APPENDIX 3
EIL CALCULATIONS

Inputs
Select contaminant from list below
As
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Arsenic generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	20	40
Urban residential and open public spaces	50	100
Commercial and industrial	80	160

Inputs
Select contaminant from list below
Cr_III
Below needed to calculate fresh and aged ACLs
Enter % clay (values from 0 to 100%)
4
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cr III soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	100
Urban residential and open public spaces	190	300
Commercial and industrial	270	500

Inputs
Select contaminant from list below
Cu
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
13
Enter soil pH (calcium chloride method) (values from 1 to 14)
6.4
Enter organic carbon content (%OC) (values from 0 to 50%)
1
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Cu soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	70	85
Urban residential and open public spaces	120	220
Commercial and industrial	180	310

Inputs
Select contaminant from list below
Ni
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
13
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Ni soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	35	40
Urban residential and open public spaces	90	200
Commercial and industrial	150	350

Inputs
Select contaminant from list below
Pb
Below needed to calculate fresh and aged ACLs
Below needed to calculate fresh and aged ABCs
or for fresh ABCs only
or for aged ABCs only

Outputs		
Land use	Lead generic EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	110	470
Urban residential and open public spaces	270	1100
Commercial and industrial	440	1800

Inputs
Select contaminant from list below
Zn
Below needed to calculate fresh and aged ACLs
Enter cation exchange capacity (silver thiourea method) (values from 0 to 100 cmolc/kg dwt)
13
Enter soil pH (calcium chloride method) (values from 1 to 14)
6.4
Below needed to calculate fresh and aged ABCs
Measured background concentration (mg/kg). Leave blank if no measured value
or for fresh ABCs only
Enter iron content (aqua regia method) (values from 0 to 50%) to obtain estimate of background concentration
7
or for aged ABCs only
Enter State (or closest State)
NSW
Enter traffic volume (high or low)
low

Outputs		
Land use	Zn soil-specific EILs (mg contaminant/kg dry soil)	
	Fresh	Aged
National parks and areas of high conservation value	80	190
Urban residential and open public spaces	220	570
Commercial and industrial	340	850

APPENDIX 4
CALIBRATION CERTIFICATES

PAS

Soil QC Sheet

Certificate of Calibration

Revision Date: September 2014

Serial Number:	58027	Model:	XL3t 500	Software:	8.4J.14
Resolution: Shaping 20	178.1	Escale: Shaping 20	7.31	Source:	Tube

Date of Q.C.: 22-January-2021
Inspector: Dave S
Calibration type: **Empirical**

60 second analysis time per filter, all switched on

Elements that are in BLUE BOLD should be detected

Elements not in BLUE BOLD need not be detected but record if present

NIST HIGH 2710	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	**707**	**507**	**978**	**750.79**	44.7	OK	
Cs	107	0	400	**66.34**	9.93	OK	
Te	NR	-300	300	**103.85**	35.58	OK	
Sb	38.4	-100	110	**50.1**	11.87	OK	
Sn	NR	-100	100	**68.46**	15.1	OK	
Cd	21.8	-10	50	**28.25**	6.75	OK	
Ag	35.3	0	60	**36.47**	5.46	OK	
Pd	NR	-70	70	**4.99**	7.46	OK	< LOD
Mo	19	0	30	**18.83**	5.37	OK	
Zr	NR			**119.4**	7.66		
Sr	**330**	**280**	**380**	**315.18**	9.81	OK	
U	25	10	40	**26.78**	12.06	OK	
Rb	***120***	**80**	**160**	**122.88**	7.91	OK	
Th	13	-80	80	**47.98**	20.9	OK	
Pb	**5532**	**5400**	**5832**	**5535.76**	80.74	OK	
Se	NR	-30	30	**-13.39**	6.75	OK	< LOD
As	**626**	**510**	**750**	**713.0**	66.1	OK	
Hg	32.6	0	50	**35.6**	13.7	OK	
Au		-20	25	**-4.9**	12.1	OK	< LOD
Zn	**6952**	**6700**	**7250**	**6897.2**	113.5	OK	
W	**93**	**0**	**400**	**107.4**	91.5	OK	< LOD
Cu	**2950**	**2700**	**3250**	**2892.0**	85.2	OK	
Ni	14.3	0	105	**57.80**	38.44	OK	
Co	10	-270	270	**-114.31**	129.99	OK	< LOD
Fe	**33800**	**30420**	**37180**	**36881.7**	493.11	OK	
Mn	**10100**	**9500**	**12000**	**9869.4**	304.3	OK	
Cr	39	-100	120	**48.39**	23.61	OK	
V	76.6	-200	300	**94.94**	47.44	OK	
Ti	2830	2260	3500	**2738.68**	148.73	OK	
Sc	8.7	-160	160	**41.05**	29.23	OK	< LOD
Ca	**12500**	**8000**	**17000**	**10337.2**	310.70	OK	
K	**21100**	**16100**	**26100**	**20173.3**	584.76	OK	
S	2400	-140000	140000	**4470.86**	1170.01	OK	

SiO2 (Blank)	Expected**	Low	High	Measured	Err	Pass	<LOD?
Ba	**0**	-200	200	**-51.62**	29.91	OK	< LOD
Cs	**0**	-260	260	**-11.24**	7.15	OK	< LOD
Te	**0**	-220	220	**-2.05**	26.08	OK	< LOD
Sb	**0**	-120	80	**-2.29**	8.51	OK	< LOD
Sn	**0**	-120	70	**-0.63**	-0.63	OK	
Cd	**0**	-50	50	**-5.49**	4.59	OK	< LOD
Ag	**0**	-30	30	**-0.65**	3.42	OK	< LOD
Pd	**0**	-50	50	**-7.38**	5.28	OK	< LOD
Mo	**0**	-10	10	**1.79**	3.44	OK	< LOD
Zr	**0**	-10	10	**1.04**	2.03	OK	< LOD
Sr	**0**	-10	10	**-2.02**	1.27	OK	< LOD
U	**0**	-10	10	**1.44**	3.71	OK	< LOD
Rb	**<210**	-10	210	**0.3**	1.5	OK	< LOD
Th	**0**	-10	10	**-1.49**	2.65	OK	< LOD
Pb	**0**	-10	10	**-2.69**	4.75	OK	< LOD
Se	**0**	-20	20	**-7.97**	2.08	OK	< LOD
As	**0**	-10	10	**0.16**	3.48	OK	< LOD
Hg	**0**	-10	10	**1.13**	4.22	OK	< LOD
Au	**0**	-10	10	**-0.85**	3.04	OK	< LOD
Zn	**0**	-10	10	**-17.24**	5.79	OK	< LOD
W	**0**	-60	60	**-7.16**	25.51	OK	< LOD
Cu	**0**	-20	20	**-0.74**	11.47	OK	< LOD
Ni	**0**	-70	70	**-3.66**	18.81	OK	< LOD
Co	**0**	-50	50	**10.52**	11.75	OK	< LOD
Fe	**0**	-50	50	**24.42**	24.31	OK	< LOD
Mn	**0**	-100	300	**-4.34**	26.65	OK	< LOD
Cr	**0**	-120	120	**-1.18**	10.03	OK	< LOD
V	**0**	-160	160	**-1.44**	8.2	OK	< LOD
Ti	**0**	-700	700	**20.26**	19.81	OK	< LOD
Sc	**0**	-100	100	**-0.67**	2.84	OK	< LOD
Ca	**0**	-2000	2000	**8.49**	18.84	OK	< LOD
K	**0**	-3000	3000	**22.65**	59.66	OK	< LOD
S	**0**	-140000	140000	**54.49**	252.46	OK	< LOD

NIST LOW 2709	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	**968**	**638**	**1238**	**773.93**	39.45	OK	
Cs	5.3	-300	300	**24.32**	8.54	OK	
Te	NR	-300	300	**11.22**	30.74	OK	< LOD
Sb	7.9	-90	100	**-2.63**	9.98	OK	< LOD
Sn	NR	-100	100	**24.37**	12.91	OK	
Cd	0.38	-60	60	**-6.16**	5.37	OK	< LOD
Ag	0.41	-40	40	**-4.23**	3.92	OK	< LOD
Pd	NR	-60	60	**-0.87**	6.41	OK	< LOD
Mo	2	-10	10	**2.25**	4.38	OK	< LOD
Zr	**160**	**120**	**200**	**161.74**	6.56	OK	
Sr	**231**	**180**	**300**	**216.95**	7.08	OK	
U	3	-80	80	**2.81**	7.76	OK	< LOD
Rb	**96**	**76**	**115**	**80.10**	5.28	OK	
Th	11	-80	80	**14.58**	4.90	OK	
Pb	18.9	0	35	**6.85**	6.71	OK	< LOD
Se	1.57	-30	30	**-8.11**	3.08	OK	< LOD
As	17.7	0	35	**7.87**	5.31	OK	< LOD
Hg	1.4	-10	10	**6.8**	6.2	OK	< LOD
Au		-15	15	**-3.9**	3.8	OK	< LOD
Zn	**106**	**50**	**160**	**51.34**	13.07	OK	
W	2	-80	80	**26.52**	37.16	OK	< LOD
Cu	34.6	0	60	**46.23**	17.86	OK	
Ni	88	0	125	**61.48**	30.06	OK	
Co	13.4	-250	280	**63.2**	103.68	OK	< LOD
Fe	**35000**	**25000**	**35000**	**29367.32**	379.49	OK	
Mn	538	0	700	**394.9**	69.8	OK	
Cr	130	30	200	**134.7**	23.2	OK	
V	112	-300	400	**147.6**	47.4	OK	
Ti	**3420**	**2700**	**4400**	**3532.2**	149.7	OK	
Sc	NR	-250	250	**0.5**	33.6	OK	< LOD
Ca	**18900**	**13900**	**27000**	**19249.0**	369.8	OK	
K	**20300**	**15300**	**25300**	**18618.7**	514.8	OK	
S	890	-150000	150000	**1359.3**	848.8	OK	

RCRA	Expected**	Low	High	Measured	Err	Pass	<LOD?
Ba				**617.83**	43.17		
Cs				**64.1**	9.73		
Te				**93.04**	34.99		
Sb	**0**	**0**	**0**	**27.56**	12.3		
Sn	0	0	0	**71.83**	15.91		
Cd	**500**	**400**	**600**	**513.41**	13.01	OK	
Ag	**500**	**400**	**600**	**515.93**	12.21	OK	
Pd				**22.32**	8.89		
Mo				**-0.98**	4.92		
Zr				**237.69**	8.29		
Sr	NA			**189.08**	7.31		
U				**4.56**	8.72		
Rb	NA			**81.67**	5.94		
Th				**15.37**	7.86		
Pb	**500**	**400**	**600**	**486.81**	27.88	OK	
Se	**500**	**400**	**600**	**508.08**	20.02	OK	
As	**500**	**400**	**600**	**442.62**	26.36	OK	
Hg	NA			**5.37**	8.26		
Au				-4.51	15.21		
Zn	NA			**36.41**	14.1		
W				**57.53**	45.16		
Cu	NA			**38.47**	20.27		
Ni	NA			**54.52**	36.45		
Co	NA			**210.39**	148.51		
Fe	NA			**49329.11**	539.57		
Mn	NA			**827.95**	102.53		
Cr (variable)	**500**			**400.56**	32.19		
V				**132.82**	52.18		
Ti				**3854.77**	167.53		
Sc				**28.81**	47.17		
Ca				**31567.24**	513.3		
K				**19100.98**	578.1		
S				**1934.88**	1053.81		

GBW 07411	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	**550**	**320**	**800**	**608.31**	42.91	OK	
Cs	9	-457	457	**41.69**	9.59	OK	
Te	NR	-300	300	**69.67**	34.56	OK	
Sb	9	-80	100	**21.32**	11.36	OK	
Sn	NR	-120	120	**106.1**	15.06	OK	
Cd	28	0	47	**32.57**	6.72	OK	
Ag	5	-35	47	**7.17**	4.65	OK	
Pd	NR	-60	60	**-6.54**	6.89	OK	< LOD
Mo	2	-9	9	**3.41**	5.06	OK	< LOD
Zr	**192**	**25**	**359**	**197.95**	7.99	OK	
Sr	**130**	**95**	**159**	**133.49**	6.47	OK	
U	3	-19	19	**3.08**	9.45	OK	< LOD
Rb	**111**	**61**	**120**	**104.29**	6.86	OK	
Th	**13**	**-18**	**45**	**31.63**	15.04	OK	
Pb	**2700**	**2324**	**2900**	**2733.48**	56.23	OK	
Se	1	-10	15	**-14.91**	5.17	OK	< LOD
As	205	127	283	**173.88**	44.57	OK	
Hg	0	-10	50	**-1.50**	9.71	OK	< LOD
Au		-10	15	**-3.55**	8.47	OK	< LOD
Zn	**3800**	**2711**	**4880**	**3725.91**	82.24	OK	
W	7	-184	184	**56.35**	70.80	OK	< LOD
Cu	**65**	**42**	**80**	**63.08**	23.00	OK	
Ni	24	-35	117	**47.64**	37.50	OK	< LOD
Co	12	-232	232	**26.86**	13.74	OK	
Fe		**0**	**60000**	**59369.55**	612.49	OK	
Mn	9700	4561	10643	**9657.5**	298.6	OK	
Cr	60	-317	380	**48.0**	27.9	OK	
V	89	-325	380	**157.4**	60.9	OK	
Ti	**4100**	**3283**	**4917**	**4469.4**	195.0	OK	
Sc	11	-300	300	**14.3**	51.6	OK	< LOD
Ca		**0**	**365000**	**30755.6**	562.5	OK	
K		**0**	**25000**	**17988.9**	625.9	OK	
S		-16000	16000	**1902.4**	1214.5	OK	

DL1a	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	ND			**214.82**	33.44		
Cs	ND			**-1.08**	7.71		
Te	ND			**-10.6**	27.91		
Sb	ND			**-7.93**	**9.07**		
Sn	ND			**4.64**	11.55		
Cd	ND			**-4.42**	4.93		
Ag	ND			**-4.45**	3.57		
Pd	ND			**-4.09**	5.75		
Mo	ND			**4.99**	4.17		
Zr	ND			**90.97**	4.63		
Sr	ND			**13.83**	2.27		
U	**116**	**93**	**140**	**113.78**	10.99	OK	
Rb	ND			**94.05**	5.97		
Th	**76**	**60**	**92**	**66.57**	7.24	OK	
Pb	ND			**58.15**	9.12		
Se	ND			**-11.50**	2.71		
As	ND			**-2.38**	6.61		
Hg	ND			**5.2**	5.4		
Au	ND			**0.8**	4.1		
Zn	ND			**23.25**	10.13		
W	ND			**15.20**	31.72		
Cu	ND			**9.45**	13.95		
Ni	ND			**19.13**	23.59		
Co	ND			**70.48**	44.85		
Fe	**9000**			**5524.24**	154.44		
Mn	ND			**49.0**	37.2		
Cr	ND			**47.3**	12.6		
V	ND			**28.4**	20.6		
Ti	900			**949.3**	63.4		
Sc	ND			**7.0**	9.7		
Ca	3000			**2401.7**	120.0		
K	2000			**23718.5**	403.9		
S	4000			**1374.4**	502.2		

PAS

Soil QC Sheet

Revision Date: July 2010

Certificate of Calibration

Serial Number:	58027	Model:	XL3t 500	Software:	8.4J.14	Date of Q.C.:	22-January-2021
Resolution: Shaping 20	178.1	Escale: Shaping 20	7.31	Source:	Tube	Inspector:	Dave S
						Calibration type:	Empirical

60 second analysis time per filter, all switched on

Elements that are in BLUE BOLD should be detected

Elements not in BLUE BOLD need not be detected but record if present

TILL4	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	**395**	**195**	**610**	448.11	39.28	OK	
Cs	12	-300	300	37.27	8.94	OK	
Te	NR	-300	300	48.51	32.21	OK	
Sb	1	-100	100	16.94	10.56	OK	
Sn	NR	-100	100	55.54	13.64	OK	
Cd	NR	-70	70	1.7	5.73	OK	< LOD
Ag	NR	-50	50	0.15	4.18	OK	< LOD
Pd	NR	-60	60	-5.62	6.48	OK	< LOD
Mo	16	0	30	11.88	5.09	OK	
Zr	385	185	585	402.11	9.5	OK	
Sr	**109**	**50**	**150**	115.98	5.48	OK	
U	5	**-20**	**20**	-2.79	9.39	OK	< LOD
Rb	**161**	**100**	**210**	161.85	7.40	OK	
Th	17.4	-40	70	50.73	7.38	OK	
Pb	50	28	70	31.37	8.81	OK	
Se	NR	-15	15	-9.89	3.98	OK	< LOD
As	111	80	140	114.35	10.49	OK	
Hg	NR	-15	15	2.5	8.2	OK	< LOD
Au		-10	10	4.7	5.6	OK	< LOD
Zn	70	45	95	45.14	13.63	OK	
W	**204**	**130**	**270**	222.50	50.02	OK	
Cu	**237**	**200**	**280**	236.48	26.83	OK	
Ni	17	-50	90	31.02	30.51	OK	< LOD
Co	8	-300	300	41.28	117.09	OK	< LOD
Fe	**39700**	**29700**	**49700**	35744.54	430.61	OK	
Mn	490	300	600	384.3	72.6	OK	
Cr	53	-50	150	52.9	21.6	OK	
V	67	-150	250	77.7	48.1	OK	
Ti	**4840**	**3870**	**5808**	4669.3	162.0	OK	
Sc	10	-150	150	12.4	23.6	OK	< LOD
Ca	NR			7323.6	260.9		
K	NR			25681.0	618.5		
S	800	-130000	130000	1292.8	867.4	OK	< LOD

NIST2780	Certified	Low	High	Measured	Err	Pass	<LOD?
Ba	**993**	**844**	**1142**	1056.68	44.82	OK	
Cs	13	-10	100	70.44	9.64	OK	
Te		0	150	141.75	34.8	OK	
Sb	160	100	250	173.39	12.61	OK	
Sn		-20	100	80.01	14.78	OK	
Cd	12.1	5	30	15.28	6.29	OK	
Ag	27	0	120	31.88	5.19	OK	
Pd		-15	15	-0.14	7.04	OK	< LOD
Mo	11	0	20	9.02	5.04	OK	
Zr	176	131	220	183.95	7.98	OK	
Sr	**217**	**195**	**239**	229.58	8.09	OK	
U	4	-20	20	11.25	11.27	OK	< LOD
Rb	175	140	210	162.39	8.29	OK	
Th	12	0	55	48.17	19.46	OK	
Pb	**5770**	**4904**	**6635**	5148.08	74.58	OK	
Se	5	-10	10	-14.68	5.98	OK	< LOD
As	48.8	0	90	1.74	57.24	OK	< LOD
Hg		-15	15	1.6	9.4	OK	< LOD
Au		-20	20	2.1	10.5	OK	< LOD
Zn	**2570**	**1800**	**3340**	2100.81	60.42	OK	
W		-100	100	56.17	59.16	OK	< LOD
Cu	**215.5**	**151**	**280**	179.58	27.06	OK	
Ni		-100	100	13.87	33.10	OK	< LOD
Co		-200	200	81.65	105.37	OK	< LOD
Fe	**27840**	**22272**	**33408**	25021.21	382.99	OK	
Mn	**462**	**415**	**508**	420.4	77.5	OK	
Cr		0	70	57.6	19.7	OK	
V	268	150	350	264.7	53.9	OK	
Ti	**6990**	**6291**	**7689**	6707.9	175.2	OK	
Sc	23	3	33	6.1	13.3	OK	< LOD
Ca	1950	1000	3000	1705.4	162.3	OK	
K	**33800**	**30420**	**37180**	34015.2	631.6	OK	
S	**12630**	**5000**	**15000**	11083.6	1312.2	OK	

This certificate is issued in accordance with Thermo Fisher Scientific factory specifications.
The measurements were found to be within specification limits at the time of calibration.
This certificate is valid for 2 years from the date of calibration.

Standards are traceable to National Institute of Standards & Technology (NIST) standards.
**** - Not Certified**

Signed:

Dave Scattergood
Service Manager

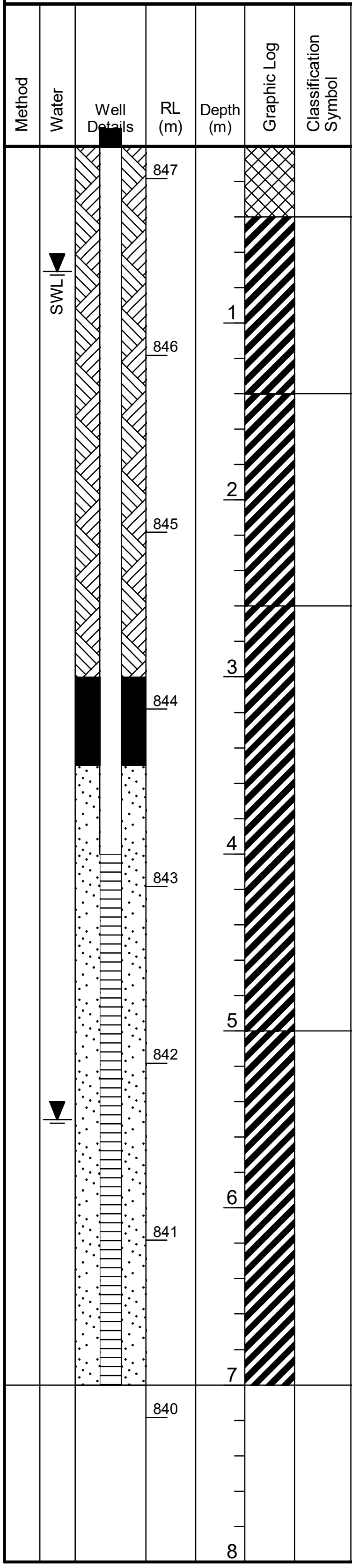
APPENDIX 5
BORE LOGS

BOREHOLE NUMBER GW01

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 7/6/21 **COMPLETED** 7/6/21 **R.L. SURFACE** 847.183 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Solid Flight Auger **HOLE LOCATION** 721402.01E,6058259.223N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES



Material Description	Samples Tests Remarks	Additional Observations
FILL; silty CLAY, dark brown, soft, minor sand and gravels, high plasticity, moist	GW01_0.0, XRF 93ppm GW01_0.1, XRF 229ppm	
CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	GW01_0.2, XRF 355ppm GW01_0.3, XRF 399ppm GW01_0.4, XRF 101ppm GW01_0.5, XRF 97ppm GW01_1.0, XRF 123ppm	
CLAY; natural, orange-brown, high plasticity, hard, moist	GW01_2.0, XRF 280ppm	
CLAY; natural, brown, very hard, minor gravels, dry, low plasticity, minor sands (weathered bedrock)	GW01_3.0, XRF 504ppm GW01_4.0, XRF 308ppm	
CLAY; natural, with silt, brown, soft, low plasticity, moist to wet		
Borehole GW01 terminated at 7m		

BOREHOLE NUMBER GW02

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 7/6/21 **COMPLETED** 7/6/21 **R.L. SURFACE** 843.612 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Solid Flight Auger **HOLE LOCATION** 721525.593E, 6058675.09N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; silty SAND, brown, loose, moist, low plasticity silts, rootlets, medium grained sands	GW03_0.0, XRF 607ppm	
							CLAY; natural, brown, moist, with sands and minor gravel, high plasticity, soft	GW03_0.1, XRF 891ppm GW03_0.2, XRF 385ppm	
	SWL		843	1			CLAY; natural, brown, moist, high plasticity, soft	GW03_0.3, XRF 247ppm GW03_0.4, XRF 214ppm GW03_0.5, XRF 361ppm GW03_1.0, XRF 354ppm	
			842	2			CLAY; natural, brown with orange/grey mottling, soft, high plasticity, wet	GW03_2.0, XRF 422ppm	
			841 840	3 4			CLAY; natural, light brown, with silts, soft, low plasticity, moist-wet	GW03_3.0, XRF 426ppm	
			839 838 837 836	5 6 7 8			Borehole GW02 terminated at 4m		

BOREHOLE NUMBER GW03

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 7/6/21 **COMPLETED** 7/6/21 **R.L. SURFACE** 845.113 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Solid Flight Auger **HOLE LOCATION** 721499.01E,6058470.421N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			845				FILL; silty CLAY, dark brown, soft, minor sand and gravels, high plasticity, moist	GW02_0.0, XRF 518ppm, D1 XRF 453ppm	Minor asphalt and concrete fragments, no odour
							FILL; CLAY, brown, with minor gravels and sand, firm, high plasticity, moist	GW02_0.1, XRF 8791ppm	Minor asphalt and concrete fragments, no odour
			844	1			CLAY; natural, light brown, with minor gravel, dry, high plasticity, hard	GW02_0.2, XRF 2372ppm GW02_0.3, XRF 7519ppm GW02_0.4, XRF 1698ppm GW02_0.5, XRF 5188ppm	
	SWL		843	2			CLAY; natural, red-brown, high plasticity, hard, dry	GW02_1.0, XRF 1972ppm GW02_2.0, XRF 2481ppm	
			842, 841	3, 4			CLAY; natural, brown, very hard, minor gravels, dry, low plasticity, minor sands (weathered bedrock)	GW02_3.0, XRF 284ppm	
			840, 839	5, 6			CLAY; light brown, with silts, soft, low plasticity, moist-wet		
			838	7, 8			Borehole GW03 terminated at 6.5m		

BOREHOLE NUMBER GW04

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 8/7/21 **COMPLETED** 8/7/21 **R.L. SURFACE** 843.287 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger **HOLE LOCATION** 721592.472E,6058721.95N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			843				FILL; silty SAND, dark brown, loose, medium grained low plasticity silts, moist, minor gravels and rootlets present	GW04_0.0, XRF 46ppm GW04_0.1, XRF 2420ppm	Bricks, glass, concrete, asphalt fragments, no odour
	SWL		842	1			CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	GW04_0.2, XRF 3534ppm GW04_0.3, XRF 903ppm GW04_0.4, XRF 21ppm GW04_0.5, XRF 40ppm GW04_1.0, XRF 67ppm	
			841 840	2 3 4			CLAY; natural, light brown, with silt, soft, low plasticity, moist to wet	GW04_2.0, XRF 21ppm	
			839 838 837 836	5 6 7 8			Borehole GW04 terminated at 4m		

