW01 Water M21-De35750 Dec 12, 2021	MW02 Water M21-De35751 Dec 12, 2021	MW05 Water M21-De35752 Dec 12, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	-	0.52	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	-	1.2	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	-	1.72	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	-	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	-	0.86	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	-	0.86	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	-	0.9	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	-	1.76	< 0.1	< 0.1

Client Sample ID			TB01 Water M21-De29708 Dec 08, 2021	MW01 Water M21-De35750 Dec 12, 2021	MW02 Water M21-De35751 Dec 12, 2021	MW05 Water M21-De35752 Dec 12, 2021
Sample Matrix						
Eurofins Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	86	102	100	97
Dissolved Gases						
Methane	0.05	mg/L	-	< 0.05	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	-	< 0.001	< 0.001	< 0.001
2-Fluorobiphenyl (surr.)	1	%	-	58	122	118
p-Terphenyl-d14 (surr.)	1	%	-	92	84	98
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
2,4-Dichlorophenol	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
2,4,5-Trichlorophenol	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
2,4,6-Trichlorophenol	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
2,6-Dichlorophenol	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
4-Chloro-3-methylphenol	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
Pentachlorophenol	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
Tetrachlorophenols - Total	0.03	mg/L	-	< 0.03	< 0.03	< 0.03
Total Halogenated Phenol*	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-dinitrophenol	0.03	mg/L	-	< 0.03	< 0.03	< 0.03
2-Nitrophenol	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
2,4-Dimethylphenol	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
2,4-Dinitrophenol	0.03	mg/L	-	< 0.03	< 0.03	< 0.03
2-Methylphenol (o-Cresol)	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	-	< 0.006	< 0.006	< 0.006
Total cresols*	0.01	mg/L	-	< 0.01	< 0.01	< 0.01
4-Nitrophenol	0.03	mg/L	-	< 0.03	< 0.03	< 0.03

Client Sample ID			TB01 Water	MW01 Water	MW02 Water	MW05 Water
Sample Matrix			M21-De29708	M21-De35750	M21-De35751	M21-De35752
Eurofins Sample No.			Dec 08, 2021	Dec 12, 2021	Dec 12, 2021	Dec 12, 2021
Date Sampled						
Test/Reference	LOR	Unit				
Phenols (non-Halogenated)						
Dinoseb	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
Phenol	0.003	mg/L	-	< 0.003	< 0.003	< 0.003
Phenol-d6 (surr.)	1	%	-	52	57	76
Total Non-Halogenated Phenol*	0.1	mg/L	-	< 0.1	< 0.1	< 0.1
Ferrous Iron - Fe2+						
Ferrous Iron - Fe2+	0.05	mg/L	-	33	0.12	6.0
Nitrate (as N)	0.02	mg/L	-	< 0.02	0.23	< 0.02
Sulphate (as SO4)	5	mg/L	-	320	490	2100
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	-	230	< 20	55
Heavy Metals						
Manganese (filtered)	0.005	mg/L	-	2.0	5.2	1.1