BOREHOLE NUMBER GW05

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 8/7/21 **COMPLETED** 8/7/21
R.L. SURFACE 842.663 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90° **BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger
HOLE LOCATION 721581.24E,6058874.257N
HOLE SIZE 0.1m
LOGGED BY TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; silty SAND, dark brown, loose, medium grained low plasticity silts, moist, minor gravels and rootlets present	GW05_0.0, XRF 63ppm GW05_0.1, XRF 148ppm	Minor glass fragments, no odour
	SWL		842				CLAY; natural, light brown with orange mottlings, firm, high plasticity, moist	GW05_0.2, XRF 173ppm GW05_0.3, XRF 167ppm GW05_0.4, XRF 7ppm GW05_0.5, XRF 7ppm	No observed contamination
			841 840	1 2 3			CLAY; light brown, with silt, soft, low plasticity, moist-wet	GW05_1.0, XRF 45ppm	No observed contamination
			839 838 837 836 835	4 5 6 7 8			Borehole GW05 terminated at 3m		

BOREHOLE NUMBER GW06

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 8/7/21	**COMPLETED** 8/7/21	**R.L. SURFACE** 845.889	**DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd		**SLOPE** 90°	**BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger		**HOLE LOCATION** 721714.924E,6058949.036N	
HOLE SIZE 0.1m		**LOGGED BY** TJF	**CHECKED BY** SM
NOTES			

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; silty SAND, dark brown, loose, medium grained, low plasticity silts, moist, minor gravels and rootlets present	GW06_0.0, XRF 68ppm, D2 XRF 46ppm	
							Silty CLAY; natural, dark brown, firm, high plasticity, moist	GW06_0.1, XRF 129ppm	
			845				CLAY; natural, light brown-grey with orange mottling, firm, high plasticity, moist	GW06_0.2, XRF 210ppm GW06_0.3, XRF 63ppm	
	SWL		844	1 2			CLAY; natural, brown, hard-very hard, minor gravels, dry, low plasticity, minor sands	GW06_0.4, XRF 15ppm GW06_0.5, XRF 19ppm GW06_1.0, XRF 14ppm	
			843 842	3 4					
			841 840	5 6			CLAY; natural, light brown, with silt, soft, low plasticity, moist-wet		
			839 838	7 8			Borehole GW06 terminated at 6m		

BOREHOLE NUMBER GW07

RAMBOLL

CLIENT	Department of Regional NSW	**PROJECT NAME**	Captains Flat Lead Management Plan
PROJECT NUMBER	318001193	**PROJECT LOCATION**	Captains Flat, NSW

DATE STARTED	8/7/21	**COMPLETED**	8/7/21	**R.L. SURFACE**	857.513	**DATUM**	m mAHD
DRILLING CONTRACTOR	Stratacore Pty Ltd			**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger, Solid Flight Auger			**HOLE LOCATION**	722012.677E,6059344.143N		
HOLE SIZE	0.1m			**LOGGED BY**	TJF	**CHECKED BY**	SM
NOTES							

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; sandy CLAY, brown, high plasticity, soft, medium grained sands, moist, rootlets present	GW07_0.0, XRF 52ppm	
			857				FILL; sandy CLAY, light brown-orange, low plasticity, fine sands, hard, dry	GW07_0.1, XRF 1552ppm GW07_0.2, XRF 1578ppm	
				1			CLAY; natural, brown, high plasticity, firm-hard, dry	GW07_0.3, XRF 1247ppm GW07_0.4, XRF 1509ppm GW07_0.5, XRF 1886ppm GW07_1.0, XRF 548ppm	
			856						
				2			Silty CLAY; natural, dark brown, high plasticity, soft, moist	GW07_2.0, XRF 3393ppm	
			855						
				3				GW07_3.0, XRF 2707ppm	
			854						
				4					
			853						
				5				GW07_5.0, XRF 1664ppm	
			852						
				6					
			851						
				7					
			850						
				8					

BOREHOLE NUMBER GW07

CLIENT	Department of Regional NSW	**PROJECT NAME**	Captains Flat Lead Management Plan
PROJECT NUMBER	318001193	**PROJECT LOCATION**	Captains Flat, NSW

DATE STARTED	8/7/21	**COMPLETED**	8/7/21	**R.L. SURFACE**	857.513	**DATUM**	m mAHD
DRILLING CONTRACTOR	Stratacore Pty Ltd			**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger, Solid Flight Auger			**HOLE LOCATION**	722012.677E,6059344.143N		
HOLE SIZE	0.1m			**LOGGED BY**	TJF	**CHECKED BY**	SM
NOTES							

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			849				Silty CLAY; natural, dark brown, high plasticity, soft, moist *(continued)*		
			848	9			CLAY; natural, light brown, with silt, soft, low plasticity, dry, bands of harder potentially weathered bedrock		
			847	10					
			846	11					
			845	12					
			844	13					
			843	14					
			842	15			Borehole GW07 terminated at 15m		
				16					

BOREHOLE NUMBER GW08

RAMBOLL

CLIENT	Department of Regional NSW	**PROJECT NAME**	Captains Flat Lead Management Plan
PROJECT NUMBER	318001193	**PROJECT LOCATION**	Captains Flat, NSW

DATE STARTED	8/7/21	**COMPLETED**	8/7/21	**R.L. SURFACE**	866.233	**DATUM**	m mAHD
DRILLING CONTRACTOR	Stratacore Pty Ltd			**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Hand Auger, Solid Flight Auger			**HOLE LOCATION**	721818.20E,6058557.89N		
HOLE SIZE	0.1m			**LOGGED BY**	TJF	**CHECKED BY**	SM
NOTES							

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; silty SAND, brown, medium grained, low plasticity silts, minor gravel, moist, dense, rootlets present	GW08_0.0, XRF 774ppm	
			866				Sandy CLAY; natural, light brown, medium plasticity, medium grained sands, firm, dry	GW08_0.1, XRF 2144ppm GW08_0.2, XRF 2364ppm GW08_0.3, XRF 1252ppm GW08_0.4, XRF 2386ppm GW08_0.5, XRF 1303ppm	
				1			CLAY; natural, light brown, high plasticity, firm, dry		
			865				CLAY; natural, brown-grey with orange mottles, firm-hard, dry, high plasticity	GW08_1.0, XRF 1710ppm	
			864	2				GW08_2.0, XRF 1262ppm, D3 XRF 1318ppm	
			863	3					
			862	4			Weathered BEDROCK; natural, sandy CLAY, very hard, red, low plasticity, fine sands, dry		
			861	5				GW08_5.0, XRF 53ppm	
			860	6					
			859	7					
				8					

RAMBOLL

CLIENT Department of Regional NSW | **PROJECT NAME** Captains Flat Lead Management Plan

PROJECT NUMBER 318001193 | **PROJECT LOCATION** Captains Flat, NSW

DATE STARTED 8/7/21 **COMPLETED** 8/7/21 | **R.L. SURFACE** 866.233 | **DATUM** m mAHD

DRILLING CONTRACTOR Stratacore Pty Ltd | **SLOPE** 90° | **BEARING** ---

EQUIPMENT Hand Auger, Solid Flight Auger | **HOLE LOCATION** 721818.20E,6058557.89N

HOLE SIZE 0.1m | **LOGGED BY** TJF | **CHECKED BY** SM

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
			858				Weathered BEDROCK; natural, sandy CLAY, very hard, red, low plasticity, fine sands, dry *(continued)*		
				9					
			857						
				10					
			856				Borehole GW08 terminated at 10m		
				11					
			855						
				12					
			854						
				13					
			853						
				14					
			852						
				15					
			851						
				16					

BOREHOLE NUMBER GW09_D

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 9/6/21 **COMPLETED** 9/6/21
R.L. SURFACE 846.559 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90° **BEARING** ---
EQUIPMENT Solid Flight Auger, Air Hammer
HOLE LOCATION 721264.48E,6059134.67N
HOLE SIZE 0.1m
LOGGED BY TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
SFA							FILL; gravelly CLAY, brown, high plasticity, soft, coarse gravels, fine sands, moist	GW09_0.0, XRF 36ppm GW09_0.1, XRF15ppm GW09_0.2, XRF 7ppm GW09_0.3, XRF <LOD GW09_0.4, XRF <LOD GW09_0.5, XRF <LOD GW09_1.0, XRF 14ppm	
							Sandy CLAY; natural, light brown, low plasticity, firm, minor gravels, fine sands, dry		
			846				CLAY; natural, light brown, high plasticity, hard-very hard, dry, minor sands and gravels		
	SWL		845	1					
							BEDROCK; natural, conglomerate, CLAY, brown, with gravels, very hard, dry		
			844	2			Becoming softer, moist		
			843	3			Becoming very hard (shale), light brown		
Air Hammer			842	4			SHALE; light brown		
			841	5					
			840	6			Becoming grey		
			839	7					
				8					

RAMBOLL

CLIENT Department of Regional NSW		**PROJECT NAME** Captains Flat Lead Management Plan	
PROJECT NUMBER 318001193		**PROJECT LOCATION** Captains Flat, NSW	
DATE STARTED 9/6/21	**COMPLETED** 9/6/21	**R.L. SURFACE** 846.559	**DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd		**SLOPE** 90°	**BEARING** ---
EQUIPMENT Solid Flight Auger, Air Hammer		**HOLE LOCATION** 721264.48E,6059134.67N	
HOLE SIZE 0.1m		**LOGGED BY** TJF	**CHECKED BY** SM
NOTES			

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
Air Hammer							Becoming grey *(continued)*		
			838						
				9					
			837						
	▼			10					
			836						
				11					
			835						
				12					
			834						
				13					
			833						
				14					
			832						
				15			Borehole GW09_D terminated at 15m		
			831						
				16					

BOREHOLE NUMBER GW09_S

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 9/6/21 **COMPLETED** 9/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; gravelly CLAY, brown, high plasticity, soft, coarse gravels, fine sands, moist	GW09_0.0, XRF 36ppm	
							Sandy CLAY; natural, light brown, low plasticity, firm, minor gravels, fine sands, dry	GW09_0.1, XRF15ppm GW09_0.2, XRF 7ppm	
	SWL			1			CLAY; natural, light brown, high plasticity, hard-very hard, dry, minor sands and gravels	GW09_0.3, XRF <LOD GW09_0.4, XRF <LOD GW09_0.5, XRF <LOD GW09_1.0, XRF 14ppm	
				2			BEDROCK; natural, conglomerate, CLAY, brown, with gravels, very hard, dry		
				3			Becoming softer, moist		
				4			Becoming very hard (shale), light brown		
				5			Borehole GW09_S terminated at 4.2m		
				6					
				7					
				8					

BOREHOLE NUMBER GW10

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 9/6/21 **COMPLETED** 9/6/21 **R.L. SURFACE** 865.981 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger **HOLE LOCATION** 720896.58E,6058791.96N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							FILL; gravelly CLAY, dark brown, high palsticity, soft, moist, medium grained sand, gravels	GW10_0.0, XRF 1468ppm	
							Sandy CLAY; natural, brown, high plasticity, moist, medium grained sands, minor gravels, firm	GW10_0.1, XRF 21ppm GW10_0.2, XRF 28ppm GW10_0.3, XRF 27ppm	
			865	1			CLAY; natural, red-brown, high plasticity, firm, moist, minor gravels and sands	GW10_0.4, XRF 21ppm GW10_0.5, XRF 27ppm GW10_1.0, XRF 23ppm	
			864 863	2 3			BEDROCK; natural, red-brown, conglomerate	GW10_2.0, XRF 27ppm	
	SWL		862 861 860 859 858	4 5 6 7 8			SHALE; natural, grey	GW10_4.0, XRF 184ppm	

BOREHOLE NUMBER GW10

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 9/6/21 **COMPLETED** 9/6/21 **R.L. SURFACE** 865.981 **DATUM** m mAHD
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Hand Auger, Solid Flight Auger **HOLE LOCATION** 720896.58E,6058791.96N
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
							SHALE; natural, grey *(continued)*		
			857	9					
			856	10					
							Borehole GW10 terminated at 10m		
			855	11					
			854	12					
			853	13					
			852	14					
			851	15					
			850	16					

BOREHOLE NUMBER SAQP10-BH01

RAMBOLL

CLIENT Department of Regional NSW

PROJECT NAME Captains Flat Lead Management Plan

PROJECT NUMBER 318001193

PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21

R.L. SURFACE

DATUM

DRILLING CONTRACTOR Stratacore Pty Ltd

SLOPE 90°

BEARING ---

EQUIPMENT Push Tube

HOLE LOCATION

HOLE SIZE 0.1m

LOGGED BY TJF

CHECKED BY SM

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly CLAY, light brown, low plasticity, fine gravels and medium grained sands, moist	SAQP10-BH01_0.0 XRF 6324ppm SAQP10-BH01_0.25 XRF 1758ppm	
						Silty CLAY; natural, dark brown, high plasticity, fine sands (minor), moist, firm	SAQP10-BH01_0.5 XRF 200ppm	
			1			CLAY; natural, light brown, firm, high plasticity, moist Becoming harder with depth	SAQP10-BH01_0.75 XRF 293ppm SAQP10-BH01_1.0 XRF 182ppm SAQP10-BH01_1.25 XRF 52ppm SAQP10-BH01_1.5 XRF 99ppm	
			2 3 4 5 6 7 8			Borehole SAQP10-BH01 terminated at 1.5m		

BOREHOLE NUMBER SAQP10-BH02

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						Sandy SILT; brown, medium grained sands, low plasticity, minor gravels, soft, moist, rootlets	SAQP10-BH02_0.0 XRF 497ppm	
						Gravelly CLAY; orange-brown, high plasticity, medium grained gravels and sands, moist, firm	SAQP10-BH02_0.25 XRF 2252ppm, D7 XRF 1820ppm	
						Silty CLAY; natural, brown, high palsticity, soft, silts, moist	SAQP10-BH02_0.5 XRF 2200ppm SAQP10-BH02_0.75 XRF 1773ppm	
			1			CLAY; light brown with grey and orange mottles, high plasticity, firm, moist	SAQP10-BH02_1.0 XRF 71ppm SAQP10-BH02_1.25 XRF 60ppm SAQP10-BH02_1.5 XRF 92ppm	
						Borehole SAQP10-BH02 terminated at 1.5m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP10-BH03

RAMBOLL

CLIENT Department of Regional NSW **PROJECT NAME** Captains Flat Lead Management Plan

PROJECT NUMBER 318001193 **PROJECT LOCATION** Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---

EQUIPMENT Push Tube **HOLE LOCATION**

HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, dark brown, loose, low plasticity silts, minor gravels, rootlets, moist	SAQP10-BH03_0.0 XRF 262ppm SAQP10-BH03_0.25 XRF 360ppm SAQP10-BH03_0.5 XRF 586ppm, D8	
			1			CLAY; natural, light brown with orange and grey mottles, firm, silts, moist, tree roots present	XRF 362ppm SAQP10-BH03_0.75 XRF <LOD SAQP10-BH03_1.0 XRF <LOD SAQP10-BH03_1.25 XRF <LOD	
						CLAY; light grey with orange mottles, high plasticity, firm, moist	SAQP10-BH03_1.5 XRF <LOD	
			2			Borehole SAQP10-BH03 terminated at 1.5m		
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP10-BH04

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, dark brown, loose, mediu grained, low plasticity silts, rootlets, moist	SAQP10-BH04_0.0 XRF 94ppm; SAQP10-BH04_0.25 XRF 51ppm	
	▼		1			Gravelly CLAY; natural, red-brown, firm, fine gravels, medium plasticity, medium grained sands, moist	SAQP10-BH04_0.5 XRF 63ppm; SAQP10-BH04_0.75 XRF 65ppm; SAQP10-BH04_1.0 XRF 62ppm	
						Sandy CLAY; natural, brown, very soft, fine-medium grained sands, wet	SAQP10-BH04_1.25 XRF 183ppm; SAQP10-BH04_1.5 XRF 28ppm	
			2 3 4 5 6 7 8			Borehole SAQP10-BH04 terminated at 1.5m		

BOREHOLE NUMBER SAQP11-BH01

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, light brown, high plasticity, silts present, soft, minor fien gravel and sand, moist	SAQP11-BH01_0.0 XRF 2473ppm D4 XRF 1862ppm	
						Sandy CLAY; natural, light brown with grey mottles, high plasticity, moist, firm-soft, fine sands	SAQP11-BH01_0.25 XRF 4969ppm SAQP11-BH01_0.5 XRF 4584ppm	
						CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH01_0.75 XRF 1769ppm	
			1			CLAY; natural, red with grey mottles, high plasticity, hard, moist	SAQP11-BH01_1.0 XRF 187ppm	
						Borehole SAQP11-BH01 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP11-BH02

RAMBOLL

CLIENT	Department of Regional NSW	**PROJECT NAME**	Captains Flat Lead Management Plan
PROJECT NUMBER	318001193	**PROJECT LOCATION**	Captains Flat, NSW

DATE STARTED	10/6/21	**COMPLETED**	10/6/21	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR	Stratacore Pty Ltd			**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Push Tube			**HOLE LOCATION**			
HOLE SIZE	0.1m			**LOGGED BY**	TJF	**CHECKED BY**	SM
NOTES							

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly CLAY, orange-brown, firm, medium grained sands, well graded gravels, moist	SAQP11-BH02_0.0 XRF 4612ppm SAQP11-BH02_0.25 XRF 4274ppm SAQP11-BH02_0.5 XRF 4421ppm	
						CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH02_0.75 XRF 442ppm	
			1			CLAY; natural, red with grey mottles, high plasticity, hard, moist	SAQP11-BH02_1.0 XRF 651ppm	
						Borehole SAQP11-BH02 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP11-BH03

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly CLAY, orange-brown, firm, medium grained sands, well graded gravels, moist	SAQP11-BH03_0.0 XRF 12489ppm, D5 6797ppm SAQP11-BH03_0.25 XRF 5787ppm SAQP11-BH03_0.5 XRF 7204ppm	
			1			CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH03_0.75 XRF 1564ppm SAQP11-BH03_1.0 XRF 1220ppm	
			2 3 4 5 6 7 8			Borehole SAQP11-BH03 terminated at 1m		

BOREHOLE NUMBER SAQP11-BH04

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, dark brown, soft, minor sand, high plasticity, moist, rootlets	SAQP11-BH04_0.0 XRF 3211ppm SAQP11-BH04_0.25 XRF 214ppm	
			1			CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	SAQP11-BH04_0.5 XRF 120ppm SAQP11-BH04_0.75 XRF 124ppm SAQP11-BH04_1.0 XRF 171ppm	
			2, 3, 4, 5, 6, 7, 8			Borehole SAQP11-BH04 terminated at 1m		

BOREHOLE NUMBER SAQP11-BH05

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, dark brown, soft, minor sand, high plasticity, moist, rootlets	SAQP11-BH05_0.0 XRF 2201ppm SAQP11-BH05_0.25 XRF 295ppm	
			1			CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	SAQP11-BH05_0.5 XRF 150ppm SAQP11-BH05_0.75 XRF 294ppm SAQP11-BH05_1.0 XRF 394ppm	
			2 3 4 5 6 7 8			Borehole SAQP11-BH05 terminated at 1m		

BOREHOLE NUMBER SAQP11-BH06

CLIENT Department of Regional NSW

PROJECT NAME Captains Flat Lead Management Plan

PROJECT NUMBER 318001193

PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---

EQUIPMENT Push Tube **HOLE LOCATION**

HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; sandy CLAY, brown, high plasticity, firm, with medium grained sands and gravels, moist	SAQP11-BH06_0.0 XRF 444ppm SAQP11-BH06_0.25 XRF 2397ppm	
						FILL; gravelly CLAY, orange, high plasticity, fine gravels, medium grained sands, moist, hard	SAQP11-BH06_0.5 XRF 62577ppm	
						CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH06_0.75 XRF 363ppm	
			1			CLAY; natural, red with grey mottles, high plasticity, hard, moist	SAQP11-BH06_1.0 XRF 761ppm	
						Borehole SAQP11-BH06 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP11-BH07

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, dark brown, soft, minor sand, high plasticity, moist, rootlets	SAQP11-BH07_0.0 XRF 2058ppm; SAQP11-BH07_0.25 XRF 2725ppm	
						CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH07_0.5 XRF 352ppm	
			1			CLAY; natural, red with grey mottles, high plasticity, hard, moist	SAQP11-BH07_0.75 XRF 133ppm; SAQP11-BH07_1.0 XRF 233ppm	
			2			Borehole SAQP11-BH07 terminated at 1m		
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP11-BH08

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; sandy CLAY, light brown, soft, fine gravels, medium grained sands, moist, high plasticity	SAQP11-BH08_0.0 XRF 735ppm	
						FILL; sandy CLAY, red-brown, soft, fine gravels, medium grained sands, moist, high plasticity	SAQP11-BH08_0.25 XRF 1316ppm; SAQP11-BH08_0.5 XRF 6013ppm	
			1			CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP11-BH08_0.75 XRF 3463ppm; SAQP11-BH08_1.0 XRF 4504ppm	
						Borehole SAQP11-BH08 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP11-BH09

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, dark brown, soft, minor sands and gravels, high plasticity, moist	SAQP11-BH09_0.0 XRF 986ppm SAQP11-BH09_0.25 XRF 1612ppm SAQP11-BH09_0.5 XRF 98ppm	
			1			CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	SAQP11-BH09_0.75 XRF 93ppm SAQP11-BH09_1.0 XRF 160ppm	
			2 3 4 5 6 7 8			Borehole SAQP11-BH09 terminated at 1m		

BOREHOLE NUMBER SAQP11-BH10

CLIENT	Department of Regional NSW	**PROJECT NAME**	Captains Flat Lead Management Plan
PROJECT NUMBER	318001193	**PROJECT LOCATION**	Captains Flat, NSW

DATE STARTED	10/6/21 **COMPLETED** 10/6/21	**R.L. SURFACE**		**DATUM**	
DRILLING CONTRACTOR	Stratacore Pty Ltd	**SLOPE**	90°	**BEARING**	---
EQUIPMENT	Push Tube	**HOLE LOCATION**			
HOLE SIZE	0.1m	**LOGGED BY**	TJF	**CHECKED BY**	SM
NOTES					

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty CLAY, dark brown, soft, minor sands and gravels, high plasticity, moist	SAQP11-BH10_0.0 XRF 611ppm SAQP11-BH10_0.25 XRF 70ppm	
			1			CLAY; natural, light brown with orange mottles, firm, high plasticity, moist	SAQP11-BH10_0.5 XRF 113ppm SAQP11-BH10_0.75 XRF 74ppm SAQP11-BH10_1.0 XRF 80ppm	
			2 3 4 5 6 7 8			Borehole SAQP11-BH10 terminated at 1m		

BOREHOLE NUMBER SAQP13-BH01

CLIENT Department of Regional NSW | **PROJECT NAME** Captains Flat Lead Management Plan

PROJECT NUMBER 318001193 | **PROJECT LOCATION** Captains Flat, NSW

DATE STARTED 10/6/21 | **COMPLETED** 10/6/21 | **R.L. SURFACE** | **DATUM**

DRILLING CONTRACTOR Stratacore Pty Ltd | **SLOPE** 90° | **BEARING** ---

EQUIPMENT Push Tube | **HOLE LOCATION**

HOLE SIZE 0.1m | **LOGGED BY** TJF | **CHECKED BY** SM

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, loose, medium grained, low plasticity silts, moist, rootlets	SAQP13-BH01-0.0 XRF 1444ppm	
						FILL; sandy CLAY, reworked natural, light brown, fine-medium grained sands, high plsticity, moist, firm-soft	SAQP13-BH01-.25 XRF 7020ppm	
						CLAY; natural, brown, high plasticity, soft, moist-wet, minor fine sands	SAQP13-BH01-.5 XRF 392ppm SAQP13-BH01-.75 XRF 245ppm	
			1			CLAY; natural, red with grey mottles, high plasticity, hard, moist	SAQP13-BH01-1.0 XRF 189ppm	
						Borehole SAQP13-BH01 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP13-BH02

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; sandy CLAY, brown, high plasticity, moist, medium grained sands, gravels, rootlets, soft	SAQP13-BH02_0.0, XRF 117ppm	
						Gravelly CLAY; light brown, high plasticity, moist, medium grained sands, fine gravels	SAQP13-BH02_0.25 XRF 189ppm	
						CLAY; light brown with grey/orange mottles, high plasticity, firm-hard, moist	SAQP13-BH02_0.5 XRF 118ppm SAQP13-BH02_0.75 XRF 94ppm	
			1			Borehole SAQP13-BH02 terminated at 1m	SAQP13-BH02_1.0, XRF 68ppm	
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP13-BH03

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly CLAY, light brown, coarse gravels, low plasticity, soft, moist, medium grained sands	SAQP13_0.0 XRF 975ppm, D6	Minor brick fragments, some shale fragments
						FILL; gravelly CLAY, red, well graved gravels, medium plasticity, firm, moist, medium grained sands	XRF 1175ppm SAQP13_0.25 XRF 1279ppm SAQP913_0.5 XRF 1865ppm SAQP13_0.75 XRF 3216ppm	Minor brick fragments, some shale fragments
			1			CLAY; natural, light brown with grey mottles, high plasticity, firm, moist	SAQP13_1.0 XRF 107ppm	
						Borehole SAQP13-BH03 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP13-BH04

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; gravelly CLAY, light brown, coarse gravels, low plasticity, soft, moist, medium grained sands	SAQP13-BH04_0.0 XRF 700ppm	
						FILL; gravelly CLAY, red, well graved gravels, medium plasticity, firm, moist, medium grained sands Becoming softer and wetter with depth	SAQP13-BH04_0.25 XRF6138ppm SAQP13-BH04_0.5 XRF 2616ppm	
			1			CLAY; natural, light brown with grey mottles, high plasticity, firm, moist	SAQP13-BH04_1.0 XRF 288ppm	
						Borehole SAQP13-BH04 terminated at 1m		
			2					
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP9-BH01

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, dense, low plasticity silts, medium grained, rootlets, moist	SAQP9-BH01_0.0 XRF 764ppm	
						FILL; gravelly CLAY, red-brown, high plasticity, fine gravels and sands, moist, firm	SAQP9-BH01_0.25 XRF 103ppm SAQP9-BH01_0.5 XRF 349ppm	
			1			CLAY; natural, light grey with red and orange mottles, hard, becoming bedrock	SAQP9-BH01_1.0 XRF 19ppm	
			2			Borehole SAQP9-BH01 terminated at 1m		
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP9-BH02

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, dense, low plasticity silts, medium grained, rootlets, moist	SAQP9-BH02_0.0 XRF 230ppm	
						FILL; gravelly CLAY, red-brown, high plasticity, fine gravels and sands, moist, firm	SAQP9-BH02_0.25 XRF 55ppm	
			1			CLAY; natural, light grey with red and orange mottles, hard, becoming bedrock	SAQP9-BH02_0.5 XRF <LOD SAQP9-BH02_0.75 XRF <LOD SAQP9-BH02_1.0 XRF <LOD	
			2 3 4 5 6 7 8			Borehole SAQP9-BH02 terminated at 1m		

BOREHOLE NUMBER SAQP9-BH03

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, dense, low plasticity silts, medium grained, rootlets, moist	SAQP9-BH03_0.0 XRF 2359ppm	
						FILL; gravelly CLAY, red-brown, high plasticity, fine gravels and sands, moist, firm	SAQP9-BH03_0.25 XRF 39ppm	
			1			CLAY; natural, light grey with red and orange mottles, hard, becoming bedrock	SAQP9-BH03_0.5 RF 12ppm SAQP9-BH03_0.75 XRF <LOD SAQP9-BH03_1.0 XRF <LOD	
			2			Borehole SAQP9-BH03 terminated at 1m		
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP9-BH04

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21 **R.L. SURFACE** **DATUM**
DRILLING CONTRACTOR Stratacore Pty Ltd **SLOPE** 90° **BEARING** ---
EQUIPMENT Push Tube **HOLE LOCATION**
HOLE SIZE 0.1m **LOGGED BY** TJF **CHECKED BY** SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, dense, low plasticity silts, medium grained, rootlets, moist	SAQP9-BH04_0.0 XRF450ppm SAQP9-BH04_0.25 XRF 1256ppm	
						FILL; gravelly CLAY, red-brown, high plasticity, fine gravels and sands, moist, firm	SAQP9-BH04_0.5 XRF 365ppm	
			1			CLAY; natural, light grey with red and orange mottles, hard, becoming bedrock	SAQP9-BH04_0.75 XRF 238ppm SAQP9-BH04_1.0 XRF 229ppm	
			2			Borehole SAQP9-BH04 terminated at 1m		
			3					
			4					
			5					
			6					
			7					
			8					

BOREHOLE NUMBER SAQP9-BH05

RAMBOLL

CLIENT Department of Regional NSW
PROJECT NAME Captains Flat Lead Management Plan
PROJECT NUMBER 318001193
PROJECT LOCATION Captains Flat, NSW

DATE STARTED 10/6/21 **COMPLETED** 10/6/21
R.L. SURFACE
DATUM
DRILLING CONTRACTOR Stratacore Pty Ltd
SLOPE 90°
BEARING ---
EQUIPMENT Push Tube
HOLE LOCATION
HOLE SIZE 0.1m
LOGGED BY TJF
CHECKED BY SM
NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Additional Observations
						FILL; silty SAND, brown, dense, low plasticity silts, medium grained, rootlets, moist	SAQP9-BH05_0.0 XRF 529ppm	
						FILL; gravelly CLAY, red-brown, high plasticity, fine gravels and sands, moist, firm	SAQP9-BH05_0.25 XRF 96ppm	
			1			CLAY; natural, light grey with red and orange mottles, hard, becoming bedrock	SAQP9-BH05_0.5 XRF 13ppm SAQP9-BH05_0.75 XRF <LOD SAQP9-BH05_1.0 XRF <LOD	
			2 3 4 5 6 7 8			Borehole SAQP9-BH05 terminated at 1m		

APPENDIX 6
NATA ACCREDITED LABORATORY REPORTS

eurofins | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Stephen Maxwell**

Report **805698-S**
Project name ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jun 23, 2021

Client Sample ID			**QA01**	**QA02**	**QA07**	**QA08**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn50356**	**S21-Jn50357**	**S21-Jn50358**	**S21-Jn50359**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	4600	2600	3900	6000
Arsenic	2	mg/kg	6.9	37	97	22
Barium	10	mg/kg	66	240	390	320
Cadmium	0.4	mg/kg	0.5	< 0.4	0.6	1.4
Chromium	5	mg/kg	9.8	< 5	11	8.9
Cobalt	5	mg/kg	< 5	< 5	< 5	< 5
Copper	5	mg/kg	51	99	400	110
Iron	20	mg/kg	10000	16000	44000	15000
Lead	5	mg/kg	120	730	2300	550
Manganese	5	mg/kg	180	230	77	250
Mercury	0.1	mg/kg	< 0.1	0.2	0.2	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	5.7	< 5
Nickel	5	mg/kg	9.1	< 5	< 5	< 5
Selenium	2	mg/kg	2.3	2.1	3.2	< 2
Titanium	10	mg/kg	460	55	78	120
Zinc	5	mg/kg	1200	1600	2500	510
% Moisture	1	%	3.9	6.6	6.3	36

Client Sample ID			**QA11**	**QA13**	**QA17**	**QA18**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn50360**	**S21-Jn50361**	**S21-Jn50362**	**S21-Jn50363**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	7700	5200	1600	3000
Arsenic	2	mg/kg	8.0	23	14	30
Barium	10	mg/kg	120	390	260	720
Cadmium	0.4	mg/kg	< 0.4	0.9	0.7	1.5
Chromium	5	mg/kg	15	8.7	< 5	< 5
Cobalt	5	mg/kg	7.5	5.6	< 5	< 5
Copper	5	mg/kg	25	57	180	430
Iron	20	mg/kg	22000	17000	12000	26000
Lead	5	mg/kg	93	360	710	1900

eurofins

Environment Testing

Client Sample ID			QA11	QA13	QA17	QA18
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50360	S21-Jn50361	S21-Jn50362	S21-Jn50363
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	5	mg/kg	190	1300	110	210
Mercury	0.1	mg/kg	< 0.1	0.2	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	7.0
Nickel	5	mg/kg	11	8.3	< 5	< 5
Selenium	2	mg/kg	2.1	< 2	< 2	2.9
Titanium	10	mg/kg	170	94	67	110
Zinc	5	mg/kg	470	1000	3000	9400
% Moisture	1	%	1.8	19	3.7	4.3
% Clay	1	%	1.0	-	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	310	-	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.4	-	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	9.9	-	-	-

Client Sample ID			QA21	QA24	QA25	QA26
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50364	S21-Jn50365	S21-Jn50366	S21-Jn50367
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	18000	9200	8600	6700
Arsenic	2	mg/kg	11	83	69	21
Barium	10	mg/kg	120	460	370	75
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	27	13	14	13
Cobalt	5	mg/kg	20	< 5	< 5	< 5
Copper	5	mg/kg	22	260	230	41
Iron	20	mg/kg	32000	42000	43000	22000
Lead	5	mg/kg	34	2400	2300	260
Manganese	5	mg/kg	230	87	89	56
Mercury	0.1	mg/kg	< 0.1	0.3	0.3	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	16	5.3	5.2	5.3
Selenium	2	mg/kg	5.5	3.9	4.3	2.3
Titanium	10	mg/kg	130	290	320	71
Zinc	5	mg/kg	59	250	230	74
% Moisture	1	%	32	14	14	26
% Clay	1	%	8.0	-	-	7.0
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	33	-	-	19
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	6.2	-	-	5.1
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	16	-	-	1.9

eurofins Environment Testing

Client Sample ID			QA30	QA33	QA40	QA43
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50368	S21-Jn50369	S21-Jn50370	S21-Jn50371
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	8500	4600	14000	6400
Arsenic	2	mg/kg	38	8.9	2.4	8.0
Barium	10	mg/kg	400	57	63	43
Cadmium	0.4	mg/kg	0.6	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	8.1	< 5	22	8.9
Cobalt	5	mg/kg	< 5	< 5	8.8	< 5
Copper	5	mg/kg	230	47	17	13
Iron	20	mg/kg	21000	11000	22000	13000
Lead	5	mg/kg	2100	240	24	90
Manganese	5	mg/kg	230	78	180	190
Mercury	0.1	mg/kg	0.4	< 0.1	< 0.1	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	6.8	< 5	16	< 5
Selenium	2	mg/kg	3.5	2.3	3.4	< 2
Titanium	10	mg/kg	250	470	280	270
Zinc	5	mg/kg	690	140	59	86
% Moisture	1	%	14	2.3	12	11
% Clay	1	%	-	-	9.0	< 1
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	< 10	12
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	5.9	5.5
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	5.4	2.4

Client Sample ID			QA44	QA101	QA102	QA103
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50372	S21-Jn50373	S21-Jn50374	S21-Jn50375
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	5900	6100	12000	12000
Arsenic	2	mg/kg	6.5	94	62	67
Barium	10	mg/kg	46	32	38	54
Cadmium	0.4	mg/kg	< 0.4	< 0.4	0.7	0.7
Chromium	5	mg/kg	14	19	59	37
Cobalt	5	mg/kg	11	< 5	< 5	< 5
Copper	5	mg/kg	20	72	240	260
Iron	20	mg/kg	20000	24000	39000	30000
Lead	5	mg/kg	27	9800	9800	12000
Manganese	5	mg/kg	99	29	28	29
Mercury	0.1	mg/kg	< 0.1	0.2	0.2	0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	9.8	< 5	< 5	5.1
Selenium	2	mg/kg	3.6	6.8	9.5	9.9
Titanium	10	mg/kg	200	140	170	160
Zinc	5	mg/kg	54	86	360	390

Client Sample ID			QA44	QA101	QA102	QA103
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50372	S21-Jn50373	S21-Jn50374	S21-Jn50375
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
% Moisture	1	%	20	12	15	15
% Clay	1	%	2.0	-	-	-
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	< 10	-	-	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.2	-	-	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	0.60	-	-	-

Client Sample ID			QA109	QA110	QA113	QA114
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50377	S21-Jn50378	S21-Jn50379	S21-Jn50380
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	15000	9600	13000	31000
Arsenic	2	mg/kg	10	16	18	8.5
Barium	10	mg/kg	140	160	170	200
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	15	12	15	22
Cobalt	5	mg/kg	7.0	8.3	7.7	8.0
Copper	5	mg/kg	22	26	31	23
Iron	20	mg/kg	23000	20000	25000	29000
Lead	5	mg/kg	92	170	160	38
Manganese	5	mg/kg	330	590	500	92
Mercury	0.1	mg/kg	0.1	0.1	0.1	< 0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	11	11	16	19
Selenium	2	mg/kg	4.2	3.7	4.3	6.3
Titanium	10	mg/kg	190	110	140	280
Zinc	5	mg/kg	110	160	210	60
% Moisture	1	%	39	40	26	22
% Clay	1	%	8.0	7.0	7.0	16
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	67	30	20	11
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.9	5.8	5.9	6.5
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	12	11	7.2	13

Client Sample ID			GW4_0.2	GW7_0.2	GW8_0.2	SAQP11-BH01_0.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50381	S21-Jn50382	S21-Jn50383	S21-Jn50384
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	5700	3900	14000	13000
Arsenic	2	mg/kg	130	37	61	40
Barium	10	mg/kg	590	120	250	220
Cadmium	0.4	mg/kg	< 0.4	< 0.4	0.8	0.4
Chromium	5	mg/kg	8.5	7.0	8.6	11
Cobalt	5	mg/kg	< 5	6.9	12	< 5
Copper	5	mg/kg	280	61	29	210
Iron	20	mg/kg	36000	27000	31000	26000
Lead	5	mg/kg	2700	920	1500	2500
Manganese	5	mg/kg	59	1100	600	120
Mercury	0.1	mg/kg	0.5	0.1	0.2	0.2
Molybdenum	5	mg/kg	5.1	< 5	< 5	< 5
Nickel	5	mg/kg	< 5	29	29	5.8
Selenium	2	mg/kg	3.3	4.2	7.9	5.0
Titanium	10	mg/kg	140	68	270	470
Zinc	5	mg/kg	700	340	1000	480
% Moisture	1	%	16	6.0	17	22

Client Sample ID			SAQP11-BH03_0.0	SAQP11-BH10_0.0	SAQP9-BH03_0.0	SAQP9-BH04_0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn50385	S21-Jn50386	S21-Jn50387	S21-Jn50388
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	11000	7800	9000	7900
Arsenic	2	mg/kg	26	41	170	90
Barium	10	mg/kg	270	340	120	440
Cadmium	0.4	mg/kg	1.6	3.9	< 0.4	0.8
Chromium	5	mg/kg	10	14	9.0	11
Cobalt	5	mg/kg	5.1	11	< 5	< 5
Copper	5	mg/kg	180	330	410	390
Iron	20	mg/kg	21000	15000	51000	41000
Lead	5	mg/kg	1300	1200	7300	4300
Manganese	5	mg/kg	190	650	94	140
Mercury	0.1	mg/kg	0.1	0.2	2.1	0.6
Molybdenum	5	mg/kg	< 5	< 5	5.8	< 5
Nickel	5	mg/kg	7.6	9.8	< 5	< 5
Selenium	2	mg/kg	4.1	4.2	8.3	3.8
Titanium	10	mg/kg	510	130	200	300
Zinc	5	mg/kg	460	1200	280	2500
% Moisture	1	%	24	25	12	12

Client Sample ID			SAQP10-BH02_0.25	SAQP13-BH02_0.0
Sample Matrix			Soil	Soil
Eurofins Sample No.			S21-Jn50389	S21-Jn50390
Date Sampled			Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	20	mg/kg	4900	11000
Arsenic	2	mg/kg	56	23
Barium	10	mg/kg	1400	240
Cadmium	0.4	mg/kg	2.9	0.5
Chromium	5	mg/kg	6.8	21
Cobalt	5	mg/kg	< 5	12
Copper	5	mg/kg	780	56
Iron	20	mg/kg	42000	19000
Lead	5	mg/kg	3600	770
Manganese	5	mg/kg	230	550
Mercury	0.1	mg/kg	0.3	0.2
Molybdenum	5	mg/kg	7.9	5.2
Nickel	5	mg/kg	5.5	18
Selenium	2	mg/kg	< 2	2.3
Titanium	10	mg/kg	150	200
Zinc	5	mg/kg	19000	530
% Moisture	1	%	7.6	40

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
Heavy Metals	Sydney	Jun 25, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Jun 25, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Clay	Brisbane	Jun 30, 2021	14 Days
- Method: LTM-GEN-7040			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Jun 25, 2021	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
% Moisture	Sydney	Jun 25, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	Jun 29, 2021	7 Days
- Method: LTM-INO-4030 Conductivity			
Cation Exchange Capacity	Melbourne	Jun 29, 2021	180 Days
- Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage			

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**													
1	QA01	Jun 03, 2021		Soil	S21-Jn50356		X	X	X	X	X	X		X	X	X	X	
2	QA02	Jun 03, 2021		Soil	S21-Jn50357		X	X	X	X	X	X		X	X	X	X	
3	QA07	Jun 03, 2021		Soil	S21-Jn50358		X	X	X	X	X	X		X	X	X	X	
4	QA08	Jun 03, 2021		Soil	S21-Jn50359		X	X	X	X	X	X		X	X	X	X	
5	QA11	Jun 03, 2021		Soil	S21-Jn50360	X	X	X	X	X	X	X	X	X	X	X	X	X
6	QA13	Jun 03, 2021		Soil	S21-Jn50361		X	X	X	X	X	X		X	X	X	X	
7	QA17	Jun 03, 2021		Soil	S21-Jn50362		X	X	X	X	X	X		X	X	X	X	
8	QA18	Jun 03, 2021		Soil	S21-Jn50363		X	X	X	X	X	X		X	X	X	X	
9	QA21	Jun 03, 2021		Soil	S21-Jn50364	X	X	X	X	X	X	X	X	X	X	X	X	X

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	805698
		Phone:	02 9954 8118
		Fax:	02 9954 8150
Project Name:	ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN	**Received:**	Jun 23, 2021 10:19 AM
Project ID:	318001193	**Due:**	Jun 30, 2021
		Priority:	5 Day
		Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
10	QA24	Jun 03, 2021		Soil	S21-Jn50365		X	X	X	X	X	X		X	X	X	X	
11	QA25	Jun 03, 2021		Soil	S21-Jn50366		X	X	X	X	X	X		X	X	X	X	
12	QA26	Jun 03, 2021		Soil	S21-Jn50367	X	X	X	X	X	X	X	X	X	X	X	X	X
13	QA30	Jun 03, 2021		Soil	S21-Jn50368		X	X	X	X	X	X		X	X	X	X	
14	QA33	Jun 03, 2021		Soil	S21-Jn50369		X	X	X	X	X	X		X	X	X	X	
15	QA40	Jun 03, 2021		Soil	S21-Jn50370	X	X	X	X	X	X	X	X	X	X	X	X	X
16	QA43	Jun 03, 2021		Soil	S21-Jn50371	X	X	X	X	X	X	X	X	X	X	X	X	X
17	QA44	Jun 03, 2021		Soil	S21-Jn50372	X	X	X	X	X	X	X	X	X	X	X	X	X
18	QA101	Jun 03, 2021		Soil	S21-Jn50373		X	X	X	X	X	X		X	X	X	X	
19	QA102	Jun 03, 2021		Soil	S21-Jn50374		X	X	X	X	X	X		X	X	X	X	
20	QA103	Jun 03, 2021		Soil	S21-Jn50375		X	X	X	X	X	X		X	X	X	X	

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
21	QA109	Jun 03, 2021		Soil	S21-Jn50377	X	X	X	X	X	X	X	X	X	X	X	X	X
22	QA110	Jun 03, 2021		Soil	S21-Jn50378	X	X	X	X	X	X	X	X	X	X	X	X	X
23	QA113	Jun 03, 2021		Soil	S21-Jn50379	X	X	X	X	X	X	X	X	X	X	X	X	X
24	QA114	Jun 03, 2021		Soil	S21-Jn50380	X	X	X	X	X	X	X	X	X	X	X	X	X
25	GW4_0.2	Jun 03, 2021		Soil	S21-Jn50381		X	X	X	X	X	X		X	X	X	X	
26	GW7_0.2	Jun 03, 2021		Soil	S21-Jn50382		X	X	X	X	X	X		X	X	X	X	
27	GW8_0.2	Jun 03, 2021		Soil	S21-Jn50383		X	X	X	X	X	X		X	X	X	X	
28	SAQP11-BH01_0.0	Jun 03, 2021		Soil	S21-Jn50384		X	X	X	X	X	X		X	X	X	X	
29	SAQP11-BH03_0.0	Jun 03, 2021		Soil	S21-Jn50385		X	X	X	X	X	X		X	X	X	X	

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 10:19 AM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	805698	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
30	SAQP11-BH10_0.0	Jun 03, 2021		Soil	S21-Jn50386		X	X	X	X	X	X		X	X	X	X	
31	SAQP9-BH03_0.0	Jun 03, 2021		Soil	S21-Jn50387		X	X	X	X	X	X		X	X	X	X	
32	SAQP9-BH04_0.25	Jun 03, 2021		Soil	S21-Jn50388		X	X	X	X	X	X		X	X	X	X	
33	SAQP10-BH02_0.25	Jun 03, 2021		Soil	S21-Jn50389		X	X	X	X	X	X		X	X	X	X	
34	SAQP13-BH02_0.0	Jun 03, 2021		Soil	S21-Jn50390		X	X	X	X	X	X		X	X	X	X	
35	R1	Jun 03, 2021		Water	S21-Jn50391		X	X	X	X	X	X		X	X	X		
36	R2	Jun 03, 2021		Water	S21-Jn50392		X	X	X	X	X	X		X	X	X		

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
37	R3	Jun 03, 2021		Water	S21-Jn50393		X	X	X	X	X	X		X	X	X		
Test Counts						10	37	37	37	37	37	37	10	37	37	37	34	10

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

eurofins | Environment Testing

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Aluminium			mg/kg	< 20			20	Pass	
Arsenic			mg/kg	< 2			2	Pass	
Barium			mg/kg	< 10			10	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Cobalt			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Lead			mg/kg	< 5			5	Pass	
Manganese			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Molybdenum			mg/kg	< 5			5	Pass	
Nickel			mg/kg	< 5			5	Pass	
Selenium			mg/kg	< 2			2	Pass	
Titanium			mg/kg	< 10			10	Pass	
Zinc			mg/kg	< 5			5	Pass	
Method Blank									
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	< 10			10	Pass	
LCS - % Recovery									
Heavy Metals									
Aluminium			%	87			80-120	Pass	
Arsenic			%	97			80-120	Pass	
Barium			%	95			80-120	Pass	
Cadmium			%	98			80-120	Pass	
Chromium			%	98			80-120	Pass	
Cobalt			%	98			80-120	Pass	
Copper			%	97			80-120	Pass	
Iron			%	85			80-120	Pass	
Lead			%	95			80-120	Pass	
Manganese			%	96			80-120	Pass	
Mercury			%	106			80-120	Pass	
Molybdenum			%	114			80-120	Pass	
Nickel			%	100			80-120	Pass	
Selenium			%	104			80-120	Pass	
Titanium			%	95			80-120	Pass	
Zinc			%	91			80-120	Pass	
LCS - % Recovery									
Conductivity (1:5 aqueous extract at 25°C as rec.)			%	90			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn50356	CP	%	109			75-125	Pass	
Barium	N21-Jn48314	NCP	%	117			75-125	Pass	
Cadmium	S21-Jn50356	CP	%	97			75-125	Pass	
Chromium	S21-Jn50356	CP	%	92			75-125	Pass	
Cobalt	S21-Jn50356	CP	%	91			75-125	Pass	
Copper	N21-Jn48314	NCP	%	102			75-125	Pass	
Lead	N21-Jn48314	NCP	%	100			75-125	Pass	
Mercury	S21-Jn50356	CP	%	87			75-125	Pass	
Molybdenum	S21-Jn50356	CP	%	103			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	S21-Jn50356	CP	%	90			75-125	Pass	
Selenium	S21-Jn50356	CP	%	104			75-125	Pass	
Zinc	N21-Jn48314	NCP	%	82			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S21-Jn50387	CP	%	104			75-125	Pass	
Chromium	S21-Jn50387	CP	%	93			75-125	Pass	
Cobalt	S21-Jn50387	CP	%	98			75-125	Pass	
Molybdenum	S21-Jn50387	CP	%	101			75-125	Pass	
Nickel	S21-Jn50387	CP	%	95			75-125	Pass	
Selenium	S21-Jn50387	CP	%	91			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn50389	CP	%	89			75-125	Pass	
Cadmium	S21-Jn50389	CP	%	102			75-125	Pass	
Chromium	S21-Jn50389	CP	%	103			75-125	Pass	
Cobalt	S21-Jn50389	CP	%	103			75-125	Pass	
Manganese	S21-Jn50389	CP	%	97			75-125	Pass	
Mercury	S21-Jn50389	CP	%	101			75-125	Pass	
Molybdenum	S21-Jn50389	CP	%	110			75-125	Pass	
Nickel	S21-Jn50389	CP	%	100			75-125	Pass	
Selenium	S21-Jn50389	CP	%	98			75-125	Pass	
Titanium	S21-Jn50389	CP	%	121			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn50358	CP	%	6.3	5.3	18	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-Jn46577	NCP	uS/cm	170	190	7.0	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-Jn46577	NCP	pH Units	7.0	7.0	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn50368	CP	%	14	12	14	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn50375	CP	mg/kg	12000	12000	2.0	30%	Pass	
Arsenic	S21-Jn50375	CP	mg/kg	67	67	1.0	30%	Pass	
Barium	S21-Jn50375	CP	mg/kg	54	48	12	30%	Pass	
Cadmium	S21-Jn50375	CP	mg/kg	0.7	0.8	16	30%	Pass	
Chromium	S21-Jn50375	CP	mg/kg	37	40	8.0	30%	Pass	
Cobalt	S21-Jn50375	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S21-Jn50375	CP	mg/kg	260	250	2.0	30%	Pass	
Iron	S21-Jn50375	CP	mg/kg	30000	32000	6.0	30%	Pass	
Lead	S21-Jn50375	CP	mg/kg	12000	9900	17	30%	Pass	
Manganese	S21-Jn50375	CP	mg/kg	29	32	9.0	30%	Pass	
Mercury	S21-Jn50375	CP	mg/kg	0.1	0.2	15	30%	Pass	
Molybdenum	S21-Jn50375	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	S21-Jn50375	CP	mg/kg	5.1	5.3	4.0	30%	Pass	
Selenium	S21-Jn50375	CP	mg/kg	9.9	10	1.0	30%	Pass	
Titanium	S21-Jn50375	CP	mg/kg	160	180	13	30%	Pass	
Zinc	S21-Jn50375	CP	mg/kg	390	400	2.0	30%	Pass	

Duplicate									
Cation Exchange Capacity				Result 1	Result 2	RPD			
Cation Exchange Capacity	S21-Jn50377	CP	meq/100g	12	13	9.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn50379	CP	%	26	27	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn50386	CP	mg/kg	7800	10000	27	30%	Pass	
Arsenic	S21-Jn50386	CP	mg/kg	41	25	48	30%	Fail	Q02
Barium	S21-Jn50386	CP	mg/kg	340	240	34	30%	Fail	Q02
Cadmium	S21-Jn50386	CP	mg/kg	3.9	2.5	44	30%	Fail	Q15
Chromium	S21-Jn50386	CP	mg/kg	14	11	25	30%	Pass	
Cobalt	S21-Jn50386	CP	mg/kg	11	8.5	22	30%	Pass	
Copper	S21-Jn50386	CP	mg/kg	330	210	41	30%	Fail	Q02
Iron	S21-Jn50386	CP	mg/kg	15000	23000	41	30%	Fail	Q02
Lead	S21-Jn50386	CP	mg/kg	1200	790	41	30%	Fail	Q02
Manganese	S21-Jn50386	CP	mg/kg	650	540	18	30%	Pass	
Mercury	S21-Jn50386	CP	mg/kg	0.2	0.1	51	30%	Fail	Q15
Molybdenum	S21-Jn50386	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	S21-Jn50386	CP	mg/kg	9.8	6.8	35	30%	Fail	Q15
Selenium	S21-Jn50386	CP	mg/kg	4.2	2.8	41	30%	Fail	Q15
Titanium	S21-Jn50386	CP	mg/kg	130	110	15	30%	Pass	
Zinc	S21-Jn50386	CP	mg/kg	1200	1300	11	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn50387	CP	mg/kg	9000	12000	31	30%	Fail	Q02
Arsenic	S21-Jn50387	CP	mg/kg	170	220	26	30%	Pass	
Barium	S21-Jn50387	CP	mg/kg	120	160	28	30%	Pass	
Cadmium	S21-Jn50387	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S21-Jn50387	CP	mg/kg	9.0	11	21	30%	Pass	
Cobalt	S21-Jn50387	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S21-Jn50387	CP	mg/kg	410	660	46	30%	Fail	Q02
Iron	S21-Jn50387	CP	mg/kg	51000	60000	16	30%	Pass	
Lead	S21-Jn50387	CP	mg/kg	7300	12000	45	30%	Fail	Q02
Manganese	S21-Jn50387	CP	mg/kg	94	140	38	30%	Fail	Q02
Mercury	S21-Jn50387	CP	mg/kg	2.1	3.3	42	30%	Fail	Q02
Molybdenum	S21-Jn50387	CP	mg/kg	5.8	7.7	29	30%	Pass	
Nickel	S21-Jn50387	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Selenium	S21-Jn50387	CP	mg/kg	8.3	11	25	30%	Pass	
Titanium	S21-Jn50387	CP	mg/kg	200	300	40	30%	Fail	Q02
Zinc	S21-Jn50387	CP	mg/kg	280	450	47	30%	Fail	Q02
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn50388	CP	mg/kg	7900	10000	23	30%	Pass	
Arsenic	S21-Jn50388	CP	mg/kg	90	130	34	30%	Fail	Q02
Barium	S21-Jn50388	CP	mg/kg	440	630	35	30%	Fail	Q02
Cadmium	S21-Jn50388	CP	mg/kg	0.8	0.6	25	30%	Pass	
Chromium	S21-Jn50388	CP	mg/kg	11	11	3.0	30%	Pass	
Cobalt	S21-Jn50388	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S21-Jn50388	CP	mg/kg	390	510	26	30%	Pass	
Iron	S21-Jn50388	CP	mg/kg	41000	53000	27	30%	Pass	
Manganese	S21-Jn50388	CP	mg/kg	140	150	9.0	30%	Pass	
Mercury	S21-Jn50388	CP	mg/kg	0.6	1.3	83	30%	Fail	Q15
Molybdenum	S21-Jn50388	CP	mg/kg	< 5	5.7	14	30%	Pass	
Nickel	S21-Jn50388	CP	mg/kg	< 5	< 5	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Selenium	S21-Jn50388	CP	mg/kg	3.8	6.3	49	30%	Fail	Q15
Titanium	S21-Jn50388	CP	mg/kg	300	280	7.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn50389	CP	%	7.6	6.2	21	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
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
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause
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:

John Nguyen	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
John Nguyen	Senior Analyst-Metal (NSW)
Jonathon Angell	Senior Analyst-Inorganic (QLD)

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.