Client Sample ID			MW06 Water	MW09 Water	MW10 Water	RB02 Water
Sample Matrix			M21-De35753	M21-De35754	M21-De35755	M21-De35756
Eurofins Sample No.			Dec 12, 2021	Dec 12, 2021	Dec 12, 2021	Dec 12, 2021
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons						
TRH C6-C9	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene ^{N02}	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1) ^{N04}	0.02	mg/L	< 0.02	< 0.02	< 0.02	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C10-C16 less Naphthalene (F2) ^{N01}	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Toluene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	< 0.002	< 0.002	< 0.002
o-Xylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003	< 0.003	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	100	103	102	101
Dissolved Gases						
Methane	0.05	mg/L	< 0.05	< 0.05	< 0.05	-
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID			MW06	MW09	MW10	RB02
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			M21-De35753	M21-De35754	M21-De35755	M21-De35756
Date Sampled			Dec 12, 2021	Dec 12, 2021	Dec 12, 2021	Dec 12, 2021
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(b&j)fluoranthene ^{N07}	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
2-Fluorobiphenyl (surr.)	1	%	84	96	80	-
p-Terphenyl-d14 (surr.)	1	%	60	99	104	-
Phenols (Halogenated)						
2-Chlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4,5-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4,6-Trichlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,6-Dichlorophenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
4-Chloro-3-methylphenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Pentachlorophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Tetrachlorophenols - Total	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Total Halogenated Phenol*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
Phenols (non-Halogenated)						
2-Cyclohexyl-4,6-dinitrophenol	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
2-Methyl-4,6-dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Nitrophenol	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
2,4-Dimethylphenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
2,4-Dinitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
2-Methylphenol (o-Cresol)	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
3&4-Methylphenol (m&p-Cresol)	0.006	mg/L	< 0.006	< 0.006	< 0.006	-
Total cresols*	0.01	mg/L	< 0.01	< 0.01	< 0.01	-
4-Nitrophenol	0.03	mg/L	< 0.03	< 0.03	< 0.03	-
Dinoseb	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Phenol	0.003	mg/L	< 0.003	< 0.003	< 0.003	-
Phenol-d6 (surr.)	1	%	41	61	75	-
Total Non-Halogenated Phenol*	0.1	mg/L	< 0.1	< 0.1	< 0.1	-
Inorganic Compounds						
Ferrous Iron - Fe2+	0.05	mg/L	0.25	3.1	7.6	-
Nitrate (as N)	0.02	mg/L	0.26	0.21	< 0.02	-
Sulphate (as SO4)	5	mg/L	610	1100	590	-
Alkalinity (speciated)						
Total Alkalinity (as CaCO3)	20	mg/L	< 20	36	31	-
Heavy Metals						
Manganese (filtered)	0.005	mg/L	1.3	1.3	2.4	-

Client Sample ID			TB02
Sample Matrix			Water
Eurofins Sample No.			M21-De35757
Date Sampled			Dec 12, 2021
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons			
Naphthalene ^{NO2}	0.01	mg/L	< 0.01
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	101

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Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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 B4A			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	7 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Melbourne	Dec 15, 2021	14 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	7 Days
Phenols (Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	7 Days
Phenols (non-Halogenated) - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Dec 15, 2021	7 Days
Eurofins Suite B16A: SO₄, CH₄, NO₃, Fe²⁺			
Dissolved Gases - Method: LTM-ORG-2070 by Headspace GC-FID	Melbourne	Dec 15, 2021	14 Days
Ferrous Iron - Fe²⁺ - Method: LTM-INO-4190 Ferrous Iron in Water by Discrete Analyser	Melbourne	Dec 15, 2021	7 Days
Nitrate (as N) - Method: LTM-INO-4120 Analysis of NO _x NO ₂ NH ₃ by FIA	Melbourne	Dec 15, 2021	28 Days
Sulphate (as SO₄) - Method: LTM-INO-4110 Sulfate by Discrete Analyser	Melbourne	Dec 15, 2021	28 Days
Alkalinity (speciated) - Method: LTM-INO-4250 Alkalinity by Electrometric Titration	Melbourne	Dec 15, 2021	14 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Dec 15, 2021	180 Days

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Internal Quality Control Review and Glossary

General

- 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.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- 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.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

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%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- 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.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Dissolved Gases							
Methane	mg/L	< 0.05			0.05	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Phenols (Halogenated)							
2-Chlorophenol	mg/L	< 0.003			0.003	Pass	
2,4-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
2,4,5-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,4,6-Trichlorophenol	mg/L	< 0.01			0.01	Pass	
2,6-Dichlorophenol	mg/L	< 0.003			0.003	Pass	
4-Chloro-3-methylphenol	mg/L	< 0.01			0.01	Pass	
Pentachlorophenol	mg/L	< 0.01			0.01	Pass	
Tetrachlorophenols - Total	mg/L	< 0.03			0.03	Pass	
Method Blank							
Phenols (non-Halogenated)							

Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
2-Cyclohexyl-4,6-dinitrophenol	mg/L	< 0.1	0.1	Pass	
2-Methyl-4,6-dinitrophenol	mg/L	< 0.03	0.03	Pass	
2-Nitrophenol	mg/L	< 0.01	0.01	Pass	
2,4-Dimethylphenol	mg/L	< 0.003	0.003	Pass	
2,4-Dinitrophenol	mg/L	< 0.03	0.03	Pass	
2-Methylphenol (o-Cresol)	mg/L	< 0.003	0.003	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/L	< 0.006	0.006	Pass	
4-Nitrophenol	mg/L	< 0.03	0.03	Pass	
Dinoseb	mg/L	< 0.1	0.1	Pass	
Phenol	mg/L	< 0.003	0.003	Pass	
Method Blank					
Ferrous Iron - Fe2+	mg/L	< 0.05	0.05	Pass	
Nitrate (as N)	mg/L	< 0.02	0.02	Pass	
Sulphate (as SO4)	mg/L	< 5	5	Pass	
Method Blank					
Alkalinity (speciated)					
Total Alkalinity (as CaCO3)	mg/L	< 20	20	Pass	
Method Blank					
Heavy Metals					
Manganese (filtered)	mg/L	< 0.005	0.005	Pass	
LCS - % Recovery					
Total Recoverable Hydrocarbons					
TRH C6-C9	%	112	70-130	Pass	
TRH C10-C14	%	97	70-130	Pass	
Naphthalene	%	80	70-130	Pass	
Naphthalene	%	94	70-130	Pass	
TRH C6-C10	%	125	70-130	Pass	
TRH >C10-C16	%	96	70-130	Pass	
LCS - % Recovery					
BTEX					
Benzene	%	98	70-130	Pass	
Toluene	%	110	70-130	Pass	
Ethylbenzene	%	109	70-130	Pass	
m&p-Xylenes	%	103	70-130	Pass	
Xylenes - Total*	%	103	70-130	Pass	
LCS - % Recovery					
Dissolved Gases					
Methane	%	90	70-130	Pass	
LCS - % Recovery					
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	%	100	70-130	Pass	
Acenaphthylene	%	117	70-130	Pass	
Anthracene	%	78	70-130	Pass	
Benz(a)anthracene	%	110	70-130	Pass	
Benzo(a)pyrene	%	74	70-130	Pass	
Benzo(b&j)fluoranthene	%	105	70-130	Pass	
Benzo(g,h,i)perylene	%	107	70-130	Pass	
Benzo(k)fluoranthene	%	88	70-130	Pass	
Chrysene	%	96	70-130	Pass	
Dibenz(a,h)anthracene	%	112	70-130	Pass	
Fluoranthene	%	110	70-130	Pass	
Fluorene	%	109	70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	111	70-130	Pass	
Naphthalene	%	99	70-130	Pass	