Certificate of Analysis

Environment Testing

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Stephen Maxwell**

Report **805698-W**
Project name ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jun 23, 2021

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**R1** **Water** **S21-Jn50391** **Jun 03, 2021**	**R2** **Water** **S21-Jn50392** **Jun 03, 2021**	**R3** **Water** **S21-Jn50393** **Jun 03, 2021**
Heavy Metals					
Aluminium	0.05	mg/L	< 0.05	< 0.05	< 0.05
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001
Barium	0.02	mg/L	< 0.02	< 0.02	< 0.02
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	< 0.001	0.004	< 0.001
Iron	0.05	mg/L	< 0.05	0.33	< 0.05
Lead	0.001	mg/L	0.039	0.015	< 0.001
Manganese	0.005	mg/L	< 0.005	0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	0.007	< 0.005	< 0.005
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001
Selenium	0.001	mg/L	< 0.001	< 0.001	< 0.001
Titanium	0.005	mg/L	< 0.005	0.006	< 0.005
Zinc	0.005	mg/L	0.008	0.020	< 0.005

eurofins | Environment Testing

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
Heavy Metals	Sydney	Jun 25, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Jun 25, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Australia

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

Perth 46-48 Banksia Road, Welshpool WA 6106, Phone : +61 8 9251 9600, NATA # 1261, Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 10:19 AM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	805698	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**													
1	QA01	Jun 03, 2021		Soil	S21-Jn50356		X	X	X	X	X	X		X	X	X	X	
2	QA02	Jun 03, 2021		Soil	S21-Jn50357		X	X	X	X	X	X		X	X	X	X	
3	QA07	Jun 03, 2021		Soil	S21-Jn50358		X	X	X	X	X	X		X	X	X	X	
4	QA08	Jun 03, 2021		Soil	S21-Jn50359		X	X	X	X	X	X		X	X	X	X	
5	QA11	Jun 03, 2021		Soil	S21-Jn50360	X	X	X	X	X	X	X	X	X	X	X	X	X
6	QA13	Jun 03, 2021		Soil	S21-Jn50361		X	X	X	X	X	X		X	X	X	X	
7	QA17	Jun 03, 2021		Soil	S21-Jn50362		X	X	X	X	X	X		X	X	X	X	
8	QA18	Jun 03, 2021		Soil	S21-Jn50363		X	X	X	X	X	X		X	X	X	X	
9	QA21	Jun 03, 2021		Soil	S21-Jn50364	X	X	X	X	X	X	X	X	X	X	X	X	X

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway, North Sydney, NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
10	QA24	Jun 03, 2021		Soil	S21-Jn50365		X	X	X	X	X	X		X	X	X	X	
11	QA25	Jun 03, 2021		Soil	S21-Jn50366		X	X	X	X	X	X		X	X	X	X	
12	QA26	Jun 03, 2021		Soil	S21-Jn50367	X	X	X	X	X	X	X	X	X	X	X	X	X
13	QA30	Jun 03, 2021		Soil	S21-Jn50368		X	X	X	X	X	X		X	X	X	X	
14	QA33	Jun 03, 2021		Soil	S21-Jn50369		X	X	X	X	X	X		X	X	X	X	
15	QA40	Jun 03, 2021		Soil	S21-Jn50370	X	X	X	X	X	X	X	X	X	X	X	X	X
16	QA43	Jun 03, 2021		Soil	S21-Jn50371	X	X	X	X	X	X	X	X	X	X	X	X	X
17	QA44	Jun 03, 2021		Soil	S21-Jn50372	X	X	X	X	X	X	X	X	X	X	X	X	X
18	QA101	Jun 03, 2021		Soil	S21-Jn50373		X	X	X	X	X	X		X	X	X	X	
19	QA102	Jun 03, 2021		Soil	S21-Jn50374		X	X	X	X	X	X		X	X	X	X	
20	QA103	Jun 03, 2021		Soil	S21-Jn50375		X	X	X	X	X	X		X	X	X	X	

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
21	QA109	Jun 03, 2021		Soil	S21-Jn50377	X	X	X	X	X	X	X	X	X	X	X	X	X
22	QA110	Jun 03, 2021		Soil	S21-Jn50378	X	X	X	X	X	X	X	X	X	X	X	X	X
23	QA113	Jun 03, 2021		Soil	S21-Jn50379	X	X	X	X	X	X	X	X	X	X	X	X	X
24	QA114	Jun 03, 2021		Soil	S21-Jn50380	X	X	X	X	X	X	X	X	X	X	X	X	X
25	GW4_0.2	Jun 03, 2021		Soil	S21-Jn50381		X	X	X	X	X	X		X	X	X	X	
26	GW7_0.2	Jun 03, 2021		Soil	S21-Jn50382		X	X	X	X	X	X		X	X	X	X	
27	GW8_0.2	Jun 03, 2021		Soil	S21-Jn50383		X	X	X	X	X	X		X	X	X	X	
28	SAQP11-BH01_0.0	Jun 03, 2021		Soil	S21-Jn50384		X	X	X	X	X	X		X	X	X	X	
29	SAQP11-BH03_0.0	Jun 03, 2021		Soil	S21-Jn50385		X	X	X	X	X	X		X	X	X	X	

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
30	SAQP11-BH10_0.0	Jun 03, 2021		Soil	S21-Jn50386		X	X	X	X	X	X		X	X	X	X	
31	SAQP9-BH03_0.0	Jun 03, 2021		Soil	S21-Jn50387		X	X	X	X	X	X		X	X	X	X	
32	SAQP9-BH04_0.25	Jun 03, 2021		Soil	S21-Jn50388		X	X	X	X	X	X		X	X	X	X	
33	SAQP10-BH02_0.25	Jun 03, 2021		Soil	S21-Jn50389		X	X	X	X	X	X		X	X	X	X	
34	SAQP13-BH02_0.0	Jun 03, 2021		Soil	S21-Jn50390		X	X	X	X	X	X		X	X	X	X	
35	R1	Jun 03, 2021		Water	S21-Jn50391		X	X	X	X	X	X		X	X	X		
36	R2	Jun 03, 2021		Water	S21-Jn50392		X	X	X	X	X	X		X	X	X		

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 805698
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 10:19 AM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						% Clay	Aluminium	Barium	Cobalt	Iron	Manganese	Molybdenum	pH (1:5 Aqueous extract at 25°C as rec.)	Selenium	Titanium	Metals M8	Moisture Set	Cation Exchange Capacity
Melbourne Laboratory - NATA Site # 1254																		X
Sydney Laboratory - NATA Site # 18217							X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794						X												
Perth Laboratory - NATA Site # 23736																		
Mayfield Laboratory - NATA Site # 25079																		
External Laboratory																		
37	R3	Jun 03, 2021		Water	S21-Jn50393		X	X	X	X	X	X		X	X	X		
Test Counts						10	37	37	37	37	37	37	10	37	37	37	34	10

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Environment Testing

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Aluminium			mg/L	< 0.05			0.05	Pass	
Arsenic			mg/L	< 0.001			0.001	Pass	
Barium			mg/L	< 0.02			0.02	Pass	
Cadmium			mg/L	< 0.0002			0.0002	Pass	
Chromium			mg/L	< 0.001			0.001	Pass	
Cobalt			mg/L	< 0.001			0.001	Pass	
Copper			mg/L	< 0.001			0.001	Pass	
Iron			mg/L	< 0.05			0.05	Pass	
Lead			mg/L	< 0.001			0.001	Pass	
Manganese			mg/L	< 0.005			0.005	Pass	
Mercury			mg/L	< 0.0001			0.0001	Pass	
Molybdenum			mg/L	< 0.005			0.005	Pass	
Nickel			mg/L	< 0.001			0.001	Pass	
Selenium			mg/L	< 0.001			0.001	Pass	
Titanium			mg/L	< 0.005			0.005	Pass	
Zinc			mg/L	< 0.005			0.005	Pass	
LCS - % Recovery									
Heavy Metals									
Aluminium			%	89			80-120	Pass	
Arsenic			%	90			80-120	Pass	
Barium			%	83			80-120	Pass	
Cadmium			%	90			80-120	Pass	
Chromium			%	99			80-120	Pass	
Cobalt			%	101			80-120	Pass	
Copper			%	100			80-120	Pass	
Iron			%	97			80-120	Pass	
Lead			%	102			80-120	Pass	
Manganese			%	90			80-120	Pass	
Mercury			%	108			80-120	Pass	
Molybdenum			%	98			80-120	Pass	
Nickel			%	100			80-120	Pass	
Selenium			%	90			80-120	Pass	
Titanium			%	95			80-120	Pass	
Zinc			%	100			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S21-Jn31317	NCP	%	95			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn50392	CP	%	95			75-125	Pass	
Barium	S21-Jn50392	CP	%	88			75-125	Pass	
Cadmium	S21-Jn50392	CP	%	96			75-125	Pass	
Chromium	S21-Jn50392	CP	%	106			75-125	Pass	
Cobalt	S21-Jn50392	CP	%	109			75-125	Pass	
Copper	S21-Jn50392	CP	%	109			75-125	Pass	
Iron	S21-Jn50392	CP	%	104			75-125	Pass	
Lead	S21-Jn50392	CP	%	110			75-125	Pass	
Manganese	S21-Jn50392	CP	%	97			75-125	Pass	

eurofins

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Mercury	S21-Jn50392	CP	%	119			75-125	Pass	
Molybdenum	S21-Jn50392	CP	%	107			75-125	Pass	
Nickel	S21-Jn50392	CP	%	108			75-125	Pass	
Selenium	S21-Jn50392	CP	%	104			75-125	Pass	
Titanium	S21-Jn50392	CP	%	97			75-125	Pass	
Zinc	S21-Jn50392	CP	%	105			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Barium	S21-Jn50391	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Cadmium	S21-Jn50391	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron	S21-Jn50391	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead	S21-Jn50391	CP	mg/L	0.039	0.002	180	30%	Fail	Q02
Manganese	S21-Jn50391	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Mercury	S21-Jn50391	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S21-Jn50391	CP	mg/L	0.007	< 0.005	160	30%	Fail	Q15
Nickel	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Selenium	S21-Jn50391	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Titanium	S21-Jn50391	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	S21-Jn50391	CP	mg/L	0.008	0.008	3.0	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	No
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
Q02	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause
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:

John Nguyen	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 272502

Client Details

Client	Ramboll Australia Pty Ltd
Attention	Stephen Maxwell
Address	PO Box 560, North Sydney, NSW, 2060

Sample Details

Your Reference	**318001193, Captains Flat Lead Management Plan**
Number of Samples	2 Soil
Date samples received	24/06/2021
Date completed instructions received	24/06/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

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

Report Details

Date results requested by	01/07/2021
Date of Issue	01/07/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Giovanni Agosti, Group Technical Manager
Manju Dewendrage, Chemist

Authorised By

Nancy Zhang, Laboratory Manager

Acid Extractractable metals in soil			
Our Reference		272502-1	272502-2
Your Reference	UNITS	QA45	QA104
Date Sampled		4/06/2021	16/06/2021
Type of sample		Soil	Soil
Date prepared	-	29/06/2021	29/06/2021
Date analysed	-	29/06/2021	29/06/2021
Arsenic	mg/kg	<4	57
Barium	mg/kg	35	18
Cadmium	mg/kg	<0.4	0.8
Chromium	mg/kg	15	39
Cobalt	mg/kg	9	2
Copper	mg/kg	19	290
Iron	mg/kg	24,000	37,000
Lead	mg/kg	25	8,900
Manganese	mg/kg	87	21
Mercury	mg/kg	<0.1	0.5
Molybdenum	mg/kg	<1	1
Nickel	mg/kg	12	5
Selenium	mg/kg	<3	<9
Titanium	mg/kg	30	16
Zinc	mg/kg	46	300
Aluminium	mg/kg	7,300	18,000

Moisture			
Our Reference		272502-1	272502-2
Your Reference	UNITS	QA45	QA104
Date Sampled		4/06/2021	16/06/2021
Type of sample		Soil	Soil
Date prepared	-	28/06/2021	28/06/2021
Date analysed	-	29/06/2021	29/06/2021
Moisture	%	22	11

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-7	[NT]
Date prepared	-			29/06/2021	[NT]	[NT]	[NT]	[NT]	29/06/2021	[NT]
Date analysed	-			29/06/2021	[NT]	[NT]	[NT]	[NT]	29/06/2021	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	103	[NT]
Barium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	101	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Cobalt	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Iron	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	88	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Manganese	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	128	[NT]
Molybdenum	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Selenium	mg/kg	2	Metals-020	<2	[NT]	[NT]	[NT]	[NT]	100	[NT]
Titanium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Aluminium	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	114	[NT]

Result Definitions	
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

All Metals in soil - The PQL for Se has been raised due to interferences from analytes (other than those being tested) in samples 272502-1 and -2.

eurofins

Environment Testing

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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 and proficiency testing scheme providers reports.

Attention:	**Stephen Maxwell**
Report	**800910-S**
Project name	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jun 04, 2021

Client Sample ID			**SED1**	**SED2**	**SED3**	**SED4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn12576**	**S21-Jn12577**	**S21-Jn12578**	**S21-Jn12579**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	69	44	36	140
Barium	10	mg/kg	490	300	150	180
Cadmium	0.4	mg/kg	22	5.5	4.6	1.1
Chromium	5	mg/kg	21	26	18	< 5
Cobalt	5	mg/kg	40	16	9.9	< 5
Copper	5	mg/kg	520	430	490	130
Iron	20	mg/kg	37000	36000	59000	130000
Lead	5	mg/kg	1500	2400	2500	1100
Manganese	5	mg/kg	1900	750	190	160
Mercury	0.1	mg/kg	0.3	0.2	0.2	0.1
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	37	19	15	< 5
Selenium	2	mg/kg	4.4	< 2	< 2	< 2
Titanium	10	mg/kg	320	380	230	590
Zinc	5	mg/kg	11000	3600	3700	1500
% Moisture	1	%	80	74	60	69

Client Sample ID			**SED5**	**SED6**	**SED7**	**SED8**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn12580**	**S21-Jn12581**	**S21-Jn12582**	**S21-Jn12583**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	140	13	17	44
Barium	10	mg/kg	630	38	41	140
Cadmium	0.4	mg/kg	1.1	4.8	0.9	1.4
Chromium	5	mg/kg	11	18	23	11
Cobalt	5	mg/kg	< 5	18	6.0	< 5
Copper	5	mg/kg	600	320	51	260
Iron	20	mg/kg	230000	18000	19000	21000
Lead	5	mg/kg	6700	220	260	550
Manganese	5	mg/kg	86	260	93	67
Mercury	0.1	mg/kg	0.4	< 0.1	< 0.1	0.4

Client Sample ID			SED5	SED6	SED7	SED8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn12580	S21-Jn12581	S21-Jn12582	S21-Jn12583
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	< 5	11	8.9	< 5
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Titanium	10	mg/kg	430	240	180	350
Zinc	5	mg/kg	1700	1300	600	500
% Moisture	1	%	33	20	13	16

Client Sample ID			SED9	SED10	SED11	SED12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn12584	S21-Jn12585	S21-Jn12586	S21-Jn12587
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	70	84	130	75
Barium	10	mg/kg	56	1400	250	78
Cadmium	0.4	mg/kg	< 0.4	3.7	1.9	< 0.4
Chromium	5	mg/kg	6.7	6.6	20	6.9
Cobalt	5	mg/kg	11	< 5	6.2	< 5
Copper	5	mg/kg	80	1300	320	94
Iron	20	mg/kg	29000	63000	68000	57000
Lead	5	mg/kg	380	5900	1000	550
Manganese	5	mg/kg	110	220	220	66
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Molybdenum	5	mg/kg	< 5	19	< 5	< 5
Nickel	5	mg/kg	< 5	5.2	11	< 5
Selenium	2	mg/kg	< 2	2.9	2.3	< 2
Titanium	10	mg/kg	540	140	170	94
Zinc	5	mg/kg	190	21000	2000	650
% Moisture	1	%	19	21	56	29

Client Sample ID			SED13	SED14	SED15	QA35
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn12588	S21-Jn12589	S21-Jn12590	S21-Jn12591
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	27	13	2.8	110
Barium	10	mg/kg	190	140	53	470
Cadmium	0.4	mg/kg	< 0.4	0.7	< 0.4	0.5
Chromium	5	mg/kg	9.0	15	< 5	8.7
Cobalt	5	mg/kg	< 5	12	< 5	< 5
Copper	5	mg/kg	180	37	13	430
Iron	20	mg/kg	8300	13000	5300	270000
Lead	5	mg/kg	730	150	76	4400

Client Sample ID			SED13	SED14	SED15	QA35
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn12588	S21-Jn12589	S21-Jn12590	S21-Jn12591
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	5	mg/kg	72	550	190	65
Mercury	0.1	mg/kg	0.3	< 0.1	< 0.1	0.3
Molybdenum	5	mg/kg	< 5	< 5	< 5	< 5
Nickel	5	mg/kg	< 5	20	< 5	< 5
Selenium	2	mg/kg	< 2	< 2	< 2	< 2
Titanium	10	mg/kg	100	160	120	330
Zinc	5	mg/kg	230	500	81	1300
% Moisture	1	%	25	71	33	42

Environment Testing

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
Metals M8	Sydney	Jun 07, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Jun 07, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jun 05, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																			
1	SW1	Jun 03, 2021		Water	S21-Jn12561	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
2	SW2	Jun 03, 2021		Water	S21-Jn12562	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
3	SW3	Jun 03, 2021		Water	S21-Jn12563	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
4	SW4	Jun 03, 2021		Water	S21-Jn12564	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
5	SW5	Jun 03, 2021		Water	S21-Jn12565	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
6	SW6	Jun 03, 2021		Water	S21-Jn12566	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
7	SW7	Jun 03, 2021		Water	S21-Jn12567	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
8	SW8	Jun 03, 2021		Water	S21-Jn12568	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
9	SW9	Jun 03, 2021		Water	S21-Jn12569	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
10	SW10	Jun 03, 2021		Water	S21-Jn12570	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
11	SW11	Jun 03, 2021		Water	S21-Jn12571	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
12	SW12	Jun 03, 2021		Water	S21-Jn12572	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
13	SW13	Jun 03, 2021		Water	S21-Jn12573	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
14	SW14	Jun 03, 2021		Water	S21-Jn12574	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
15	SW15	Jun 03, 2021		Water	S21-Jn12575	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
16	SED1	Jun 03, 2021		Soil	S21-Jn12576	X		X			X		X		X		X		X		X			X
17	SED2	Jun 03, 2021		Soil	S21-Jn12577	X		X			X		X		X		X		X		X			X
18	SED3	Jun 03, 2021		Soil	S21-Jn12578	X		X			X		X		X		X		X		X			X
19	SED4	Jun 03, 2021		Soil	S21-Jn12579	X		X			X		X		X		X		X		X			X
20	SED5	Jun 03, 2021		Soil	S21-Jn12580	X		X			X		X		X		X		X		X			X

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
21	SED6	Jun 03, 2021		Soil	S21-Jn12581	X		X			X		X		X		X		X		X			X
22	SED7	Jun 03, 2021		Soil	S21-Jn12582	X		X			X		X		X		X		X		X			X
23	SED8	Jun 03, 2021		Soil	S21-Jn12583	X		X			X		X		X		X		X		X			X
24	SED9	Jun 03, 2021		Soil	S21-Jn12584	X		X			X		X		X		X		X		X			X
25	SED10	Jun 03, 2021		Soil	S21-Jn12585	X		X			X		X		X		X		X		X			X
26	SED11	Jun 03, 2021		Soil	S21-Jn12586	X		X			X		X		X		X		X		X			X
27	SED12	Jun 03, 2021		Soil	S21-Jn12587	X		X			X		X		X		X		X		X			X
28	SED13	Jun 03, 2021		Soil	S21-Jn12588	X		X			X		X		X		X		X		X			X
29	SED14	Jun 03, 2021		Soil	S21-Jn12589	X		X			X		X		X		X		X		X			X
30	SED15	Jun 03, 2021		Soil	S21-Jn12590	X		X			X		X		X		X		X		X			X
31	QA35	Jun 03, 2021		Soil	S21-Jn12591	X		X			X		X		X		X		X		X			X

Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 4, 2021 5:45 PM
Address:	Level 3/100 Pacific Highway	**Report #:**	800910	**Due:**	Jun 11, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
32	QA35	Jun 03, 2021		Water	S21-Jn12592	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		
33	R01	Jun 03, 2021		Water	S21-Jn12593					X														
34	R02	Jun 03, 2021		Water	S21-Jn12594					X														
35	R03	Jun 03, 2021		Water	S21-Jn12595					X														
36	R04	Jun 03, 2021		Water	S21-Jn12596					X														
37	QA01	Jun 03, 2021		Soil	S21-Jn12597					X														
38	QA02	Jun 03, 2021		Soil	S21-Jn12598					X														
39	QA03	Jun 03, 2021		Soil	S21-Jn12599					X														
40	QA04	Jun 03, 2021		Soil	S21-Jn12600					X														
41	QA05	Jun 03, 2021		Soil	S21-Jn12601					X														
42	QA06	Jun 03, 2021		Soil	S21-Jn12602					X														

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
43	QA07	Jun 03, 2021		Soil	S21-Jn12603					X														
44	QA08	Jun 03, 2021		Soil	S21-Jn12604					X														
45	QA09	Jun 03, 2021		Soil	S21-Jn12605					X														
46	QA10	Jun 03, 2021		Soil	S21-Jn12606					X														
47	QA11	Jun 03, 2021		Soil	S21-Jn12607					X														
48	QA12	Jun 03, 2021		Soil	S21-Jn12608					X														
49	QA13	Jun 03, 2021		Soil	S21-Jn12609					X														
50	QA14	Jun 03, 2021		Soil	S21-Jn12610					X														
51	QA15	Jun 03, 2021		Soil	S21-Jn12611					X														
52	QA16	Jun 03, 2021		Soil	S21-Jn12612					X														
53	QA17	Jun 03, 2021		Soil	S21-Jn12613					X														

Australia

Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271

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

Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway, North Sydney, NSW 2060

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
54	QA18	Jun 03, 2021		Soil	S21-Jn12614					X														
55	QA19	Jun 03, 2021		Soil	S21-Jn12615					X														
56	QA20	Jun 03, 2021		Soil	S21-Jn12616					X														
57	QA21	Jun 03, 2021		Soil	S21-Jn12617					X														
58	QA22	Jun 03, 2021		Soil	S21-Jn12618					X														
59	QA23	Jun 03, 2021		Soil	S21-Jn12619					X														
60	QA24	Jun 03, 2021		Soil	S21-Jn12620					X														
61	QA25	Jun 03, 2021		Soil	S21-Jn12621					X														
62	QA26	Jun 03, 2021		Soil	S21-Jn12622					X														
63	QA27	Jun 03, 2021		Soil	S21-Jn12623					X														
64	QA28	Jun 03, 2021		Soil	S21-Jn12624					X														

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
65	QA29	Jun 03, 2021		Soil	S21-Jn12625					X														
66	QA30	Jun 03, 2021		Soil	S21-Jn12626					X														
67	QA31	Jun 03, 2021		Soil	S21-Jn12627					X														
68	QA32	Jun 03, 2021		Soil	S21-Jn12628					X														
69	QA33	Jun 03, 2021		Soil	S21-Jn12629					X														
70	QA34	Jun 03, 2021		Soil	S21-Jn12630					X														
71	QA37	Jun 03, 2021		Soil	S21-Jn12631					X														
72	QA38	Jun 03, 2021		Soil	S21-Jn12632					X														
73	QA39	Jun 03, 2021		Soil	S21-Jn12633					X														
74	QA40	Jun 03, 2021		Soil	S21-Jn12634					X														
75	QA41	Jun 03, 2021		Soil	S21-Jn12635					X														

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
76	QA42	Jun 03, 2021		Soil	S21-Jn12636					X														
77	QA43	Jun 03, 2021		Soil	S21-Jn12637					X														
78	QA44	Jun 03, 2021		Soil	S21-Jn12638					X														
79	QA45	Jun 03, 2021		Soil	S21-Jn12639					X														
80	QA46	Jun 03, 2021		Soil	S21-Jn12640					X														
Test Counts						32	16	32	16	48	32	16	32	16	32	16	32	16	32	16	32	16	15	16

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

eurofins | Environment Testing

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/kg	< 2			2	Pass	
Barium			mg/kg	< 10			10	Pass	
Cadmium			mg/kg	< 0.4			0.4	Pass	
Chromium			mg/kg	< 5			5	Pass	
Cobalt			mg/kg	< 5			5	Pass	
Copper			mg/kg	< 5			5	Pass	
Iron			mg/kg	< 20			20	Pass	
Lead			mg/kg	< 5			5	Pass	
Manganese			mg/kg	< 5			5	Pass	
Mercury			mg/kg	< 0.1			0.1	Pass	
Molybdenum			mg/kg	< 5			5	Pass	
Nickel			mg/kg	< 5			5	Pass	
Selenium			mg/kg	< 2			2	Pass	
Titanium			mg/kg	< 10			10	Pass	
Zinc			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	97			80-120	Pass	
Barium			%	103			80-120	Pass	
Cadmium			%	101			80-120	Pass	
Chromium			%	101			80-120	Pass	
Cobalt			%	100			80-120	Pass	
Copper			%	100			80-120	Pass	
Iron			%	103			80-120	Pass	
Lead			%	99			80-120	Pass	
Manganese			%	100			80-120	Pass	
Mercury			%	98			80-120	Pass	
Molybdenum			%	111			80-120	Pass	
Nickel			%	98			80-120	Pass	
Selenium			%	106			80-120	Pass	
Titanium			%	100			80-120	Pass	
Zinc			%	95			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Barium	S21-Jn12648	NCP	%	111			75-125	Pass	
Cadmium	S21-Jn12700	NCP	%	92			75-125	Pass	
Chromium	S21-Jn12700	NCP	%	117			75-125	Pass	
Cobalt	S21-Jn12700	NCP	%	101			75-125	Pass	
Lead	S21-Jn12700	NCP	%	92			75-125	Pass	
Mercury	S21-Jn12700	NCP	%	93			75-125	Pass	
Molybdenum	S21-Jn12446	NCP	%	88			75-125	Pass	
Nickel	S21-Jn12700	NCP	%	108			75-125	Pass	
Selenium	S21-Jn12700	NCP	%	88			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn12584	CP	%	122			75-125	Pass	
Copper	S21-Jn12584	CP	%	117			75-125	Pass	
Manganese	S21-Jn12584	CP	%	103			75-125	Pass	

eurofins

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Titanium	S21-Jn12584	CP	%	81			75-125	Pass	
Zinc	S21-Jn12584	CP	%	107			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Jn12583	CP	mg/kg	44	37	17	30%	Pass	
Barium	S21-Jn12583	CP	mg/kg	140	140	5.0	30%	Pass	
Cadmium	S21-Jn12583	CP	mg/kg	1.4	1.2	16	30%	Pass	
Chromium	S21-Jn12583	CP	mg/kg	11	9.9	6.0	30%	Pass	
Cobalt	S21-Jn12583	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Copper	S21-Jn12583	CP	mg/kg	260	200	27	30%	Pass	
Iron	S21-Jn12583	CP	mg/kg	21000	19000	8.0	30%	Pass	
Lead	S21-Jn12583	CP	mg/kg	550	400	32	30%	Fail	Q15
Manganese	S21-Jn12583	CP	mg/kg	67	82	21	30%	Pass	
Mercury	S21-Jn12583	CP	mg/kg	0.4	0.4	17	30%	Pass	
Molybdenum	S21-Jn12583	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Nickel	S21-Jn12583	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Selenium	S21-Jn12583	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Titanium	S21-Jn12583	CP	mg/kg	350	380	9.0	30%	Pass	
Zinc	S21-Jn12583	CP	mg/kg	500	530	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn12583	CP	%	16	17	7.0	30%	Pass	

eurofins | Environment Testing

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
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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

Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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 and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report	**800910-W**
Project name	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jun 04, 2021

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**SW1** **Water** **S21-Jn12561** **Jun 03, 2021**	**SW2** **Water** **S21-Jn12562** **Jun 03, 2021**	**SW3** **Water** **S21-Jn12563** **Jun 03, 2021**	**SW4** **Water** **S21-Jn12564** **Jun 03, 2021**
Hardness mg equivalent CaCO3/L	1	mg/L	63	62	88	54
Heavy Metals						
Arsenic	0.001	mg/L	< 0.001	0.001	0.001	0.001
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Barium	0.02	mg/L	0.02	< 0.02	0.03	< 0.02
Barium (filtered)	0.02	mg/L	0.02	0.02	0.03	0.02
Cadmium	0.0002	mg/L	0.0019	0.0019	0.011	0.0018
Cadmium (filtered)	0.0002	mg/L	0.0019	0.0020	0.012	0.0021
Chromium	0.001	mg/L	< 0.001	0.002	0.003	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	0.003	0.003	0.008	0.003
Cobalt (filtered)	0.001	mg/L	0.003	0.003	0.008	0.003
Copper	0.001	mg/L	0.012	0.016	0.15	0.016
Copper (filtered)	0.001	mg/L	0.008	0.008	0.11	0.010
Iron	0.05	mg/L	2.1	3.9	3.0	3.8
Iron (filtered)	0.05	mg/L	0.63	0.87	0.82	1.7
Lead	0.001	mg/L	0.019	0.028	0.087	0.028
Lead (filtered)	0.001	mg/L	0.007	0.005	0.018	0.006
Manganese	0.005	mg/L	0.31	0.32	0.65	0.31
Manganese (filtered)	0.005	mg/L	0.30	0.35	0.71	0.33
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.005	0.005	0.008	0.003
Nickel (filtered)	0.001	mg/L	0.004	0.006	0.008	0.003
Selenium	0.001	mg/L	0.001	< 0.001	0.002	< 0.001
Selenium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Titanium	0.005	mg/L	< 0.005	< 0.005	0.010	0.006
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	2.3	2.2	8.0	2.1
Zinc (filtered)	0.005	mg/L	1.6	1.8	6.8	1.8
Alkali Metals						
Calcium	0.5	mg/L	11	11	15	9.2
Magnesium	0.5	mg/L	8.8	8.6	12	7.6

eurofins

Environment Testing

Client Sample ID			SW5	SW6	SW7	SW8
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn12565	S21-Jn12566	S21-Jn12567	S21-Jn12568
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	1400	33	32	300
Heavy Metals						
Arsenic	0.001	mg/L	0.010	0.002	0.002	0.003
Arsenic (filtered)	0.001	mg/L	0.008	< 0.001	< 0.001	0.001
Barium	0.02	mg/L	< 0.02	0.03	0.03	0.02
Barium (filtered)	0.02	mg/L	< 0.02	0.02	0.02	0.03
Cadmium	0.0002	mg/L	0.10	0.0029	0.0030	0.11
Cadmium (filtered)	0.0002	mg/L	0.11	0.0030	0.0032	0.12
Chromium	0.001	mg/L	0.002	0.003	0.003	0.003
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Cobalt	0.001	mg/L	0.086	0.001	0.002	0.037
Cobalt (filtered)	0.001	mg/L	0.097	0.001	0.001	0.041
Copper	0.001	mg/L	0.33	0.063	0.060	1.7
Copper (filtered)	0.001	mg/L	0.36	0.045	0.046	1.9
Iron	0.05	mg/L	150	2.2	2.0	15
Iron (filtered)	0.05	mg/L	190	0.65	0.63	11
Lead	0.001	mg/L	1.2	0.29	0.30	1.2
Lead (filtered)	0.001	mg/L	1.3	0.11	0.13	1.2
Manganese	0.005	mg/L	10	0.042	0.042	2.5
Manganese (filtered)	0.005	mg/L	12	0.033	0.034	3.0
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.063	0.004	0.003	0.034
Nickel (filtered)	0.001	mg/L	0.072	0.003	0.003	0.036
Selenium	0.001	mg/L	0.011	0.002	0.001	0.007
Selenium (filtered)	0.001	mg/L	0.003	< 0.001	< 0.001	0.002
Titanium	0.005	mg/L	< 0.005	0.053	0.042	< 0.005
Titanium (filtered)	0.005	mg/L	< 0.005	0.012	0.011	< 0.005
Zinc	0.005	mg/L	120	1.4	1.4	67
Zinc (filtered)	0.005	mg/L	140	1.1	1.2	78
Alkali Metals						
Calcium	0.5	mg/L	280	4.2	4.2	55
Magnesium	0.5	mg/L	170	5.5	5.3	40

Client Sample ID			SW9	SW10	SW11	SW12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn12569	S21-Jn12570	S21-Jn12571	S21-Jn12572
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	330	96	21	930
Heavy Metals						
Arsenic	0.001	mg/L	0.002	0.001	< 0.001	0.003
Arsenic (filtered)	0.001	mg/L	0.002	< 0.001	0.001	0.002
Barium	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02
Barium (filtered)	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02

Client Sample ID			SW9	SW10	SW11	SW12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn12569	S21-Jn12570	S21-Jn12571	S21-Jn12572
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.0002	mg/L	0.16	0.0069	0.0003	0.024
Cadmium (filtered)	0.0002	mg/L	0.18	0.0072	0.0003	0.025
Chromium	0.001	mg/L	0.004	0.001	0.001	0.004
Chromium (filtered)	0.001	mg/L	0.004	< 0.001	< 0.001	0.004
Cobalt	0.001	mg/L	0.040	0.016	< 0.001	0.13
Cobalt (filtered)	0.001	mg/L	0.043	0.016	< 0.001	0.14
Copper	0.001	mg/L	2.6	0.19	0.006	0.33
Copper (filtered)	0.001	mg/L	2.7	0.18	0.005	0.35
Iron	0.05	mg/L	7.5	3.8	0.84	91
Iron (filtered)	0.05	mg/L	8.3	1.2	0.43	99
Lead	0.001	mg/L	1.3	0.11	0.008	0.024
Lead (filtered)	0.001	mg/L	1.4	0.069	0.004	0.025
Manganese	0.005	mg/L	3.0	1.3	0.081	14
Manganese (filtered)	0.005	mg/L	3.3	1.3	0.074	15
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.044	0.006	0.002	0.050
Nickel (filtered)	0.001	mg/L	0.047	0.007	0.002	0.053
Selenium	0.001	mg/L	0.009	0.004	0.001	0.016
Selenium (filtered)	0.001	mg/L	0.002	< 0.001	< 0.001	0.002
Titanium	0.005	mg/L	< 0.005	< 0.005	0.009	< 0.005
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	95	8.2	0.39	67
Zinc (filtered)	0.005	mg/L	110	6.8	0.32	75
Alkali Metals						
Calcium	0.5	mg/L	72	13	2.9	100
Magnesium	0.5	mg/L	36	15	3.3	160

Client Sample ID			SW13	SW14	SW15	QA35
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn12573	S21-Jn12574	S21-Jn12575	S21-Jn12592
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	47	17	18	-
Heavy Metals						
Arsenic	0.001	mg/L	0.001	< 0.001	< 0.001	0.011
Arsenic (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.008
Barium	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02
Barium (filtered)	0.02	mg/L	0.03	< 0.02	< 0.02	< 0.02
Cadmium	0.0002	mg/L	0.0083	< 0.0002	< 0.0002	0.11
Cadmium (filtered)	0.0002	mg/L	0.0090	< 0.0002	< 0.0002	0.11
Chromium	0.001	mg/L	0.001	< 0.001	< 0.001	0.002
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt	0.001	mg/L	0.014	< 0.001	< 0.001	0.096
Cobalt (filtered)	0.001	mg/L	0.016	< 0.001	< 0.001	0.098

eurofins

Environment Testing

Client Sample ID			SW13	SW14	SW15	QA35
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn12573	S21-Jn12574	S21-Jn12575	S21-Jn12592
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Copper	0.001	mg/L	0.37	0.002	0.002	0.37
Copper (filtered)	0.001	mg/L	0.37	0.003	0.003	0.37
Iron	0.05	mg/L	0.65	0.69	0.69	170
Iron (filtered)	0.05	mg/L	0.22	0.52	0.40	190
Lead	0.001	mg/L	0.15	0.005	0.004	1.3
Lead (filtered)	0.001	mg/L	0.14	0.003	0.002	1.4
Manganese	0.005	mg/L	0.35	0.024	0.027	11
Manganese (filtered)	0.005	mg/L	0.38	0.010	0.012	12
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	0.003	0.002	0.003	0.071
Nickel (filtered)	0.001	mg/L	0.003	0.002	0.002	0.072
Selenium	0.001	mg/L	0.003	< 0.001	< 0.001	0.013
Selenium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.002
Titanium	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	4.3	0.041	0.042	130
Zinc (filtered)	0.005	mg/L	3.7	0.058	0.049	140
Alkali Metals						
Calcium	0.5	mg/L	6.3	2.4	2.6	-
Magnesium	0.5	mg/L	7.6	2.8	2.8	-

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
Hardness Set			
Hardness mg equivalent CaCO3/L	Sydney	Jun 11, 2021	28 Days
- Method: E020.1 Hardness in water			
Alkali Metals	Sydney	Jun 11, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8	Sydney	Jun 11, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Metals M8 filtered	Sydney	Jun 11, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Jun 11, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Sydney	Jun 11, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																			
1	SW1	Jun 03, 2021		Water	S21-Jn12561	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
2	SW2	Jun 03, 2021		Water	S21-Jn12562	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
3	SW3	Jun 03, 2021		Water	S21-Jn12563	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
4	SW4	Jun 03, 2021		Water	S21-Jn12564	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
5	SW5	Jun 03, 2021		Water	S21-Jn12565	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
6	SW6	Jun 03, 2021		Water	S21-Jn12566	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
7	SW7	Jun 03, 2021		Water	S21-Jn12567	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
8	SW8	Jun 03, 2021		Water	S21-Jn12568	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
9	SW9	Jun 03, 2021		Water	S21-Jn12569	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
10	SW10	Jun 03, 2021		Water	S21-Jn12570	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
11	SW11	Jun 03, 2021		Water	S21-Jn12571	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
12	SW12	Jun 03, 2021		Water	S21-Jn12572	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
13	SW13	Jun 03, 2021		Water	S21-Jn12573	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
14	SW14	Jun 03, 2021		Water	S21-Jn12574	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
15	SW15	Jun 03, 2021		Water	S21-Jn12575	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
16	SED1	Jun 03, 2021		Soil	S21-Jn12576	X		X			X		X		X		X		X		X			X
17	SED2	Jun 03, 2021		Soil	S21-Jn12577	X		X			X		X		X		X		X		X			X
18	SED3	Jun 03, 2021		Soil	S21-Jn12578	X		X			X		X		X		X		X		X			X
19	SED4	Jun 03, 2021		Soil	S21-Jn12579	X		X			X		X		X		X		X		X			X
20	SED5	Jun 03, 2021		Soil	S21-Jn12580	X		X			X		X		X		X		X		X			X

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
21	SED6	Jun 03, 2021		Soil	S21-Jn12581	X		X			X		X		X		X		X		X			X
22	SED7	Jun 03, 2021		Soil	S21-Jn12582	X		X			X		X		X		X		X		X			X
23	SED8	Jun 03, 2021		Soil	S21-Jn12583	X		X			X		X		X		X		X		X			X
24	SED9	Jun 03, 2021		Soil	S21-Jn12584	X		X			X		X		X		X		X		X			X
25	SED10	Jun 03, 2021		Soil	S21-Jn12585	X		X			X		X		X		X		X		X			X
26	SED11	Jun 03, 2021		Soil	S21-Jn12586	X		X			X		X		X		X		X		X			X
27	SED12	Jun 03, 2021		Soil	S21-Jn12587	X		X			X		X		X		X		X		X			X
28	SED13	Jun 03, 2021		Soil	S21-Jn12588	X		X			X		X		X		X		X		X			X
29	SED14	Jun 03, 2021		Soil	S21-Jn12589	X		X			X		X		X		X		X		X			X
30	SED15	Jun 03, 2021		Soil	S21-Jn12590	X		X			X		X		X		X		X		X			X
31	QA35	Jun 03, 2021		Soil	S21-Jn12591	X		X			X		X		X		X		X		X			X

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
32	QA35	Jun 03, 2021		Water	S21-Jn12592	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X		
33	R01	Jun 03, 2021		Water	S21-Jn12593					X														
34	R02	Jun 03, 2021		Water	S21-Jn12594					X														
35	R03	Jun 03, 2021		Water	S21-Jn12595					X														
36	R04	Jun 03, 2021		Water	S21-Jn12596					X														
37	QA01	Jun 03, 2021		Soil	S21-Jn12597					X														
38	QA02	Jun 03, 2021		Soil	S21-Jn12598					X														
39	QA03	Jun 03, 2021		Soil	S21-Jn12599					X														
40	QA04	Jun 03, 2021		Soil	S21-Jn12600					X														
41	QA05	Jun 03, 2021		Soil	S21-Jn12601					X														
42	QA06	Jun 03, 2021		Soil	S21-Jn12602					X														

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
43	QA07	Jun 03, 2021		Soil	S21-Jn12603					X														
44	QA08	Jun 03, 2021		Soil	S21-Jn12604					X														
45	QA09	Jun 03, 2021		Soil	S21-Jn12605					X														
46	QA10	Jun 03, 2021		Soil	S21-Jn12606					X														
47	QA11	Jun 03, 2021		Soil	S21-Jn12607					X														
48	QA12	Jun 03, 2021		Soil	S21-Jn12608					X														
49	QA13	Jun 03, 2021		Soil	S21-Jn12609					X														
50	QA14	Jun 03, 2021		Soil	S21-Jn12610					X														
51	QA15	Jun 03, 2021		Soil	S21-Jn12611					X														
52	QA16	Jun 03, 2021		Soil	S21-Jn12612					X														
53	QA17	Jun 03, 2021		Soil	S21-Jn12613					X														

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
54	QA18	Jun 03, 2021		Soil	S21-Jn12614					X														
55	QA19	Jun 03, 2021		Soil	S21-Jn12615					X														
56	QA20	Jun 03, 2021		Soil	S21-Jn12616					X														
57	QA21	Jun 03, 2021		Soil	S21-Jn12617					X														
58	QA22	Jun 03, 2021		Soil	S21-Jn12618					X														
59	QA23	Jun 03, 2021		Soil	S21-Jn12619					X														
60	QA24	Jun 03, 2021		Soil	S21-Jn12620					X														
61	QA25	Jun 03, 2021		Soil	S21-Jn12621					X														
62	QA26	Jun 03, 2021		Soil	S21-Jn12622					X														
63	QA27	Jun 03, 2021		Soil	S21-Jn12623					X														
64	QA28	Jun 03, 2021		Soil	S21-Jn12624					X														

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
65	QA29	Jun 03, 2021		Soil	S21-Jn12625					X														
66	QA30	Jun 03, 2021		Soil	S21-Jn12626					X														
67	QA31	Jun 03, 2021		Soil	S21-Jn12627					X														
68	QA32	Jun 03, 2021		Soil	S21-Jn12628					X														
69	QA33	Jun 03, 2021		Soil	S21-Jn12629					X														
70	QA34	Jun 03, 2021		Soil	S21-Jn12630					X														
71	QA37	Jun 03, 2021		Soil	S21-Jn12631					X														
72	QA38	Jun 03, 2021		Soil	S21-Jn12632					X														
73	QA39	Jun 03, 2021		Soil	S21-Jn12633					X														
74	QA40	Jun 03, 2021		Soil	S21-Jn12634					X														
75	QA41	Jun 03, 2021		Soil	S21-Jn12635					X														

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 800910
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 4, 2021 5:45 PM
Due: Jun 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Barium (filtered)	Cobalt	Cobalt (filtered)	HOLD	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Molybdenum	Molybdenum (filtered)	Selenium	Selenium (filtered)	Titanium	Titanium (filtered)	Metals M8	Metals M8 filtered	Hardness Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
Perth Laboratory - NATA Site # 23736																								
Mayfield Laboratory - NATA Site # 25079																								
External Laboratory																								
76	QA42	Jun 03, 2021		Soil	S21-Jn12636					X														
77	QA43	Jun 03, 2021		Soil	S21-Jn12637					X														
78	QA44	Jun 03, 2021		Soil	S21-Jn12638					X														
79	QA45	Jun 03, 2021		Soil	S21-Jn12639					X														
80	QA46	Jun 03, 2021		Soil	S21-Jn12640					X														
Test Counts						32	16	32	16	48	32	16	32	16	32	16	32	16	32	16	32	16	15	16

Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Barium	mg/L	< 0.02			0.02	Pass	
Barium (filtered)	mg/L	< 0.02			0.02	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Molybdenum	mg/L	< 0.005			0.005	Pass	
Molybdenum (filtered)	mg/L	< 0.005			0.005	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	
Titanium	mg/L	< 0.005			0.005	Pass	
Titanium (filtered)	mg/L	< 0.005			0.005	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	91			80-120	Pass	
Arsenic (filtered)	%	101			80-120	Pass	
Barium	%	90			80-120	Pass	
Barium (filtered)	%	102			80-120	Pass	
Cadmium	%	91			80-120	Pass	
Cadmium (filtered)	%	103			80-120	Pass	
Chromium	%	92			80-120	Pass	
Chromium (filtered)	%	101			80-120	Pass	
Cobalt	%	88			80-120	Pass	
Cobalt (filtered)	%	102			80-120	Pass	
Copper	%	90			80-120	Pass	
Copper (filtered)	%	100			80-120	Pass	
Iron	%	92			80-120	Pass	
Iron (filtered)	%	102			80-120	Pass	
Lead	%	90			80-120	Pass	
Lead (filtered)	%	104			80-120	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Manganese			%	90			80-120	Pass	
Manganese (filtered)			%	103			80-120	Pass	
Mercury			%	97			80-120	Pass	
Mercury (filtered)			%	100			80-120	Pass	
Molybdenum			%	100			80-120	Pass	
Molybdenum (filtered)			%	120			80-120	Pass	
Nickel			%	92			80-120	Pass	
Nickel (filtered)			%	101			80-120	Pass	
Selenium			%	89			80-120	Pass	
Selenium (filtered)			%	108			80-120	Pass	
Titanium			%	95			80-120	Pass	
Titanium (filtered)			%	106			80-120	Pass	
Zinc			%	90			80-120	Pass	
Zinc (filtered)			%	103			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	96			80-120	Pass	
Magnesium			%	101			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Iron	S21-Jn12705	NCP	%	89			75-125	Pass	
Manganese	S21-Jn12705	NCP	%	86			75-125	Pass	
Zinc	S21-Jn12705	NCP	%	94			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S21-Jn12705	NCP	%	90			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S21-Jn12573	CP	%	94			75-125	Pass	
Barium (filtered)	S21-Jn12573	CP	%	86			75-125	Pass	
Cadmium (filtered)	S21-Jn12573	CP	%	87			75-125	Pass	
Chromium (filtered)	S21-Jn12573	CP	%	95			75-125	Pass	
Cobalt (filtered)	S21-Jn12573	CP	%	94			75-125	Pass	
Iron (filtered)	S21-Jn12573	CP	%	99			75-125	Pass	
Lead (filtered)	S21-Jn12573	CP	%	89			75-125	Pass	
Mercury (filtered)	S21-Jn12573	CP	%	101			75-125	Pass	
Nickel (filtered)	S21-Jn12573	CP	%	100			75-125	Pass	
Selenium (filtered)	S21-Jn12573	CP	%	101			75-125	Pass	
Titanium (filtered)	S21-Jn12573	CP	%	99			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn12592	CP	%	98			75-125	Pass	
Barium	S21-Jn12592	CP	%	94			75-125	Pass	
Cadmium	S21-Jn12592	CP	%	116			75-125	Pass	
Chromium	S21-Jn12592	CP	%	92			75-125	Pass	
Cobalt	S21-Jn12592	CP	%	90			75-125	Pass	
Copper	S21-Jn12592	CP	%	93			75-125	Pass	
Lead	S21-Jn12592	CP	%	102			75-125	Pass	
Mercury	S21-Jn12592	CP	%	101			75-125	Pass	
Molybdenum	S21-Jn12592	CP	%	93			75-125	Pass	
Nickel	S21-Jn12592	CP	%	92			75-125	Pass	
Selenium	S21-Jn12592	CP	%	98			75-125	Pass	
Titanium	S21-Jn12592	CP	%	94			75-125	Pass	

eurofins

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Alkali Metals				Result 1					
Magnesium	S21-Jn12592	CP	%	102			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Jn12561	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Arsenic (filtered)	S21-Jn12561	CP	mg/L	< 0.001	0.001	18	30%	Pass	
Barium	S21-Jn12561	CP	mg/L	0.02	0.02	3.0	30%	Pass	
Barium (filtered)	S21-Jn12561	CP	mg/L	0.02	0.02	11	30%	Pass	
Cadmium	S21-Jn12561	CP	mg/L	0.0019	0.0019	2.0	30%	Pass	
Cadmium (filtered)	S21-Jn12561	CP	mg/L	0.0019	0.0019	3.0	30%	Pass	
Chromium	S21-Jn12561	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chromium (filtered)	S21-Jn12561	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S21-Jn12561	CP	mg/L	0.003	0.003	2.0	30%	Pass	
Cobalt (filtered)	S21-Jn12561	CP	mg/L	0.003	0.003	10	30%	Pass	
Copper	S21-Jn12561	CP	mg/L	0.012	0.012	1.0	30%	Pass	
Copper (filtered)	S21-Jn12561	CP	mg/L	0.008	0.008	2.0	30%	Pass	
Iron	S21-Jn12561	CP	mg/L	2.1	2.1	2.0	30%	Pass	
Iron (filtered)	S21-Jn12561	CP	mg/L	0.63	0.64	3.0	30%	Pass	
Lead	S21-Jn12561	CP	mg/L	0.019	0.019	1.0	30%	Pass	
Lead (filtered)	S21-Jn12561	CP	mg/L	0.007	0.006	4.0	30%	Pass	
Manganese	S21-Jn12561	CP	mg/L	0.31	0.31	<1	30%	Pass	
Manganese (filtered)	S21-Jn12561	CP	mg/L	0.30	0.31	2.0	30%	Pass	
Mercury	S21-Jn12561	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Mercury (filtered)	S21-Jn12561	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S21-Jn12561	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Molybdenum (filtered)	S21-Jn12561	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nickel	S21-Jn12561	CP	mg/L	0.005	0.005	6.0	30%	Pass	
Nickel (filtered)	S21-Jn12561	CP	mg/L	0.004	0.005	10	30%	Pass	
Selenium	S21-Jn12561	CP	mg/L	0.001	< 0.001	43	30%	Fail	Q15
Selenium (filtered)	S21-Jn12561	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Titanium	S21-Jn12561	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Titanium (filtered)	S21-Jn12561	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	S21-Jn12561	CP	mg/L	2.3	2.3	<1	30%	Pass	
Zinc (filtered)	S21-Jn12561	CP	mg/L	1.6	1.6	2.0	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S21-Jn12561	CP	mg/L	11	11	<1	30%	Pass	
Magnesium	S21-Jn12561	CP	mg/L	8.8	8.9	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Jn12575	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Barium	S21-Jn12575	CP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Cadmium	S21-Jn12575	CP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S21-Jn12575	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt	S21-Jn12575	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S21-Jn12575	CP	mg/L	0.002	0.002	8.0	30%	Pass	
Iron	S21-Jn12575	CP	mg/L	0.69	0.57	18	30%	Pass	
Lead	S21-Jn12575	CP	mg/L	0.004	0.005	2.0	30%	Pass	
Manganese	S21-Jn12575	CP	mg/L	0.027	0.027	1.0	30%	Pass	
Mercury	S21-Jn12575	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S21-Jn12575	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nickel	S21-Jn12575	CP	mg/L	0.003	0.002	22	30%	Pass	

eurofins | Environment Testing

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Selenium	S21-Jn12575	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Titanium	S21-Jn12575	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	S21-Jn12575	CP	mg/L	0.042	0.039	8.0	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	S21-Jn12575	CP	mg/L	2.6	2.7	6.0	30%	Pass	
Magnesium	S21-Jn12575	CP	mg/L	2.8	2.9	2.0	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
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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 | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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 and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report	**802794-S**
Project name	ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jun 15, 2021