Test	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code		
Phenanthrene	%	104	70-130	Pass			
Pyrene	%	100	70-130	Pass			
LCS - % Recovery							
Phenols (Halogenated)							
2-Chlorophenol	%	74	25-140	Pass			
2,4-Dichlorophenol	%	96	25-140	Pass			
2,4,5-Trichlorophenol	%	92	25-140	Pass			
2,4,6-Trichlorophenol	%	98	25-140	Pass			
2,6-Dichlorophenol	%	92	25-140	Pass			
4-Chloro-3-methylphenol	%	88	25-140	Pass			
Pentachlorophenol	%	83	25-140	Pass			
Tetrachlorophenols - Total	%	103	25-140	Pass			
LCS - % Recovery							
Phenols (non-Halogenated)							
2-Cyclohexyl-4,6-dinitrophenol	%	106	25-140	Pass			
2-Methyl-4,6-dinitrophenol	%	92	25-140	Pass			
2-Nitrophenol	%	98	25-140	Pass			
2,4-Dimethylphenol	%	104	25-140	Pass			
2,4-Dinitrophenol	%	76	25-140	Pass			
2-Methylphenol (o-Cresol)	%	84	25-140	Pass			
3&4-Methylphenol (m&p-Cresol)	%	78	25-140	Pass			
4-Nitrophenol	%	97	25-140	Pass			
Dinoseb	%	95	25-140	Pass			
Phenol	%	97	25-140	Pass			
LCS - % Recovery							
Ferrous Iron - Fe2+	%	101	70-130	Pass			
Nitrate (as N)	%	106	70-130	Pass			
Sulphate (as SO4)	%	103	70-130	Pass			
LCS - % Recovery							
Alkalinity (speciated)							
Total Alkalinity (as CaCO3)	%	91	70-130	Pass			
Test	Lab Sample ID	QA Source	Units	Result 1	Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery							
Total Recoverable Hydrocarbons				Result 1			
TRH C6-C9	M21-De29515	NCP	%	120	70-130	Pass	
Naphthalene	M21-De29515	NCP	%	79	70-130	Pass	
TRH C6-C10	M21-De29515	NCP	%	116	70-130	Pass	
Spike - % Recovery							
BTEX				Result 1			
Benzene	M21-De29515	NCP	%	93	70-130	Pass	
Toluene	M21-De29515	NCP	%	104	70-130	Pass	
Ethylbenzene	M21-De29515	NCP	%	103	70-130	Pass	
m&p-Xylenes	M21-De29515	NCP	%	98	70-130	Pass	
o-Xylene	M21-De29515	NCP	%	97	70-130	Pass	
Xylenes - Total*	M21-De29515	NCP	%	98	70-130	Pass	
Spike - % Recovery							
Polycyclic Aromatic Hydrocarbons				Result 1			
Acenaphthene	S21-De23060	NCP	%	95	70-130	Pass	
Acenaphthylene	S21-De23060	NCP	%	89	70-130	Pass	
Anthracene	S21-De23060	NCP	%	96	70-130	Pass	
Benz(a)anthracene	S21-De23060	NCP	%	81	70-130	Pass	
Benzo(a)pyrene	S21-De23060	NCP	%	94	70-130	Pass	
Benzo(b&j)fluoranthene	S21-De23060	NCP	%	88	70-130	Pass	
Benzo(g,h,i)perylene	S21-De23060	NCP	%	86	70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	S21-De23060	NCP	%	82			70-130	Pass	
Chrysene	S21-De23060	NCP	%	99			70-130	Pass	
Dibenz(a,h)anthracene	S21-De23060	NCP	%	74			70-130	Pass	
Fluoranthene	S21-De23060	NCP	%	92			70-130	Pass	
Fluorene	S21-De23060	NCP	%	87			70-130	Pass	
Indeno(1,2,3-cd)pyrene	S21-De23060	NCP	%	77			70-130	Pass	
Naphthalene	S21-De23060	NCP	%	104			70-130	Pass	
Phenanthrene	S21-De23060	NCP	%	88			70-130	Pass	
Pyrene	S21-De23060	NCP	%	105			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	S21-De23060	NCP	%	102			30-130	Pass	
2,4-Dichlorophenol	S21-De23060	NCP	%	40			30-130	Pass	
2,4,5-Trichlorophenol	S21-De23060	NCP	%	91			30-130	Pass	
2,4,6-Trichlorophenol	S21-De23060	NCP	%	92			30-130	Pass	
2,6-Dichlorophenol	S21-De23060	NCP	%	41			30-130	Pass	
4-Chloro-3-methylphenol	S21-De23060	NCP	%	101			30-130	Pass	
Pentachlorophenol	S21-De23060	NCP	%	91			30-130	Pass	
Tetrachlorophenols - Total	S21-De23060	NCP	%	95			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4,6-dinitrophenol	S21-De23060	NCP	%	89			30-130	Pass	
2-Methyl-4,6-dinitrophenol	S21-De23060	NCP	%	63			30-130	Pass	
2-Nitrophenol	S21-De23060	NCP	%	93			30-130	Pass	
2-Methylphenol (o-Cresol)	S21-De23060	NCP	%	61			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	S21-De23060	NCP	%	50			30-130	Pass	
4-Nitrophenol	S21-De23060	NCP	%	48			30-130	Pass	
Dinoseb	S21-De23060	NCP	%	85			30-130	Pass	
Phenol	S21-De23060	NCP	%	50			30-130	Pass	
Spike - % Recovery									
				Result 1					
Nitrate (as N)	M21-De26566	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Dissolved Gases				Result 1					
Methane	M21-De29701	CP	%	87			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M21-De29707	CP	%	119			70-130	Pass	
TRH >C10-C16	M21-De29707	CP	%	119			70-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2,4-Dinitrophenol	B21-De10234	NCP	%	41			30-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons				Result 1					
TRH C10-C14	M21-De35756	CP	%	114			70-130	Pass	
TRH >C10-C16	M21-De35756	CP	%	114			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C6-C9	M21-De29516	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Naphthalene	M21-De29516	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
TRH C6-C10	M21-De29516	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M21-De29516	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	M21-De29516	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	M21-De29516	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	M21-De29516	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	M21-De29516	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total*	M21-De29516	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2,6-Dichlorophenol	B21-De29567	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ferrous Iron - Fe2+	N21-De23029	NCP	mg/L	3.5	3.5	<1	30%	Pass	
Sulphate (as SO4)	M21-De29700	CP	mg/L	2900	2900	3.0	30%	Pass	
Duplicate									
Dissolved Gases				Result 1	Result 2	RPD			
Methane	M21-De29702	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Nitrate (as N)	M21-De29703	CP	mg/L	0.35	0.35	2.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD			
TRH C10-C14	M21-De35750	CP	mg/L	0.52	0.81	44	30%	Fail	Q02
TRH C15-C28	M21-De35750	CP	mg/L	1.2	1.9	48	30%	Fail	Q02
TRH C29-C36	M21-De35750	CP	mg/L	< 0.1	0.1	43	30%	Fail	Q02
TRH >C10-C16	M21-De35750	CP	mg/L	0.86	1.4	45	30%	Fail	Q02
TRH >C16-C34	M21-De35750	CP	mg/L	0.9	1.4	49	30%	Fail	Q02
TRH >C34-C40	M21-De35750	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g,h,i)perylene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a,h)anthracene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	M21-De35750	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M21-De35750	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4-Dichlorophenol	M21-De35750	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
2,4,5-Trichlorophenol	M21-De35750	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
2,4,6-Trichlorophenol	M21-De35750	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
4-Chloro-3-methylphenol	M21-De35750	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Pentachlorophenol	M21-De35750	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Tetrachlorophenols - Total	M21-De35750	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass	

Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4.6-dinitrophenol	M21-De35750	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4.6-dinitrophenol	M21-De35750	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	M21-De35750	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2.4-Dimethylphenol	M21-De35750	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2.4-Dinitrophenol	M21-De35750	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	M21-De35750	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M21-De35750	CP	mg/L	< 0.006	< 0.006	<1	30%	Pass
4-Nitrophenol	M21-De35750	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	M21-De35750	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	M21-De35750	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Sulphate (as SO4)				Result 1	Result 2	RPD		
	M21-De35750	CP	mg/L	320	330	1.0	30%	Pass
Duplicate								
Alkalinity (speciated)				Result 1	Result 2	RPD		
Total Alkalinity (as CaCO3)	M21-De35750	CP	mg/L	230	240	1.0	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Manganese (filtered)	M21-De35750	CP	mg/L	2.0	2.0	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C10-C14	M21-De35752	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH C15-C28	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH C29-C36	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C10-C16	M21-De35752	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benz(a)anthracene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1.2.3-cd)pyrene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	M21-De35752	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	M21-De35752	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2.4-Dichlorophenol	M21-De35752	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2.4.5-Trichlorophenol	M21-De35752	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2.4.6-Trichlorophenol	M21-De35752	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
4-Chloro-3-methylphenol	M21-De35752	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Pentachlorophenol	M21-De35752	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Tetrachlorophenols - Total	M21-De35752	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass

Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	M21-De35752	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	M21-De35752	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	M21-De35752	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	M21-De35752	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	M21-De35752	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M21-De35752	CP	mg/L	< 0.006	< 0.006	<1	30%	Pass
4-Nitrophenol	M21-De35752	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	M21-De35752	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	M21-De35752	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons				Result 1	Result 2	RPD		
TRH C10-C14	M21-De35755	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH C15-C28	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH C29-C36	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C10-C16	M21-De35755	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass
TRH >C16-C34	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
TRH >C34-C40	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD		
Acenaphthene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Acenaphthylene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Anthracene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)anthracene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(a)pyrene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(b&j)fluoranthene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(g,h,i)perylene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Benzo(k)fluoranthene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Chrysene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Dibenz(a,h)anthracene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluoranthene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Fluorene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Indeno(1,2,3-cd)pyrene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Naphthalene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Phenanthrene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Pyrene	M21-De35755	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass
Duplicate								
Phenols (Halogenated)				Result 1	Result 2	RPD		
2-Chlorophenol	M21-De35755	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dichlorophenol	M21-De35755	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4,5-Trichlorophenol	M21-De35755	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4,6-Trichlorophenol	M21-De35755	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
4-Chloro-3-methylphenol	M21-De35755	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Pentachlorophenol	M21-De35755	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
Tetrachlorophenols - Total	M21-De35755	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
2-Cyclohexyl-4,6-dinitrophenol	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
2-Methyl-4,6-dinitrophenol	M21-De35755	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Nitrophenol	M21-De35755	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass
2,4-Dimethylphenol	M21-De35755	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
2,4-Dinitrophenol	M21-De35755	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
2-Methylphenol (o-Cresol)	M21-De35755	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass
3&4-Methylphenol (m&p-Cresol)	M21-De35755	CP	mg/L	< 0.006	< 0.006	<1	30%	Pass

Duplicate								
Phenols (non-Halogenated)				Result 1	Result 2	RPD		
4-Nitrophenol	M21-De35755	CP	mg/L	< 0.03	< 0.03	<1	30%	Pass
Dinoseb	M21-De35755	CP	mg/L	< 0.1	< 0.1	<1	30%	Pass
Phenol	M21-De35755	CP	mg/L	< 0.003	< 0.003	<1	30%	Pass

DRAFT

Comments
Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause

Authorised by:

Michael Morrison	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
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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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2144789

Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR DYLAN BYFORD	Contact	: Peter Ravlic
Address	: 11/14 Winnellie Road WINNELLIE NT, AUSTRALIA 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: dylan.byford@greencap.com.au	E-mail	: peter.ravlic@alsglobal.com
Telephone	: +61 08 8299 9955	Telephone	: +6138549 9645
Facsimile	: +61 08 8362 9776	Facsimile	: +61-2-8784 8500
Project	: J168829 ORA Diesel Spill	Page	: 1 of 2
Order number	: ----	Quote number	: EM2018ADEENV0002 (EN/333 - secondary work only)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Berrimah Freight Terminal		
Sampler	: VARUN BHAGWAT		

Dates

Date Samples Received	: 14-Dec-2021 07:00	Issue Date	: 14-Dec-2021
Client Requested Due Date	: 22-Dec-2021	Scheduled Reporting Date	: 22-Dec-2021

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: 5.6° C
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.



QUALITY CONTROL REPORT

Work Order : ES2144789

Page : 1 of 6

Client : GREENCAP-NAA PTY LTD
 Contact : MR DYLAN BYFORD
 Address : 11/14 Winnellie Road
 WINNELLIE NT, AUSTRALIA 0820
 Telephone : +61 08 8299 9955
 Project : J168829 ORA Diesel Spill
 Order number : ----
 C-O-C number : ----
 Sampler : VARUN BHAGWAT
 Site : Berrimah Freight Terminal
 Quote number : EN/333 - secondary work only
 No. of samples received : 1
 No. of samples analysed : 1

Laboratory : Environmental Division Sydney
 Contact : Peter Ravlic
 Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
 Telephone : +6138549 9645
 Date Samples Received : 14-Dec-2021
 Date Analysis Commenced : 15-Dec-2021
 Issue Date : 22-Dec-2021



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.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	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 moisture content, insufficient sample (reduced weight employed) or matrix interference.

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 sample ID	Sample ID	Method/Compound	CAS Number	LOR	Unit	Laboratory Duplicate (DUP) Report		Acceptable RPD (%)
						Original Result	Duplicate Result	
ED037P: Alkalinity by PC Titrator (QC Lot: 4084991)								
ES2145861-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	518	568	9.1
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	518	568	9.1
ES2145861-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	522	514	1.7
		ED037-P: Total Alkalinity as CaCO3	---	1	mg/L	522	514	1.7
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4077076)								
ES2145467-008	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	529	518	2.0
ES2145414-007	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	210	202	3.7
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4086330)								
ES2144789-001	QC01A	EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.39	1.37	1.5
ES2145466-001	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.002	0.003	0.0
EG051G: Ferrous Iron by Discrete Analyser (QC Lot: 4080691)								
ES2144652-010	Anonymous	EG051G: Ferrous Iron	---	0.05	mg/L	20.4	21.2	3.6
ES2145275-005	Anonymous	EG051G: Ferrous Iron	---	0.05	mg/L	9.76	9.30	4.8
EP033: C1 - C4 Hydrocarbon Gases (QC Lot: 4077724)								
EM2124964-003	Anonymous	EP033: Methane	74-82-8	10	µg/L	16	17	7.3
EP2115052-001	Anonymous	EP033: Methane	74-82-8	10	µg/L	<10	<10	0.0
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4082181)								
ES2144789-001	QC01A	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0
ES2145173-001	Anonymous	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0



Page : 4 of 6
 Work Order : ES2144789
 Client : GREENCAP-NAA PTY LTD
 Project : J168829 ORA Diesel Spill

Method Blank (MB) and Laboratory Control Sample (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 Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method/Compound	CAS Number	LOR	Unit	Method Blank (MB) Report		Laboratory Control Spike (LCS) Report		
				Result	Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 4084991)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.1	81.0	111
					50 mg/L	104	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4077076)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.0	82.0	122
				<1	500 mg/L	97.8	82.0	122
EG020F: Dissolved Metals by ICP-MS (QCLot: 4086330)								
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.4	82.0	110
EG051G: Ferrous Iron by Discrete Analyser (QCLot: 4080691)								
EG051G: Ferrous Iron	----	0.05	mg/L	<0.05	2 mg/L	103	89.0	117
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4077724)								
EP033: Methane	74-82-8	10	µg/L	<10	28.48 µg/L	103	86.0	114
EP075(SIM)A: Phenolic Compounds (QCLot: 4077765)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	35.6	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	71.5	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	68.1	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	67.9	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	75.4	48.0	100
EP075(SIM): 2,4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	67.9	49.0	99.0
EP075(SIM): 2,4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	67.6	53.0	105
EP075(SIM): 2,6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	67.9	57.0	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	77.2	53.0	99.0
EP075(SIM): 2,4,6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	70.2	50.0	106
EP075(SIM): 2,4,5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	78.8	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	35.5	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4077765)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	77.5	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	76.0	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	81.4	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	90.4	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	85.4	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	85.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	87.6	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	89.7	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	72.2	64.1	117