Client Sample ID			**SED1**	**SED2**	**SED3**	**SED4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn27518**	**S21-Jn27519**	**S21-Jn27520**	**S21-Jn27521**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	17000	12000	14000	9600
% Moisture	1	%	78	65	59	65

Client Sample ID			**SED5**	**SED6**	**SED7**	**SED8**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn27522**	**S21-Jn27523**	**S21-Jn27524**	**S21-Jn27525**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	6000	5500	5700	15000
% Moisture	1	%	36	19	14	31

Client Sample ID			**SED9**	**SED10**	**SED11**	**SED12**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn27526**	**S21-Jn27527**	**S21-Jn27528**	**S21-Jn27529**
Date Sampled			**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**	**Jun 03, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	5100	3600	14000	4000
% Moisture	1	%	15	18	55	8.5

Eurofins Environment Testing

Client Sample ID			SED13	SED14	SED15	QA35
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27530	S21-Jn27531	S21-Jn27532	S21-Jn27533
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	9900	10000	4500	2900
% Moisture	1	%	16	62	23	25

Client Sample ID			QA01	QA02	QA03	QA04
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27539	S21-Jn27540	S21-Jn27541	S21-Jn27542
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	5000	4100	5000	6000
% Moisture	1	%	9.3	6.9	4.4	30

Client Sample ID			QA05	QA06	QA07	QA08
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27543	S21-Jn27544	S21-Jn27545	S21-Jn27546
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	7500	6600	2800	7400
% Moisture	1	%	12	11	5.8	33

Client Sample ID			QA09	QA10	QA11	QA12
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27547	S21-Jn27548	S21-Jn27549	S21-Jn27550
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	7100	3300	7700	9500
% Moisture	1	%	28	35	1.8	4.4

eurofins

Environment Testing

Client Sample ID			QA13	QA14	QA15	QA16
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27551	S21-Jn27552	S21-Jn27553	S21-Jn27554
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	10000	2500	2400	7800
% Moisture	1	%	11	12	1.9	5.4

Client Sample ID			QA17	QA18	QA19	QA20
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27555	S21-Jn27556	S21-Jn27557	S21-Jn27558
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	3800	1700	3300	10000
% Moisture	1	%	4.0	4.0	7.6	16

Client Sample ID			QA21	QA22	QA23	QA24
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27559	S21-Jn27560	S21-Jn27561	S21-Jn27562
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	23000	19000	14000	9500
% Moisture	1	%	16	16	4.8	6.0

Client Sample ID			QA25	QA26	QA27	QA28
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27563	S21-Jn27564	S21-Jn27565	S21-Jn27566
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	11000	7600	8400	8300
% Moisture	1	%	13	23	24	25

Client Sample ID			QA29	QA30	QA31	QA32
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27567	S21-Jn27568	S21-Jn27569	S21-Jn27570
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	3100	12000	12000	11000
% Moisture	1	%	1.2	< 1	12	9.4

Client Sample ID			QA33	QA34	QA37	QA38
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27571	S21-Jn27572	S21-Jn27575	S21-Jn27576
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	6500	6300	18000	18000
% Moisture	1	%	8.7	9.2	5.6	6.6

Client Sample ID			QA39	QA40	QA41	QA42
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27577	S21-Jn27578	S21-Jn27579	S21-Jn27580
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	24000	14000	14000	14000
% Moisture	1	%	9.1	2.8	14	16

Client Sample ID			QA43	QA44	QA45	QA46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S21-Jn27581	S21-Jn27582	S21-Jn27583	S21-Jn27584
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	20	mg/kg	7500	8000	7000	12000
% Moisture	1	%	12	15	24	18

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
Heavy Metals	Sydney	Jun 15, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jun 15, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SW1	Jun 03, 2021		Water	S21-Jn27503	X	X	
2	SW2	Jun 03, 2021		Water	S21-Jn27504	X	X	
3	SW3	Jun 03, 2021		Water	S21-Jn27505	X	X	
4	SW4	Jun 03, 2021		Water	S21-Jn27506	X	X	
5	SW5	Jun 03, 2021		Water	S21-Jn27507	X	X	
6	SW6	Jun 03, 2021		Water	S21-Jn27508	X	X	
7	SW7	Jun 03, 2021		Water	S21-Jn27509	X	X	
8	SW8	Jun 03, 2021		Water	S21-Jn27510	X	X	
9	SW9	Jun 03, 2021		Water	S21-Jn27511	X	X	

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
10	SW10	Jun 03, 2021		Water	S21-Jn27512	X	X	
11	SW11	Jun 03, 2021		Water	S21-Jn27513	X	X	
12	SW12	Jun 03, 2021		Water	S21-Jn27514	X	X	
13	SW13	Jun 03, 2021		Water	S21-Jn27515	X	X	
14	SW14	Jun 03, 2021		Water	S21-Jn27516	X	X	
15	SW15	Jun 03, 2021		Water	S21-Jn27517	X	X	
16	SED1	Jun 03, 2021		Soil	S21-Jn27518	X		X
17	SED2	Jun 03, 2021		Soil	S21-Jn27519	X		X
18	SED3	Jun 03, 2021		Soil	S21-Jn27520	X		X
19	SED4	Jun 03, 2021		Soil	S21-Jn27521	X		X
20	SED5	Jun 03, 2021		Soil	S21-Jn27522	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
21	SED6	Jun 03, 2021		Soil	S21-Jn27523	X		X
22	SED7	Jun 03, 2021		Soil	S21-Jn27524	X		X
23	SED8	Jun 03, 2021		Soil	S21-Jn27525	X		X
24	SED9	Jun 03, 2021		Soil	S21-Jn27526	X		X
25	SED10	Jun 03, 2021		Soil	S21-Jn27527	X		X
26	SED11	Jun 03, 2021		Soil	S21-Jn27528	X		X
27	SED12	Jun 03, 2021		Soil	S21-Jn27529	X		X
28	SED13	Jun 03, 2021		Soil	S21-Jn27530	X		X
29	SED14	Jun 03, 2021		Soil	S21-Jn27531	X		X
30	SED15	Jun 03, 2021		Soil	S21-Jn27532	X		X
31	QA35	Jun 03, 2021		Soil	S21-Jn27533	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
32	QA35	Jun 03, 2021		Water	S21-Jn27534	X	X	
33	R01	Jun 03, 2021		Water	S21-Jn27535	X		
34	R02	Jun 03, 2021		Water	S21-Jn27536	X		
35	R03	Jun 03, 2021		Water	S21-Jn27537	X		
36	R04	Jun 03, 2021		Water	S21-Jn27538	X		
37	QA01	Jun 03, 2021		Soil	S21-Jn27539	X		X
38	QA02	Jun 03, 2021		Soil	S21-Jn27540	X		X
39	QA03	Jun 03, 2021		Soil	S21-Jn27541	X		X
40	QA04	Jun 03, 2021		Soil	S21-Jn27542	X		X
41	QA05	Jun 03, 2021		Soil	S21-Jn27543	X		X
42	QA06	Jun 03, 2021		Soil	S21-Jn27544	X		X

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 15, 2021 3:39 AM
Address:	Level 3/100 Pacific Highway	**Report #:**	802794	**Due:**	Jun 18, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	3 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
43	QA07	Jun 03, 2021		Soil	S21-Jn27545	X		X
44	QA08	Jun 03, 2021		Soil	S21-Jn27546	X		X
45	QA09	Jun 03, 2021		Soil	S21-Jn27547	X		X
46	QA10	Jun 03, 2021		Soil	S21-Jn27548	X		X
47	QA11	Jun 03, 2021		Soil	S21-Jn27549	X		X
48	QA12	Jun 03, 2021		Soil	S21-Jn27550	X		X
49	QA13	Jun 03, 2021		Soil	S21-Jn27551	X		X
50	QA14	Jun 03, 2021		Soil	S21-Jn27552	X		X
51	QA15	Jun 03, 2021		Soil	S21-Jn27553	X		X
52	QA16	Jun 03, 2021		Soil	S21-Jn27554	X		X
53	QA17	Jun 03, 2021		Soil	S21-Jn27555	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
54	QA18	Jun 03, 2021		Soil	S21-Jn27556	X		X
55	QA19	Jun 03, 2021		Soil	S21-Jn27557	X		X
56	QA20	Jun 03, 2021		Soil	S21-Jn27558	X		X
57	QA21	Jun 03, 2021		Soil	S21-Jn27559	X		X
58	QA22	Jun 03, 2021		Soil	S21-Jn27560	X		X
59	QA23	Jun 03, 2021		Soil	S21-Jn27561	X		X
60	QA24	Jun 03, 2021		Soil	S21-Jn27562	X		X
61	QA25	Jun 03, 2021		Soil	S21-Jn27563	X		X
62	QA26	Jun 03, 2021		Soil	S21-Jn27564	X		X
63	QA27	Jun 03, 2021		Soil	S21-Jn27565	X		X
64	QA28	Jun 03, 2021		Soil	S21-Jn27566	X		X

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
65	QA29	Jun 03, 2021		Soil	S21-Jn27567	X		X
66	QA30	Jun 03, 2021		Soil	S21-Jn27568	X		X
67	QA31	Jun 03, 2021		Soil	S21-Jn27569	X		X
68	QA32	Jun 03, 2021		Soil	S21-Jn27570	X		X
69	QA33	Jun 03, 2021		Soil	S21-Jn27571	X		X
70	QA34	Jun 03, 2021		Soil	S21-Jn27572	X		X
71	QA37	Jun 03, 2021		Soil	S21-Jn27575	X		X
72	QA38	Jun 03, 2021		Soil	S21-Jn27576	X		X
73	QA39	Jun 03, 2021		Soil	S21-Jn27577	X		X
74	QA40	Jun 03, 2021		Soil	S21-Jn27578	X		X
75	QA41	Jun 03, 2021		Soil	S21-Jn27579	X		X

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271

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

Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
76	QA42	Jun 03, 2021		Soil	S21-Jn27580	X		X
77	QA43	Jun 03, 2021		Soil	S21-Jn27581	X		X
78	QA44	Jun 03, 2021		Soil	S21-Jn27582	X		X
79	QA45	Jun 03, 2021		Soil	S21-Jn27583	X		X
80	QA46	Jun 03, 2021		Soil	S21-Jn27584	X		X
Test Counts						80	16	60

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Aluminium			mg/kg	< 20			20	Pass	
LCS - % Recovery									
Heavy Metals									
Aluminium			%	116			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S21-Jn27567	CP	%	102			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27519	CP	mg/kg	12000	15000	16	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27521	CP	%	65	67	3.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27531	CP	%	62	61	2.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27546	CP	%	33	31	6.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27556	CP	mg/kg	1700	1800	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27556	CP	%	4.0	4.3	8.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27561	CP	mg/kg	14000	13000	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27562	CP	mg/kg	9500	9600	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27566	CP	%	25	22	12	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27576	CP	mg/kg	18000	15000	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn27576	CP	%	6.6	6.6	1.0	30%	Pass	

eurofins | Environment Testing

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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 and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report **802794-W**
Project name ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jun 15, 2021

Client Sample ID			SW1	SW2	SW3	SW4
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn27503	S21-Jn27504	S21-Jn27505	S21-Jn27506
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	0.33	0.70	1.6	0.62
Aluminium (filtered)	0.05	mg/L	0.09	0.06	< 0.05	0.10

Client Sample ID			SW5	SW6	SW7	SW8
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn27507	S21-Jn27508	S21-Jn27509	S21-Jn27510
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	13	2.5	2.0	16
Aluminium (filtered)	0.05	mg/L	13	0.74	0.51	13

Client Sample ID			SW9	SW10	SW11	SW12
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn27511	S21-Jn27512	S21-Jn27513	S21-Jn27514
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	16	2.6	0.50	24
Aluminium (filtered)	0.05	mg/L	15	1.2	0.16	23

Client Sample ID			SW13	SW14	SW15	QA35
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn27515	S21-Jn27516	S21-Jn27517	S21-Jn27534
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	2.4	0.27	0.21	14
Aluminium (filtered)	0.05	mg/L	1.1	0.14	0.10	12

eurofins | Environment Testing

Client Sample ID			R01	R02	R03	R04
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			S21-Jn27535	S21-Jn27536	S21-Jn27537	S21-Jn27538
Date Sampled			Jun 03, 2021	Jun 03, 2021	Jun 03, 2021	Jun 03, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	0.05	mg/L	< 0.05	0.20	< 0.05	< 0.05

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
Heavy Metals	Sydney	Jun 18, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Sydney	Jun 15, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SW1	Jun 03, 2021		Water	S21-Jn27503	X	X	
2	SW2	Jun 03, 2021		Water	S21-Jn27504	X	X	
3	SW3	Jun 03, 2021		Water	S21-Jn27505	X	X	
4	SW4	Jun 03, 2021		Water	S21-Jn27506	X	X	
5	SW5	Jun 03, 2021		Water	S21-Jn27507	X	X	
6	SW6	Jun 03, 2021		Water	S21-Jn27508	X	X	
7	SW7	Jun 03, 2021		Water	S21-Jn27509	X	X	
8	SW8	Jun 03, 2021		Water	S21-Jn27510	X	X	
9	SW9	Jun 03, 2021		Water	S21-Jn27511	X	X	

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
10	SW10	Jun 03, 2021		Water	S21-Jn27512	X	X	
11	SW11	Jun 03, 2021		Water	S21-Jn27513	X	X	
12	SW12	Jun 03, 2021		Water	S21-Jn27514	X	X	
13	SW13	Jun 03, 2021		Water	S21-Jn27515	X	X	
14	SW14	Jun 03, 2021		Water	S21-Jn27516	X	X	
15	SW15	Jun 03, 2021		Water	S21-Jn27517	X	X	
16	SED1	Jun 03, 2021		Soil	S21-Jn27518	X		X
17	SED2	Jun 03, 2021		Soil	S21-Jn27519	X		X
18	SED3	Jun 03, 2021		Soil	S21-Jn27520	X		X
19	SED4	Jun 03, 2021		Soil	S21-Jn27521	X		X
20	SED5	Jun 03, 2021		Soil	S21-Jn27522	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
21	SED6	Jun 03, 2021		Soil	S21-Jn27523	X		X
22	SED7	Jun 03, 2021		Soil	S21-Jn27524	X		X
23	SED8	Jun 03, 2021		Soil	S21-Jn27525	X		X
24	SED9	Jun 03, 2021		Soil	S21-Jn27526	X		X
25	SED10	Jun 03, 2021		Soil	S21-Jn27527	X		X
26	SED11	Jun 03, 2021		Soil	S21-Jn27528	X		X
27	SED12	Jun 03, 2021		Soil	S21-Jn27529	X		X
28	SED13	Jun 03, 2021		Soil	S21-Jn27530	X		X
29	SED14	Jun 03, 2021		Soil	S21-Jn27531	X		X
30	SED15	Jun 03, 2021		Soil	S21-Jn27532	X		X
31	QA35	Jun 03, 2021		Soil	S21-Jn27533	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
32	QA35	Jun 03, 2021		Water	S21-Jn27534	X	X	
33	R01	Jun 03, 2021		Water	S21-Jn27535	X		
34	R02	Jun 03, 2021		Water	S21-Jn27536	X		
35	R03	Jun 03, 2021		Water	S21-Jn27537	X		
36	R04	Jun 03, 2021		Water	S21-Jn27538	X		
37	QA01	Jun 03, 2021		Soil	S21-Jn27539	X		X
38	QA02	Jun 03, 2021		Soil	S21-Jn27540	X		X
39	QA03	Jun 03, 2021		Soil	S21-Jn27541	X		X
40	QA04	Jun 03, 2021		Soil	S21-Jn27542	X		X
41	QA05	Jun 03, 2021		Soil	S21-Jn27543	X		X
42	QA06	Jun 03, 2021		Soil	S21-Jn27544	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
43	QA07	Jun 03, 2021		Soil	S21-Jn27545	X		X
44	QA08	Jun 03, 2021		Soil	S21-Jn27546	X		X
45	QA09	Jun 03, 2021		Soil	S21-Jn27547	X		X
46	QA10	Jun 03, 2021		Soil	S21-Jn27548	X		X
47	QA11	Jun 03, 2021		Soil	S21-Jn27549	X		X
48	QA12	Jun 03, 2021		Soil	S21-Jn27550	X		X
49	QA13	Jun 03, 2021		Soil	S21-Jn27551	X		X
50	QA14	Jun 03, 2021		Soil	S21-Jn27552	X		X
51	QA15	Jun 03, 2021		Soil	S21-Jn27553	X		X
52	QA16	Jun 03, 2021		Soil	S21-Jn27554	X		X
53	QA17	Jun 03, 2021		Soil	S21-Jn27555	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
54	QA18	Jun 03, 2021		Soil	S21-Jn27556	X		X
55	QA19	Jun 03, 2021		Soil	S21-Jn27557	X		X
56	QA20	Jun 03, 2021		Soil	S21-Jn27558	X		X
57	QA21	Jun 03, 2021		Soil	S21-Jn27559	X		X
58	QA22	Jun 03, 2021		Soil	S21-Jn27560	X		X
59	QA23	Jun 03, 2021		Soil	S21-Jn27561	X		X
60	QA24	Jun 03, 2021		Soil	S21-Jn27562	X		X
61	QA25	Jun 03, 2021		Soil	S21-Jn27563	X		X
62	QA26	Jun 03, 2021		Soil	S21-Jn27564	X		X
63	QA27	Jun 03, 2021		Soil	S21-Jn27565	X		X
64	QA28	Jun 03, 2021		Soil	S21-Jn27566	X		X

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	802794
		Phone:	02 9954 8118
		Fax:	02 9954 8150
Project Name:	ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN	**Received:**	Jun 15, 2021 3:39 AM
Project ID:	318001193	**Due:**	Jun 18, 2021
		Priority:	3 Day
		Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
65	QA29	Jun 03, 2021		Soil	S21-Jn27567	X		X
66	QA30	Jun 03, 2021		Soil	S21-Jn27568	X		X
67	QA31	Jun 03, 2021		Soil	S21-Jn27569	X		X
68	QA32	Jun 03, 2021		Soil	S21-Jn27570	X		X
69	QA33	Jun 03, 2021		Soil	S21-Jn27571	X		X
70	QA34	Jun 03, 2021		Soil	S21-Jn27572	X		X
71	QA37	Jun 03, 2021		Soil	S21-Jn27575	X		X
72	QA38	Jun 03, 2021		Soil	S21-Jn27576	X		X
73	QA39	Jun 03, 2021		Soil	S21-Jn27577	X		X
74	QA40	Jun 03, 2021		Soil	S21-Jn27578	X		X
75	QA41	Jun 03, 2021		Soil	S21-Jn27579	X		X

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 802794
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 15, 2021 3:39 AM
Due: Jun 18, 2021
Priority: 3 Day
Contact Name: Stephen Maxwell

Project Name: ADDITIONAL - CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium	Aluminium (filtered)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
76	QA42	Jun 03, 2021		Soil	S21-Jn27580	X		X
77	QA43	Jun 03, 2021		Soil	S21-Jn27581	X		X
78	QA44	Jun 03, 2021		Soil	S21-Jn27582	X		X
79	QA45	Jun 03, 2021		Soil	S21-Jn27583	X		X
80	QA46	Jun 03, 2021		Soil	S21-Jn27584	X		X
Test Counts						80	16	60

eurofins Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Environment Testing

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Aluminium			mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)			mg/L	< 0.05			0.05	Pass	
LCS - % Recovery									
Heavy Metals									
Aluminium			%	86			80-120	Pass	
Aluminium (filtered)			%	87			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium (filtered)	S21-Jn23394	NCP	%	82			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S21-Jn27534	CP	%	118			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S21-Jn27536	CP	%	90			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27503	CP	mg/L	0.33	0.36	7.0	30%	Pass	
Aluminium (filtered)	S21-Jn27503	CP	mg/L	0.09	0.09	2.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium (filtered)	S21-Jn27513	CP	mg/L	0.16	0.18	12	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27517	CP	mg/L	0.21	0.18	14	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn27535	CP	mg/L	< 0.05	< 0.05	<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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200   fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 271012

Client Details

Client	Ramboll Australia Pty Ltd
Attention	Stephen Maxwell
Address	PO Box 560, North Sydney, NSW, 2060

Sample Details

Your Reference	**318001193, Captains Flat Lead Management Plan**
Number of Samples	1 Soil, 1 Water
Date samples received	07/06/2021
Date completed instructions received	07/06/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

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

Report Details

Date results requested by	15/06/2021
Date of Issue	15/06/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Giovanni Agosti, Group Technical Manager
Hannah Nguyen, Senior Chemist
Thomas Beenie, Lab Technician

Authorised By

Nancy Zhang, Laboratory Manager

Acid Extractractable metals in soil		
Our Reference		271012-1
Your Reference	UNITS	QA36
Date Sampled		03/06/2021
Type of sample		Soil
Date prepared	-	15/06/2021
Date analysed	-	15/06/2021
Arsenic	mg/kg	31
Barium	mg/kg	30
Cadmium	mg/kg	<0.4
Chromium	mg/kg	3
Cobalt	mg/kg	<1
Copper	mg/kg	200
Iron	mg/kg	4,400
Lead	mg/kg	1,300
Manganese	mg/kg	30
Mercury	mg/kg	0.4
Molybdenum	mg/kg	<1
Nickel	mg/kg	1
Selenium	mg/kg	<12
Titanium	mg/kg	24
Zinc	mg/kg	480
Aluminium	mg/kg	230

Moisture		
Our Reference		271012-1
Your Reference	UNITS	QA36
Date Sampled		03/06/2021
Type of sample		Soil
Date prepared	-	08/06/2021
Date analysed	-	09/06/2021
Moisture	%	33

All metals in water-dissolved		
Our Reference		271012-2
Your Reference	UNITS	QA36
Date Sampled		03/06/2021
Type of sample		Water
Date prepared	-	08/06/2021
Date analysed	-	08/06/2021
Arsenic-Dissolved	µg/L	6
Barium-Dissolved	µg/L	6
Cadmium-Dissolved	µg/L	100
Cobalt-Dissolved	µg/L	67
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	240
Iron-Dissolved	µg/L	170,000
Mercury-Dissolved	µg/L	<0.05
Manganese-Dissolved	µg/L	11,000
Molybdenum-Dissolved	µg/L	<1
Nickel-Dissolved	µg/L	47
Lead-Dissolved	µg/L	1,400
Selenium-Dissolved	µg/L	<1
Titanium-Dissolved	µg/L	<1
Zinc-Dissolved	µg/L	140,000
Aluminium-Dissolved	µg/L	16,000

All metals in water - total		
Our Reference		271012-2
Your Reference	UNITS	QA36
Date Sampled		03/06/2021
Type of sample		Water
Date prepared	-	10/06/2021
Date analysed	-	10/06/2021
Arsenic-Total	µg/L	11
Barium-Total	µg/L	9
Cadmium-Total	µg/L	120
Cobalt-Total	µg/L	90
Chromium-Total	µg/L	<1
Copper-Total	µg/L	330
Iron-Total	µg/L	160,000
Mercury-Total	µg/L	<0.05
Manganese-Total	µg/L	11,000
Molybdenum-Total	µg/L	<1
Nickel-Total	µg/L	66
Lead-Total	µg/L	1,300
Selenium-Total	µg/L	2
Titanium-Total	µg/L	1.1
Zinc-Total	µg/L	130,000
Aluminium-Total	µg/L	14,000

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.

QUALITY CONTROL: Acid Extractractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			15/06/2021	[NT]	[NT]	[NT]	[NT]	15/06/2021	[NT]
Date analysed	-			15/06/2021	[NT]	[NT]	[NT]	[NT]	15/06/2021	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	94	[NT]
Barium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	89	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Cobalt	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Iron	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	114	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Manganese	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Molybdenum	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Selenium	mg/kg	2	Metals-020	<2	[NT]	[NT]	[NT]	[NT]	90	[NT]
Titanium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Aluminium	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: All metals in water-dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			09/06/2021	[NT]	[NT]	[NT]	[NT]	09/06/2021	[NT]
Date analysed	-			09/06/2021	[NT]	[NT]	[NT]	[NT]	09/06/2021	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Barium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Cobalt-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	95	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	98	[NT]
Molybdenum-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Selenium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Titanium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Aluminium-Dissolved	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: All metals in water - total					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			09/06/2021	[NT]	[NT]	[NT]	[NT]	09/06/2021	[NT]
Date analysed	-			09/06/2021	[NT]	[NT]	[NT]	[NT]	09/06/2021	[NT]
Arsenic-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Barium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Cadmium-Total	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Cobalt-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Chromium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Copper-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Iron-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	112	[NT]
Mercury-Total	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	[NT]	[NT]	96	[NT]
Manganese-Total	µg/L	5	Metals-022	<5	[NT]	[NT]	[NT]	[NT]	109	[NT]
Molybdenum-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Nickel-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Lead-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Selenium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Titanium-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Zinc-Total	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Aluminium-Total	µg/L	10	Metals-022	<10	[NT]	[NT]	[NT]	[NT]	118	[NT]

Result Definitions	
NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments
The PQL for Se has been raised due to interferences from analytes (other than those being tested) in sample 271012-1.

eurofins

Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 25079

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: **Stephen Maxwell**

Report **804715-W**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jun 22, 2021

Client Sample ID			**GW1**	**GW2**	**GW3**	**GW4**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**N21-Jn42606**	**N21-Jn42607**	**N21-Jn42608**	**N21-Jn42609**
Date Sampled			**Jun 18, 2021**	**Jun 18, 2021**	**Jun 18, 2021**	**Jun 18, 2021**
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	460	280	840	260
Heavy Metals						
Aluminium (filtered)	0.05	mg/L	0.13	0.35	15	< 0.05
Arsenic (filtered)	0.001	mg/L	0.002	0.001	0.007	0.001
Barium (filtered)	0.02	mg/L	0.07	0.04	0.05	0.05
Cadmium (filtered)	0.0002	mg/L	0.049	0.090	0.17	0.0009
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	0.007	0.002
Cobalt (filtered)	0.001	mg/L	0.32	0.16	0.19	0.011
Copper (filtered)	0.001	mg/L	0.083	0.097	2.7	0.007
Iron (filtered)	0.05	mg/L	< 0.05	0.06	7.2	< 0.05
Lead (filtered)	0.001	mg/L	0.41	0.017	0.049	< 0.001
Manganese (filtered)	0.005	mg/L	11	8.4	7.5	0.87
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Nickel (filtered)	0.001	mg/L	0.14	0.11	0.18	0.014
Selenium (filtered)	0.001	mg/L	0.005	0.004	0.009	0.003
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc (filtered)	0.005	mg/L	23	37	47	0.48
Alkali Metals						
Calcium	0.5	mg/L	56	64	140	62
Magnesium	0.5	mg/L	77	30	120	26

Client Sample ID			**GW5**	**GW6**	**GW9_S**	**GW9_D**
Sample Matrix			**Water**	**Water**	**Water**	**Water**
Eurofins Sample No.			**N21-Jn42610**	**N21-Jn42611**	**N21-Jn42612**	**N21-Jn42613**
Date Sampled			**Jun 18, 2021**	**Jun 18, 2021**	**Jun 18, 2021**	**Jun 18, 2021**
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	140	180	1700	1600
Heavy Metals						
Aluminium (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic (filtered)	0.001	mg/L	0.001	0.001	0.001	0.002
Barium (filtered)	0.02	mg/L	0.04	0.03	0.04	0.02
Cadmium (filtered)	0.0002	mg/L	0.0003	< 0.0002	< 0.0002	0.0003

eurofins

Environment Testing

Client Sample ID			GW5	GW6	GW9_S	GW9_D
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N21-Jn42610	N21-Jn42611	N21-Jn42612	N21-Jn42613
Date Sampled			Jun 18, 2021	Jun 18, 2021	Jun 18, 2021	Jun 18, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Chromium (filtered)	0.001	mg/L	< 0.001	0.001	< 0.001	< 0.001
Cobalt (filtered)	0.001	mg/L	0.007	< 0.001	0.014	0.013
Copper (filtered)	0.001	mg/L	0.003	0.004	0.002	0.002
Iron (filtered)	0.05	mg/L	< 0.05	< 0.05	< 0.05	0.44
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	0.001
Manganese (filtered)	0.005	mg/L	1.7	0.095	20	9.7
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Molybdenum (filtered)	0.005	mg/L	< 0.005	< 0.005	0.007	< 0.005
Nickel (filtered)	0.001	mg/L	0.003	0.004	0.015	0.005
Selenium (filtered)	0.001	mg/L	< 0.001	0.001	0.005	0.005
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	< 0.005
Zinc (filtered)	0.005	mg/L	0.081	0.067	0.22	0.53
Alkali Metals						
Calcium	0.5	mg/L	28	49	450	460
Magnesium	0.5	mg/L	17	13	130	110

Client Sample ID			GW10	D01_180621	T01_180621	R10
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N21-Jn42614	N21-Jn42615	N21-Jn42616	N21-Jn42617
Date Sampled			Jun 18, 2021	Jun 18, 2021	Jun 18, 2021	Jun 16, 2021
Test/Reference	LOR	Unit				
Hardness mg equivalent CaCO3/L	1	mg/L	440	-	-	-
Heavy Metals						
Aluminium	0.05	mg/L	-	-	-	< 0.05
Aluminium (filtered)	0.05	mg/L	< 0.05	0.38	0.36	-
Arsenic	0.001	mg/L	-	-	-	< 0.001
Arsenic (filtered)	0.001	mg/L	0.001	< 0.001	0.001	-
Barium	0.02	mg/L	-	-	-	< 0.02
Barium (filtered)	0.02	mg/L	0.05	0.04	0.03	-
Cadmium	0.0002	mg/L	-	-	-	< 0.0002
Cadmium (filtered)	0.0002	mg/L	0.0097	0.092	0.089	-
Chromium	0.001	mg/L	-	-	-	< 0.001
Chromium (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-
Cobalt	0.001	mg/L	-	-	-	< 0.001
Cobalt (filtered)	0.001	mg/L	0.078	0.17	0.17	-
Copper	0.001	mg/L	-	-	-	< 0.001
Copper (filtered)	0.001	mg/L	0.004	0.10	0.10	-
Iron	0.05	mg/L	-	-	-	< 0.05
Iron (filtered)	0.05	mg/L	< 0.05	0.05	< 0.05	-
Lead	0.001	mg/L	-	-	-	< 0.001
Lead (filtered)	0.001	mg/L	< 0.001	0.015	0.016	-
Manganese	0.005	mg/L	-	-	-	< 0.005
Manganese (filtered)	0.005	mg/L	1.6	8.7	8.6	-
Mercury	0.0001	mg/L	-	-	-	< 0.0001
Mercury (filtered)	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001	-
Molybdenum	0.005	mg/L	-	-	-	< 0.005
Molybdenum (filtered)	0.005	mg/L	0.007	< 0.005	< 0.005	-

eurofins

Environment Testing

Client Sample ID			GW10	D01_180621	T01_180621	R10
Sample Matrix			Water	Water	Water	Water
Eurofins Sample No.			N21-Jn42614	N21-Jn42615	N21-Jn42616	N21-Jn42617
Date Sampled			Jun 18, 2021	Jun 18, 2021	Jun 18, 2021	Jun 16, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Nickel	0.001	mg/L	-	-	-	< 0.001
Nickel (filtered)	0.001	mg/L	0.12	0.12	0.12	-
Selenium	0.001	mg/L	-	-	-	< 0.001
Selenium (filtered)	0.001	mg/L	0.004	0.001	< 0.001	-
Titanium	0.005	mg/L	-	-	-	< 0.005
Titanium (filtered)	0.005	mg/L	< 0.005	< 0.005	< 0.005	-
Zinc	0.005	mg/L	-	-	-	< 0.005
Zinc (filtered)	0.005	mg/L	0.98	37	36	-
Alkali Metals						
Calcium	0.5	mg/L	54	-	-	-
Magnesium	0.5	mg/L	75	-	-	-

Client Sample ID			R11	R12
Sample Matrix			Water	Water
Eurofins Sample No.			N21-Jn42618	N21-Jn42619
Date Sampled			Jun 17, 2021	Jun 18, 2021
Test/Reference	LOR	Unit		
Heavy Metals				
Aluminium	0.05	mg/L	< 0.05	< 0.05
Arsenic	0.001	mg/L	< 0.001	< 0.001
Barium	0.02	mg/L	< 0.02	< 0.02
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002
Chromium	0.001	mg/L	< 0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001
Copper	0.001	mg/L	0.001	< 0.001
Iron	0.05	mg/L	< 0.05	< 0.05
Lead	0.001	mg/L	< 0.001	< 0.001
Manganese	0.005	mg/L	< 0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005
Nickel	0.001	mg/L	< 0.001	< 0.001
Selenium	0.001	mg/L	< 0.001	< 0.001
Titanium	0.005	mg/L	< 0.005	< 0.005
Zinc	0.005	mg/L	< 0.005	< 0.005

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
Hardness Set			
Hardness mg equivalent CaCO3/L	Sydney	Jun 29, 2021	28 Days
- Method: E020.1 Hardness in water			
Alkali Metals	Sydney	Jun 29, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Jun 29, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals (filtered)	Sydney	Jun 23, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Mobil Metals : Metals M15	Sydney	Jun 23, 2021	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804715
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 22, 2021 10:05 AM
Due: Jun 29, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium (filtered)	Arsenic (filtered)	Barium (filtered)	Cadmium (filtered)	Chromium (filtered)	Cobalt (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Molybdenum (filtered)	Nickel (filtered)	Selenium (filtered)	Titanium (filtered)	Zinc (filtered)	Hardness Set
Melbourne Laboratory - NATA Site # 1254																						
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																						
Perth Laboratory - NATA Site # 23736																						
Mayfield Laboratory - NATA Site # 25079																						
External Laboratory																						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																	
1	GW1	Jun 18, 2021		Water	N21-Jn42606	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	GW2	Jun 18, 2021		Water	N21-Jn42607	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	GW3	Jun 18, 2021		Water	N21-Jn42608	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	GW4	Jun 18, 2021		Water	N21-Jn42609	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	GW5	Jun 18, 2021		Water	N21-Jn42610	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	GW6	Jun 18, 2021		Water	N21-Jn42611	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	GW9_S	Jun 18, 2021		Water	N21-Jn42612	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	GW9_D	Jun 18, 2021		Water	N21-Jn42613	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	GW10	Jun 18, 2021		Water	N21-Jn42614	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Date Reported:Jun 29, 2021

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804715
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 22, 2021 10:05 AM
Due: Jun 29, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aluminium (filtered)	Arsenic (filtered)	Barium (filtered)	Cadmium (filtered)	Chromium (filtered)	Cobalt (filtered)	Copper (filtered)	Iron (filtered)	Lead (filtered)	Manganese (filtered)	Mercury (filtered)	Molybdenum (filtered)	Nickel (filtered)	Selenium (filtered)	Titanium (filtered)	Zinc (filtered)	Hardness Set
Melbourne Laboratory - NATA Site # 1254																						
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																						
Perth Laboratory - NATA Site # 23736																						
Mayfield Laboratory - NATA Site # 25079																						
External Laboratory																						
10	D01_180621	Jun 18, 2021		Water	N21-Jn42615	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
11	T01_180621	Jun 18, 2021		Water	N21-Jn42616	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
12	R10	Jun 16, 2021		Water	N21-Jn42617	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
13	R11	Jun 17, 2021		Water	N21-Jn42618	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
14	R12	Jun 18, 2021		Water	N21-Jn42619	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Test Counts						14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	9

Date Reported:Jun 29, 2021

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Aluminium	mg/L	< 0.05			0.05	Pass	
Aluminium (filtered)	mg/L	< 0.05			0.05	Pass	
Arsenic	mg/L	< 0.001			0.001	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Barium	mg/L	< 0.02			0.02	Pass	
Barium (filtered)	mg/L	< 0.02			0.02	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Cadmium (filtered)	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Cobalt	mg/L	< 0.001			0.001	Pass	
Cobalt (filtered)	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron	mg/L	< 0.05			0.05	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese	mg/L	< 0.005			0.005	Pass	
Manganese (filtered)	mg/L	< 0.005			0.005	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Molybdenum	mg/L	< 0.005			0.005	Pass	
Molybdenum (filtered)	mg/L	< 0.005			0.005	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Selenium	mg/L	< 0.001			0.001	Pass	
Selenium (filtered)	mg/L	< 0.001			0.001	Pass	
Titanium	mg/L	< 0.005			0.005	Pass	
Titanium (filtered)	mg/L	< 0.005			0.005	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
Method Blank							
Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Heavy Metals							
Aluminium	%	95			80-120	Pass	
Aluminium (filtered)	%	96			80-120	Pass	
Arsenic	%	101			80-120	Pass	
Arsenic (filtered)	%	97			80-120	Pass	
Barium	%	101			80-120	Pass	
Barium (filtered)	%	95			80-120	Pass	
Cadmium	%	106			80-120	Pass	
Cadmium (filtered)	%	98			80-120	Pass	
Chromium	%	98			80-120	Pass	
Chromium (filtered)	%	95			80-120	Pass	
Cobalt	%	98			80-120	Pass	
Cobalt (filtered)	%	98			80-120	Pass	
Copper	%	94			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Copper (filtered)			%	97			80-120	Pass	
Iron			%	93			80-120	Pass	
Iron (filtered)			%	95			80-120	Pass	
Lead			%	97			80-120	Pass	
Lead (filtered)			%	96			80-120	Pass	
Manganese			%	96			80-120	Pass	
Manganese (filtered)			%	100			80-120	Pass	
Mercury			%	81			80-120	Pass	
Mercury (filtered)			%	96			80-120	Pass	
Molybdenum			%	112			80-120	Pass	
Molybdenum (filtered)			%	111			80-120	Pass	
Nickel			%	96			80-120	Pass	
Nickel (filtered)			%	94			80-120	Pass	
Selenium			%	104			80-120	Pass	
Selenium (filtered)			%	102			80-120	Pass	
Titanium			%	97			80-120	Pass	
Titanium (filtered)			%	96			80-120	Pass	
Zinc			%	96			80-120	Pass	
Zinc (filtered)			%	94			80-120	Pass	
LCS - % Recovery									
Alkali Metals									
Calcium			%	94			80-120	Pass	
Magnesium			%	102			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium (filtered)	S21-Jn43929	NCP	%	88			75-125	Pass	
Arsenic (filtered)	S21-Jn43929	NCP	%	94			75-125	Pass	
Barium (filtered)	S21-Jn43929	NCP	%	91			75-125	Pass	
Cadmium (filtered)	S21-Jn43929	NCP	%	96			75-125	Pass	
Chromium (filtered)	S21-Jn43929	NCP	%	86			75-125	Pass	
Cobalt (filtered)	S21-Jn43929	NCP	%	87			75-125	Pass	
Copper (filtered)	S21-Jn43929	NCP	%	86			75-125	Pass	
Iron (filtered)	S21-Jn43929	NCP	%	92			75-125	Pass	
Lead (filtered)	S21-Jn43929	NCP	%	89			75-125	Pass	
Manganese (filtered)	S21-Jn41118	NCP	%	88			75-125	Pass	
Mercury (filtered)	S21-Jn43929	NCP	%	87			75-125	Pass	
Molybdenum (filtered)	S21-Jn43929	NCP	%	118			75-125	Pass	
Nickel (filtered)	S21-Jn43929	NCP	%	85			75-125	Pass	
Selenium (filtered)	S21-Jn43929	NCP	%	100			75-125	Pass	
Titanium (filtered)	S21-Jn43929	NCP	%	88			75-125	Pass	
Zinc (filtered)	S21-Jn43929	NCP	%	95			75-125	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	S21-Jn43945	NCP	%	90			75-125	Pass	
Magnesium	S21-Jn43945	NCP	%	96			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S21-Jn43945	NCP	%	93			75-125	Pass	
Arsenic	S21-Jn43945	NCP	%	105			75-125	Pass	
Barium	S21-Jn43945	NCP	%	95			75-125	Pass	
Cadmium	S21-Jn43945	NCP	%	105			75-125	Pass	
Chromium	S21-Jn43945	NCP	%	98			75-125	Pass	
Cobalt	S21-Jn43945	NCP	%	95			75-125	Pass	

eurofins

Environment Testing

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Copper	S21-Jn43945	NCP	%	91			75-125	Pass	
Iron	S21-Jn43945	NCP	%	91			75-125	Pass	
Lead	S21-Jn43945	NCP	%	92			75-125	Pass	
Manganese	S21-Jn43945	NCP	%	97			75-125	Pass	
Mercury	S21-Jn43945	NCP	%	81			75-125	Pass	
Molybdenum	S21-Jn43945	NCP	%	112			75-125	Pass	
Nickel	S21-Jn43945	NCP	%	94			75-125	Pass	
Selenium	S21-Jn43945	NCP	%	104			75-125	Pass	
Titanium	S21-Jn43945	NCP	%	101			75-125	Pass	
Zinc	S21-Jn43945	NCP	%	94			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium (filtered)	N21-Jn42606	CP	mg/L	0.13	0.13	3.0	30%	Pass	
Arsenic (filtered)	N21-Jn42606	CP	mg/L	0.002	< 0.001	57	30%	Fail	Q15
Barium (filtered)	N21-Jn42606	CP	mg/L	0.07	0.07	4.0	30%	Pass	
Cadmium (filtered)	N21-Jn42606	CP	mg/L	0.049	0.049	<1	30%	Pass	
Chromium (filtered)	N21-Jn42606	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cobalt (filtered)	N21-Jn42606	CP	mg/L	0.32	0.32	1.0	30%	Pass	
Copper (filtered)	N21-Jn42606	CP	mg/L	0.083	0.084	1.0	30%	Pass	
Iron (filtered)	N21-Jn42606	CP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
Lead (filtered)	N21-Jn42606	CP	mg/L	0.41	0.42	2.0	30%	Pass	
Manganese (filtered)	N21-Jn42606	CP	mg/L	11	11	1.0	30%	Pass	
Mercury (filtered)	N21-Jn42606	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum (filtered)	N21-Jn42606	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nickel (filtered)	N21-Jn42606	CP	mg/L	0.14	0.14	1.0	30%	Pass	
Selenium (filtered)	N21-Jn42606	CP	mg/L	0.005	0.005	11	30%	Pass	
Titanium (filtered)	N21-Jn42606	CP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc (filtered)	S21-Jn42585	NCP	mg/L	0.008	0.012	45	30%	Fail	Q15
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	N21-Jn42614	CP	mg/L	1.3	1.4	11	30%	Pass	
Arsenic	N21-Jn42614	CP	mg/L	0.003	0.003	2.0	30%	Pass	
Barium	N21-Jn42614	CP	mg/L	0.06	0.06	1.0	30%	Pass	
Cadmium	N21-Jn42614	CP	mg/L	0.010	0.010	<1	30%	Pass	
Chromium	N21-Jn42614	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Cobalt	N21-Jn42614	CP	mg/L	0.086	0.087	1.0	30%	Pass	
Copper	N21-Jn42614	CP	mg/L	0.007	0.007	6.0	30%	Pass	
Iron	N21-Jn42614	CP	mg/L	1.7	2.0	17	30%	Pass	
Lead	N21-Jn42614	CP	mg/L	0.013	0.014	12	30%	Pass	
Manganese	N21-Jn42614	CP	mg/L	1.8	1.8	1.0	30%	Pass	
Mercury	N21-Jn42614	CP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	N21-Jn42614	CP	mg/L	0.007	0.007	5.0	30%	Pass	
Nickel	N21-Jn42614	CP	mg/L	0.13	0.13	1.0	30%	Pass	
Selenium	N21-Jn42614	CP	mg/L	0.003	0.003	17	30%	Pass	
Titanium	N21-Jn42614	CP	mg/L	0.017	0.017	1.0	30%	Pass	
Zinc	N21-Jn42614	CP	mg/L	1.2	1.2	2.0	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	N21-Jn42614	CP	mg/L	54	56	4.0	30%	Pass	
Magnesium	N21-Jn42614	CP	mg/L	75	75	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Aluminium	S21-Jn41834	NCP	mg/L	0.53	0.57	6.0	30%	Pass	
Arsenic	S21-Jn41834	NCP	mg/L	0.003	0.003	7.0	30%	Pass	
Barium	S21-Jn41834	NCP	mg/L	0.03	0.03	2.0	30%	Pass	
Cadmium	S21-Jn41834	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S21-Jn41834	NCP	mg/L	0.002	0.002	3.0	30%	Pass	
Cobalt	S21-Jn41834	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S21-Jn41834	NCP	mg/L	0.015	0.014	8.0	30%	Pass	
Iron	S21-Jn41834	NCP	mg/L	0.79	0.82	3.0	30%	Pass	
Lead	S21-Jn41834	NCP	mg/L	0.006	0.006	1.0	30%	Pass	
Manganese	S21-Jn41834	NCP	mg/L	0.018	0.018	3.0	30%	Pass	
Mercury	S21-Jn41834	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S21-Jn41834	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Nickel	S21-Jn41834	NCP	mg/L	0.002	0.001	26	30%	Pass	
Selenium	S21-Jn41834	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Titanium	S21-Jn41834	NCP	mg/L	0.013	0.015	19	30%	Pass	
Zinc	S21-Jn41834	NCP	mg/L	0.039	0.036	8.0	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	No
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
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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 and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report **803030-W**
Project name CAPTAIN FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jun 11, 2021

Client Sample ID			**R1**	**R2**	**R3**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins Sample No.			**S21-Jn29258**	**S21-Jn29259**	**S21-Jn29260**
Date Sampled			**Jun 07, 2021**	**Jun 08, 2021**	**Jun 10, 2021**
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	0.001	mg/L	< 0.001	< 0.001	< 0.001
Barium	0.02	mg/L	< 0.02	< 0.02	< 0.02
Cadmium	0.0002	mg/L	< 0.0002	< 0.0002	< 0.0002
Chromium	0.001	mg/L	0.001	0.001	< 0.001
Cobalt	0.001	mg/L	< 0.001	< 0.001	< 0.001
Copper	0.001	mg/L	0.001	< 0.001	0.001
Iron	0.05	mg/L	< 0.05	< 0.05	< 0.05
Lead	0.001	mg/L	< 0.001	< 0.001	< 0.001
Manganese	0.005	mg/L	< 0.005	< 0.005	< 0.005
Mercury	0.0001	mg/L	< 0.0001	< 0.0001	< 0.0001
Molybdenum	0.005	mg/L	< 0.005	< 0.005	< 0.005
Nickel	0.001	mg/L	< 0.001	< 0.001	< 0.001
Selenium	0.001	mg/L	< 0.001	< 0.001	< 0.001
Titanium	0.005	mg/L	< 0.005	< 0.005	< 0.005
Zinc	0.005	mg/L	< 0.005	< 0.005	< 0.005

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
Metals M8	Sydney	Jun 15, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Sydney	Jun 16, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Australia

Melbourne 6 Monterey Road Dandenong South VIC 3175 Phone : +61 3 8564 5000 NATA # 1261 Site # 1254 & 14271

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

Perth 46-48 Banksia Road Welshpool WA 6106 Phone : +61 8 9251 9600 NATA # 1261 Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAIN FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 803030
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 11, 2021 4:57 PM
Due: Jun 21, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	CANCELLED	Cobalt	HOLD	Iron	Manganese	Molybdenum	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
Mayfield Laboratory - NATA Site # 25079															
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	R1	Jun 07, 2021		Water	S21-Jn29258	X		X		X	X	X	X	X	X
2	R2	Jun 08, 2021		Water	S21-Jn29259	X		X		X	X	X	X	X	X
3	R3	Jun 10, 2021		Water	S21-Jn29260	X		X		X	X	X	X	X	X
4	GW1_0.0	Jun 07, 2021		Soil	S21-Jn29261				X						
5	GW2_0.0	Jun 07, 2021		Soil	S21-Jn29262				X						
6	D1	Jun 07, 2021		Soil	S21-Jn29263				X						
7	GW4_0.2	Jun 08, 2021		Soil	S21-Jn29264				X						
8	GW6_0.0	Jun 08, 2021		Soil	S21-Jn29265				X						
9	D2	Jun 08, 2021		Soil	S21-Jn29266				X						

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAIN FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 803030
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 11, 2021 4:57 PM
Due: Jun 21, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	CANCELLED	Cobalt	HOLD	Iron	Manganese	Molybdenum	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
Mayfield Laboratory - NATA Site # 25079															
External Laboratory															
10	GW7_0.2	Jun 08, 2021		Soil	S21-Jn29267				X						
11	GW8_2.0	Jun 08, 2021		Soil	S21-Jn29268				X						
12	D3	Jun 08, 2021		Soil	S21-Jn29269				X						
13	SAQP11-BH01_0.0	Jun 10, 2021		Soil	S21-Jn29270				X						
14	D4	Jun 10, 2021		Soil	S21-Jn29271				X						
15	SAQP11-BH3_0.0	Jun 10, 2021		Soil	S21-Jn29272		X								
16	D5	Jun 10, 2021		Soil	S21-Jn29273				X						
17	SAQP11-BH07_0.25	Jun 10, 2021		Soil	S21-Jn29274				X						
18	SAQP11-	Jun 10, 2021		Soil	S21-Jn29275				X						

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 11, 2021 4:57 PM
Address:	Level 3/100 Pacific Highway	**Report #:**	803030	**Due:**	Jun 21, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAIN FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	CANCELLED	Cobalt	HOLD	Iron	Manganese	Molybdenum	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
Mayfield Laboratory - NATA Site # 25079															
External Laboratory															
18	SAQP11-BH10_0.0	Jun 10, 2021		Soil	S21-Jn29275										
19	SAQP9-BH03_0.0	Jun 10, 2021		Soil	S21-Jn29276				X						
20	D6	Jun 10, 2021		Soil	S21-Jn29277				X						
21	SAQP9-BH04_0.25	Jun 10, 2021		Soil	S21-Jn29278				X						
22	SAQP10-BH02_0.25	Jun 10, 2021		Soil	S21-Jn29279				X						
23	D7	Jun 10, 2021		Soil	S21-Jn29280				X						
24	SAQP10-BH03_0.5	Jun 10, 2021		Soil	S21-Jn29281				X						