Sub-Matrix: WATER				Method Blank (MB) Report		Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4077766) - continued									
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	73.5	62.5	116	
EP075(SIM): Benzo(b+f)fluoranthene	205-99-2	1	µg/L	<1.0	5 µg/L	71.8	61.7	119	
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	76.6	63.0	115	
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	68.0	63.3	117	
EP075(SIM): Indeno(1,2,3-cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	68.5	59.9	118	
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	73.6	61.2	117	
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	75.4	59.1	118	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4077766)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	72.5	55.8	112	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	79.5	71.6	113	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	82.6	56.0	121	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4082181)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	99.4	75.0	127	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4077766)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	80.9	57.9	119	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	83.5	62.5	110	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	85.3	61.5	121	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4082181)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	106	75.0	127	
EP080: BTEXN (QCLot: 4082181)									
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	93.8	70.0	122	
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	103	69.0	123	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	110	70.0	120	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	112	69.0	121	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	113	72.0	122	
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	115	70.0	120	

Matrix Spike (MS) Report

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

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	SpikeRecovery(%)	MS
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4077076)						
ES2144789-001	QC01A					
				Acceptable Limits (%)	Low	High



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 Work Order : ES2144789
 Client : GREENCAP-NAA PTY LTD
 Project : J168829 ORA Diesel Spill

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	SpikeRecovery(%) MS	Acceptable Limits (%)
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4077076) - continued						
ES2144789-001	QC01A	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 4086330)						
ES2145173-001	Anonymous	EG020A-F: Manganese	7439-96-5	1 mg/L	95.2	130
EG051G: Ferrrous Iron by Discrete Analyser (QCLot: 4080691)						
ES2144652-010	Anonymous	EG051G: Ferrous Iron	---	1 mg/L	# Not Determined	130
EP033: C1 - C4 Hydrocarbon Gases (QCLot: 4077724)						
EM2124964-004	Anonymous	EP033: Methane	74-82-8	28.48 µg/L	95.4	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4082181)						
ES2144789-001	QC01A	EP080: C6 - C9 Fraction	----	325 µg/L	107	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4082181)						
ES2144789-001	QC01A	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	108	130
EP080: BTEXN (QCLot: 4082181)						
ES2144789-001	QC01A	EP080: Benzene	71-43-2	25 µg/L	102	130
		EP080: Toluene	108-88-3	25 µg/L	98.2	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	103	130
		EP080: ortho-Xylene	106-42-3	25 µg/L	105	130
		EP080: Naphthalene	91-20-3	25 µg/L	95.5	130



Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2144789	Page	: 1 of 7
Client	: GREENCAP-NAA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR DYLAN BYFORD	Telephone	: +6138549 9645
Project	: J168829 ORA Diesel Spill	Date Samples Received	: 14-Dec-2021
Site	: Berrimah Freight Terminal	Issue Date	: 22-Dec-2021
Sampler	: VARUN BHAGWAT	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

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.



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 Work Order : ES2144789
 Client : GREENCAP-NAA PTY LTD
 Project : J168829 ORA Diesel Spill

Outliers : Quality Control Samples
 Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2144789--001	QC01A	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EG051G: Ferrous Iron by Discrete Analyser	ES2144652--010	Anonymous	Ferrous Iron	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: WATER

Method	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EG051G: Ferrous Iron by Discrete Analyser						
Clear Plastic Bottle - HCl QC01A	----	----	----	16-Dec-2021	09-Dec-2021	7
EP075(SIM)A: Phenolic Compounds						
Amber Glass Bottle - Unpreserved QC01A	16-Dec-2021	15-Dec-2021	1	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Amber Glass Bottle - Unpreserved QC01A	16-Dec-2021	15-Dec-2021	1	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Amber Glass Bottle - Unpreserved QC01A	16-Dec-2021	15-Dec-2021	1	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Amber Glass Bottle - Unpreserved QC01A	16-Dec-2021	15-Dec-2021	1	----	----	----

Outliers : Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Count			Rate (%)		Quality Control Specification
	QC	Regular	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
PAH/Phenols (GC/MS - SIM)	0	14	0.00	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	0	16	0.00	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)						
PAH/Phenols (GC/MS - SIM)	0	14	0.00	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	0	16	0.00	0.00	5.00	NEPM 2013 B3 & ALS QC Standard