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAIN FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 803030
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 11, 2021 4:57 PM
Due: Jun 21, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	CANCELLED	Cobalt	HOLD	Iron	Manganese	Molybdenum	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA Site # 1254 & 14271															
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															
Perth Laboratory - NATA Site # 23736															
Mayfield Laboratory - NATA Site # 25079															
External Laboratory															
25	D8	Jun 10, 2021		Soil	S21-Jn29282				X						
26	SAQP13-BH02_0.0	Jun 10, 2021		Soil	S21-Jn29283				X						
27	SAQP13-BH03_0.25	Jun 10, 2021		Soil	S21-Jn29284				X						
28	SAQP-BH03_0.0	Jun 10, 2021		Soil	S21-Jn29285				X						
Test Counts						3	1	3	24	3	3	3	3	3	3

eurofins

Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/L	< 0.001			0.001	Pass	
Barium			mg/L	< 0.02			0.02	Pass	
Cadmium			mg/L	< 0.0002			0.0002	Pass	
Chromium			mg/L	< 0.001			0.001	Pass	
Cobalt			mg/L	< 0.001			0.001	Pass	
Copper			mg/L	< 0.001			0.001	Pass	
Iron			mg/L	< 0.05			0.05	Pass	
Lead			mg/L	< 0.001			0.001	Pass	
Manganese			mg/L	< 0.005			0.005	Pass	
Mercury			mg/L	< 0.0001			0.0001	Pass	
Molybdenum			mg/L	< 0.005			0.005	Pass	
Nickel			mg/L	< 0.001			0.001	Pass	
Selenium			mg/L	< 0.001			0.001	Pass	
Titanium			mg/L	< 0.005			0.005	Pass	
Zinc			mg/L	< 0.005			0.005	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	94			80-120	Pass	
Barium			%	89			80-120	Pass	
Cadmium			%	93			80-120	Pass	
Chromium			%	99			80-120	Pass	
Cobalt			%	94			80-120	Pass	
Copper			%	96			80-120	Pass	
Iron			%	97			80-120	Pass	
Lead			%	100			80-120	Pass	
Manganese			%	92			80-120	Pass	
Mercury			%	103			80-120	Pass	
Molybdenum			%	112			80-120	Pass	
Nickel			%	97			80-120	Pass	
Selenium			%	88			80-120	Pass	
Titanium			%	94			80-120	Pass	
Zinc			%	93			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S21-Jn31317	NCP	%	100			75-125	Pass	
Barium	S21-Jn31317	NCP	%	84			75-125	Pass	
Cadmium	S21-Jn31317	NCP	%	100			75-125	Pass	
Chromium	S21-Jn31317	NCP	%	104			75-125	Pass	
Cobalt	S21-Jn31317	NCP	%	102			75-125	Pass	
Copper	S21-Jn31317	NCP	%	102			75-125	Pass	
Iron	S21-Jn31317	NCP	%	104			75-125	Pass	
Lead	S21-Jn31317	NCP	%	106			75-125	Pass	
Manganese	S21-Jn31317	NCP	%	96			75-125	Pass	
Mercury	S21-Jn31317	NCP	%	107			75-125	Pass	
Molybdenum	S21-Jn31317	NCP	%	115			75-125	Pass	
Nickel	S21-Jn31317	NCP	%	103			75-125	Pass	
Selenium	S21-Jn31317	NCP	%	93			75-125	Pass	
Titanium	S21-Jn31317	NCP	%	102			75-125	Pass	
Zinc	S21-Jn31317	NCP	%	97			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S21-Jn37297	NCP	mg/L	0.002	0.002	10	30%	Pass	
Barium	S21-Jn37297	NCP	mg/L	0.13	0.13	2.0	30%	Pass	
Cadmium	S21-Jn37297	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S21-Jn37297	NCP	mg/L	0.009	0.009	3.0	30%	Pass	
Cobalt	S21-Jn37297	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S21-Jn37297	NCP	mg/L	0.010	0.010	<1	30%	Pass	
Iron	S21-Jn37297	NCP	mg/L	0.37	0.38	2.0	30%	Pass	
Lead	S21-Jn37297	NCP	mg/L	0.002	0.002	25	30%	Pass	
Manganese	S21-Jn37297	NCP	mg/L	0.086	0.085	1.0	30%	Pass	
Mercury	S21-Jn37297	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Molybdenum	S21-Jn37297	NCP	mg/L	0.012	0.012	4.0	30%	Pass	
Nickel	S21-Jn37297	NCP	mg/L	0.002	0.002	15	30%	Pass	
Selenium	S21-Jn37297	NCP	mg/L	0.005	0.006	19	30%	Pass	
Titanium	S21-Jn37297	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc	S21-Jn37297	NCP	mg/L	1.3	1.3	2.0	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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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

Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Stephen Maxwell**

Report **811512-S**
Project name ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Jul 19, 2021

Client Sample ID			**MS_VAC1**	**MS_VAC2**	**MS_VAC3**
Sample Matrix			**Dust**	**Dust**	**Dust**
Eurofins Sample No.			**S21-JI34967**	**S21-JI34968**	**S21-JI34969**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit			
Sulphur	5	mg/kg	1000	1100	990
Heavy Metals					
Lead	5	mg/kg	360	270	300
Titanium	10	mg/kg	170	180	150

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
Sulphur	Melbourne	Jul 20, 2021	7 Days
- Method: LTM-MET-3010 Alkali Metals Sulfur Silicon and Phosphorus by ICP-AES			
Heavy Metals	Sydney	Jul 23, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**		**Received:**	Jul 19, 2021 9:32 AM
Address:	Level 3/100 Pacific Highway	**Report #:**	811512	**Due:**	Jul 26, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Sulphur	Titanium
Melbourne Laboratory - NATA Site # 1254							X	
Sydney Laboratory - NATA Site # 18217						X		X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	MS_VAC1	Jun 17, 2021		Dust	S21-JI34967	X	X	X
2	MS_VAC2	Jun 17, 2021		Dust	S21-JI34968	X	X	X
3	MS_VAC3	Jun 17, 2021		Dust	S21-JI34969	X	X	X
Test Counts						3	3	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

eurofins | Environment Testing

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
Titanium			mg/kg	< 10			10	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	100			80-120	Pass	
Titanium			%	97			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Jl28844	NCP	%	106			75-125	Pass	
Titanium	N21-Jl33907	NCP	%	91			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Jl29409	NCP	mg/kg	17	18	5.0	30%	Pass	
Titanium	S21-Jl29409	NCP	mg/kg	< 10	< 10	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
John Nguyen	Senior Analyst-Metal (NSW)

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 | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 25079

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:	**Stephen Maxwell**
Report	**804978-A**
Project name	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jun 23, 2021

Client Sample ID			**MS_SWAB1**	**MS_SWAB2**	**MS_SWAB3**	**MS_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44554**	**N21-Jn44555**	**N21-Jn44556**	**N21-Jn44557**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	640	97	210	22

Client Sample ID			**CH_SWAB1**	**CH_SWAB2**	**CH_SWAB3**	**CH_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44558**	**N21-Jn44559**	**N21-Jn44560**	**N21-Jn44561**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	8.7	2.4	46	210

Client Sample ID			**RFS_SWAB1**	**RFS_SWAB2**	**RFS_SWAB3**	**RFS_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44562**	**N21-Jn44563**	**N21-Jn44564**	**N21-Jn44565**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	43	27	18	8.7

Client Sample ID			**STP_SWAB1**	**STP_SWAB2**	**STP_SWAB3**	**STP_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44566**	**N21-Jn44567**	**N21-Jn44568**	**N21-Jn44569**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	10	18	6.8	< 1

Environment Testing

Client Sample ID			SWAB_QA01	SWAB_QA02	SWAB_RB	SWAB_BLANK
Sample Matrix			Wipes	Wipes	Wipes	Wipes
Eurofins Sample No.			N21-Jn44570	N21-Jn44571	N21-Jn44572	N21-Jn44573
Date Sampled			Jun 17, 2021	Jun 17, 2021	Jun 17, 2021	Jun 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	5.8	15	< 1	< 1

Environment Testing

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
Heavy Metals	Sydney	Jun 30, 2021	180 Days

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MS_SWAB1	Jun 17, 2021		Paint	N21-Jn44554		X
2	MS_SWAB2	Jun 17, 2021		Paint	N21-Jn44555		X
3	MS_SWAB3	Jun 17, 2021		Paint	N21-Jn44556		X
4	MS_SWAB4	Jun 17, 2021		Paint	N21-Jn44557		X
5	CH_SWAB1	Jun 17, 2021		Paint	N21-Jn44558		X
6	CH_SWAB2	Jun 17, 2021		Paint	N21-Jn44559		X
7	CH_SWAB3	Jun 17, 2021		Paint	N21-Jn44560		X
8	CH_SWAB4	Jun 17, 2021		Paint	N21-Jn44561		X
9	RFS_SWAB1	Jun 17, 2021		Paint	N21-Jn44562		X

Date Reported:Jun 30, 2021

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
10	RFS_SWAB2	Jun 17, 2021		Paint	N21-Jn44563		X
11	RFS_SWAB3	Jun 17, 2021		Paint	N21-Jn44564		X
12	RFS_SWAB4	Jun 17, 2021		Paint	N21-Jn44565		X
13	STP_SWAB1	Jun 17, 2021		Paint	N21-Jn44566		X
14	STP_SWAB2	Jun 17, 2021		Paint	N21-Jn44567		X
15	STP_SWAB3	Jun 17, 2021		Paint	N21-Jn44568		X
16	STP_SWAB4	Jun 17, 2021		Paint	N21-Jn44569		X
17	SWAB_QA01	Jun 17, 2021		Paint	N21-Jn44570		X
18	SWAB_QA02	Jun 17, 2021		Paint	N21-Jn44571		X
19	SWAB_RB	Jun 17, 2021		Paint	N21-Jn44572		X
20	SWAB_BLAN	Jun 17, 2021		Paint	N21-Jn44573		X

Date Reported:Jun 30, 2021

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
20	SWAB_BLANK	Jun 17, 2021		Paint	N21-Jn44573		
21	MS_VAC1	Jun 17, 2021		Paint	N21-Jn44574	X	
22	MS_VAC2	Jun 17, 2021		Paint	N21-Jn44575	X	
23	MS_VAC3	Jun 17, 2021		Paint	N21-Jn44576	X	
24	CH_VAC1	Jun 17, 2021		Paint	N21-Jn44577	X	
25	CH_VAC2	Jun 17, 2021		Paint	N21-Jn44578	X	
26	CH_VAC3	Jun 17, 2021		Paint	N21-Jn44579	X	
27	RFS_VAC1	Jun 17, 2021		Paint	N21-Jn44580	X	
28	RFS_VAC2	Jun 17, 2021		Paint	N21-Jn44581	X	
29	RFS_VAC3	Jun 17, 2021		Paint	N21-Jn44582	X	

Date Reported:Jun 30, 2021

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 12:30 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	804978	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
30	STP_VAC1	Jun 17, 2021		Paint	N21-Jn44583	X	
31	STP_VAC2	Jun 17, 2021		Paint	N21-Jn44584	X	
32	STP_VAC3	Jun 17, 2021		Paint	N21-Jn44585	X	
Test Counts						12	20

Date Reported:Jun 30, 2021

Eurofins Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

eurofins

Environment Testing

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	Total ug	< 1			1	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	99			80-120	Pass	

eurofins | Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

eurofins | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Stephen Maxwell**

Report **815203-S**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001193
Received Date Aug 06, 2021

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**PAINT_01** **Paint** **N21-Au10998** **Aug 04, 2021**	**PAINT_02** **Paint** **N21-Au10999** **Aug 04, 2021**	**PAINT_03** **Paint** **N21-Au11000** **Aug 04, 2021**
Lead (% w/w)	0.01	%	< 0.01	0.14	< 0.01

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
Lead (% w/w)	Sydney	Aug 10, 2021	6 Months

- Method: LTM-MET-3040 Metals in Waters Soils & Sediments by ICP-MS

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Aug 6, 2021 8:30 AM
Address:	Level 3/100 Pacific Highway	**Report #:**	815203	**Due:**	Aug 13, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254						
Sydney Laboratory - NATA Site # 18217						X
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
Mayfield Laboratory - NATA Site # 25079						
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	PAINT_01	Aug 04, 2021		Paint	N21-Au10998	X
2	PAINT_02	Aug 04, 2021		Paint	N21-Au10999	X
3	PAINT_03	Aug 04, 2021		Paint	N21-Au11000	X
Test Counts						3

Date Reported:Aug 10, 2021

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Emma Beesley	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

APPENDIX 7
TECHNICAL NOTE ON THE DEVELOPMENT OF SITE-SPECIFIC TRIGGER LEVELS FOR LEAD IN SOIL

ENVIRONMENT
& HEALTH

CAPTAINS FLAT LEAD MANAGEMENT PLAN – DERIVATION OF SITE SPECIFIC GUIDELINE VALUES FOR LEAD IN SOIL
DERIVATION OF SITE-SPECIFIC GUIDELINE VALUES FOR LEAD IN SOIL

Project name	**Captains Flat Lead Management Plan**
Project no.	**318001193**
Recipient	**Department of Regional NSW**
Document type	**Technical Note**
Version	**0**
Date	**25/11/2021**
Prepared by	**Anand Chandra**
Checked by	**Steve Maxwell**
Approved by	**Rowena Salmon**
Description	**The report provides details of lead site specific guideline values derived from site bioaccessibility data**

CONTENTS

APPENDICES

1. Introduction

Ramboll Australia Pty Ltd (Ramboll) was retained by the Department of Regional NSW (Regional NSW) to prepare the Captains Flat Lead Management Plan to address exposure risks from lead within the environment and the community that relates to the legacy Lake George Mine. This report provides information regarding the development of site-specific guideline values (SSGVs) for lead. The SSGVs are part of the conceptual site model being developed to assist in finalising the Captains Flat Lead Management Plan.

The Captains Flat Lead Management Plan Precinct (the Precinct) was defined in the Ramboll Review of Information and SAQP and encompasses built areas of the Captains Flat community, the legacy Lake George Mine site and the Molonglo River from upstream of the water supply dam to a waterhole approximately 1.5 km downstream of the mine. The Precinct includes roads accessing Captains Flat (to a distance of at least 400 m), the rail corridor (to a distance of 1 km) and bushland areas at the perimeters of the community.

The extended period of mining within the area has included a range of potentially contaminating activities. As a result, elevated lead concentrations have been identified in shallow soils within the Precinct associated with dust deposition, runoff and emplacement of ore, mine waste and slag. Elevated soil lead concentrations are also expected to influence indoor dust lead concentrations. Distribution around the former preschool and at the south end of Foxlow Street appears related to application of mine waste as fill, surficial deposition (potential runoff from the eastern embankment of the mine and/or windborne dust deposition). Distribution at Foxlow Parklet appears related to application of fill. Lead within accessible soils in the Precinct has originated from different transport pathways and has undergone varying degrees of environmental degradation. It is therefore likely that the bioavailability[1] of lead varies across the Precinct.

Lead health investigation levels (HILs) available from NEPM (2013) can be updated using site-specific measure of bioavailability to reflect local exposure conditions. This report details the approach taken to update the following HILs with site-specific bioavailability measurements:

1. HIL A - Residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake (no poultry), also includes childcare centres, preschools and primary schools.
2. HIL C - Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths.
3. HIL D - Commercial/industrial, includes premises such as shops, offices, factories and industrial sites.

The above HILs were updated based on the exposure scenarios expected at the site.

2. Objectives

The objective of this report was to use site-specific bioavailability data from accessible soils to derive SSGVs for lead considering different exposure scenarios.

Tier 1 screening assessment of soil lead results indicate that relevant NEPM HILs are exceeded at some locations within the Precinct. While relevant HILs are exceeded, the actual risk of adverse effects remains unclear. NEPM HILs for lead use conservative bioavailability assumptions for lead in soil and dust. For soil lead at the site, this refers to the fraction of orally ingested lead that dissolves into the gastrointestinal tract and the fraction of this dissolved lead that is actually absorbed into systemic circulation. For ore and slag derived lead, it is unlikely that lead would be 100% bioavailable, although

[1] Bioavailability is a generic term defined as the fraction of a contaminant that is absorbed into the body following dermal contact, ingestion or inhalation. It is expressed as the ratio (or percentage) of the absorbed dose (systemic dose) to the administered dose (NEPM 2013).

factors such as extended weathering, particle size, mixing with soil organic matter may change bioavailability at the point of exposure. To better understand potential risks and the extent to which exposure can change blood lead concentrations in human receptors (especially sensitive subpopulations such as children who are more susceptible to adverse effects of lead), site-specific bioavailability measurement of soil lead was conducted to allow the development of SSGVs.

The scope of works included:

- Sampling of shallow soils from various locations within the Precinct, based on areas of potential exposure.
- Measurement of soil lead bioavailability (bioaccessibility – defined later in this report) at the University of South Australia
- Derivation of SSGVs using the Integrated Exposure Uptake Biokinetic (IEUBK) model and Adult Lead Methodology (ALM) available from United States Environment Protection Agency (US EPA), as used previously for derivation of lead HILs.
- Preparation of this technical note to document the derivation.

Generally, only bioavailability information was updated in the IEUBK and ALM models, while the remaining input parameters were kept same as NEPM (2013). Guidance from the following documents was adopted:

- *NEPC (2013a) Assessment of Site Contamination: Schedule B4 – Site-specific Health Risk Assessment Methodology. National Environment Protection Council, Adelaide*
- *NEPC (2013b) Guidance note – Lead: Supplementary information to Schedule B7 section 5.4. NEPM Toolbox. http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox*
- *NEPC (2013c) Guideline on derivation of health-based investigation levels. National Environment Protection Council, Adelaide (Appendix A1 and Appendix D)*
- *EnRisks (2011) IEUBK modelling for establishing HIL A and conducting site-specific adjustments to the model https://www.enrisks.com.au/wp-content/uploads/2013/04/IEUBK-Modelling-for-Establishing-HIL-A-and-Site-Specific-Adjustments.pdf*

3. Data Review and Evaluation

Shallow soil samples were collected from a number of non-residential locations within the Precinct, targeting locations where recreational exposures were likely to occur. Residential sampling within the Precinct were conducted previously by the EPA and soil samples from residential areas were not available for bioavailability testing. For confidentiality reasons, sample results from residential areas were not part of the scope of this report. A total of 16 samples were collected for bioavailability testing including one duplicate.

All samples were tested for lead and bioavailability of lead and particle size distribution. Mining related samples such as ores and slag can contain very high concentrations of lead present in a heterogenous matrix containing different mineral phases. Therefore, standard soil analysis method for lead extraction and determination of total lead concentration in such samples is not appropriate. Sample lead concentrations were analysed by ALS Geochemistry using a four-acid digestion approach. Soil lead concentration summary is provided in Table 3-1.

3.1 Bioavailability Measurements

The toxic effect of a contaminant depends upon the uptake or absorbed dose of contaminant, that is, the amount that gets into the bloodstream after being ingested, inhaled or via skin contact. The fraction of a compound that is absorbed into the body (systemic dose) following exposure via all pathways is generically termed the 'bioavailable fraction'.

More specifically:

- absolute bioavailability is the fraction of a compound which is ingested, inhaled or applied to the skin that actually is absorbed and reaches systemic circulation and
- relative bioavailability (RBA) is referred to the comparative bioavailability of different forms of a chemical or for different exposure media containing the chemical. It is the ratio of the absorbed fraction from the exposure medium in the risk assessment (e.g. soil) to the absorbed fraction from the dosing medium used in the critical toxicity study.

The assessment of contaminant bioaccessibility may also be considered for estimating contaminant uptake. Bioaccessibility is related to the solubility of the contaminant in the gastrointestinal tract. More specifically, in the context of soil contamination, it is defined as the fraction of a contaminant in soil that is soluble in the relevant physiological milieu (usually the gastrointestinal tract) which is potentially available for absorption. If the lead is sourced from the breakdown of car batteries for example then the lead is likely to be readily bioaccessible; however, if the lead is sourced from an ore body then the bioaccessibility can be quite different and a site-specific value may be used in the site-specific risk assessment. This can be assessed by validating with *in vitro* test systems.

Relative bioavailability of contaminants in soil is complicated, variable and difficult to predict. This is because it depends strongly on the nature of the soil matrix (for example, soil type, age of soil, organic carbon, potential particle size, etc.) and on environmental conditions, particularly redox potential. NEPM HILs for lead are derived using 50% absolute bioavailability value, derived from 100% relative bioavailability assumptions; however, a site-specific assessment can be conducted to further verify or refine this assumption. *In vitro* assays are appropriate as a surrogate method for estimating relative bioavailability for contaminants such as lead and arsenic (NEPC 2013a). There are a number of *in vitro* methods that may be considered as a surrogate measure of arsenic and lead relative bioavailability and these may include Relative Bioavailability Leaching Procedure (RBALP) (US EPA 2007), the Solubility Bioavailability Research Consortium (SBRC) (Kelley et al. 2002) or the in vitro gastrointestinal method (IVG).

The bioaccessibility of lead in the soils from the site was determined in <250 µm particle size fraction using gastric and intestinal phase of the SBRC assay. The gastric phase of this method (termed RBALP for lead) has been correlated to in vivo lead relative bioavailability when determined using juvenile swine (Juhasz et al., 2007; USEPA 2007). Sixteen samples were tested at the Future Industries Institute, based at the Mawson Lakes Campus of the University of South Australia (UniSA). The tests were conducted for several replicates and included quality control testing. The reports are provided in **Appendix 1** (which also describes the method used).

Bioaccessibility values for the samples were calculated for gastric (SBRC-G) and intestinal (SBRC-I) phases. Gastric phase extraction occurs in an acidic environment at pH 1.5, while the intestinal phase extraction uses a pH of about 6.5-7.0. The extraction in different phases is designed to replicate the human gut and estimate the soluble fraction of lead in stomach and intestine. Due to the lower pH in gastric phase, the gastric phase bioaccessibility is expected to be higher than intestinal phase bioaccessibility. Usually the difference is not expected to be large between the two extraction phases (Smith et al. 2011; Juhasz, A. personal communication, 20 May 2020) however was large in Captains Flat samples. The gastrointestinal absorption of inorganic lead (the form relevant for the site) occurs primarily from the duodenum (first part of small intestine) and may involve saturable mechanisms of absorption (ATSDR 2019). The stomach plays a role in uptake via transformation(s) of lead-bearing media or form-specific lead to potentially more soluble or otherwise mobile forms (Mushak 1991). The epithelial lining of the small intestine in humans and experimental animals is the principal anatomical and physiological location where lead uptake occurs (Mushak 1991). Therefore, the intestinal phase values are likely to be a realistic indicator of the fraction of lead that will reach systemic circulation.

In vivo bioassays such as the juvenile swine, provide the most reliable indication of RBA of lead in soil and are, therefore, the preferred method of analysis (US EPA 2007). However, to reduce cost and time, *in vitro* methods, such as the one employed by UniSA, are commonly used for estimating lead RBA. For the *in vitro* methods to be acceptable, results for various soil types and chemical forms of lead need to be validated. It has been shown previously that relative SBRC-I values obtained using *in vitro* methods provide the best estimate of overall *in vivo* relative lead bioavailability, especially for soils that have more soluble forms of lead (Smith et al. 2011; Juhasz et al. 2009). SBRC-G values provide a good prediction of *in vivo* relative lead bioavailability for soils where lead mineralogy limits lead dissolution but tend to overpredict relative lead bioavailability for soils with more soluble forms of lead (Juhasz et al. 2009). Lead mineralogy in Precinct soils appears variable and so SBRC-G has been conservatively adopted. This aligns with US EPA 2021 guidance that recommends gastric phase extractions for *in vitro* bioaccessibility assessments for lead in soil.

The SBRC-G, SBRC-I and relative SBRC-I values for different samples are shown in Table 3-1. For this assessment maximum SBRC-G values was adopted as a conservative measure of lead bioaccessibility for site soils.

Table 3-1: Bioaccessibility results of soil samples from the Precinct.

Soil	Total Pb	In vitro	Pb Bioacc	Pb Bioacc	Location
	(mg kg^{-1})	Phase	(mg kg^{-1})	(%)	
R_S117a	3250	SBRC-G	224	6.9	Flood berms
		SBRC-I	9.5	0.3	
		Rel-SBRC-I*		2.8	
R_S118a	2720	SBRC-G	2010	73.9	Tennis Court
		SBRC-I	224	8.2	
		Rel-SBRC-I*		79.6	
R_S119a	2580	SBRC-G	42	1.6	Flood berms
		SBRC-I	2.5	0.1	
		Rel-SBRC-I*		0.9	
R_S120a	9090	SBRC-G	5660	62.3	Foxlow Parklet
		SBRC-I	2080	22.9	
		Rel-SBRC-I*		60.8	
R_S121a	49250	SBRC-G	30250	61.4	Foxlow Parklet
		SBRC-I	13150	26.7	
		Rel-SBRC-I*		70.9	
R_S122a	5055	SBRC-G	3695	73.1	Foxlow Parklet
		SBRC-I	1210	23.9	
		Rel-SBRC-I*		63.6	

Soil	Total Pb (mg kg^{-1})	In vitro Phase	Pb Bioacc (mg kg^{-1})	Pb Bioacc (%)	Location
R_S123a	3865	SBRC-G	740	19.1	Eastern embankment
		SBRC-I	90	2.3	
		Rel-SBRC-I*		22.5	
R_S124a	30650	SBRC-G	7015	22.9	Eastern embankment
		SBRC-I	1485	4.8	
		Rel-SBRC-I*		12.9	
R_S125a	7510	SBRC-G	4900	65.2	Eastern embankment
		SBRC-I	614	8.2	
		Rel-SBRC-I*		21.7	
R_S126a	91800	SBRC-G	52400	57.1	Rail Corridor
		SBRC-I	25900	28.2	
		Rel-SBRC-I*		75	
R_S145a	3125	SBRC-G	1080	34.6	Eastern embankment
		SBRC-I	168	5.4	
		Rel-SBRC-I		52	
R_S146a	1965	SBRC-G	223	11.3	Eastern embankment
		SBRC-I	33	1.7	
		Rel-SBRC-I		16.2	
R_S147a	30850	SBRC-G	776	2.5	Rail Corridor
		SBRC-I	92	0.3	
		Rel-SBRC-I		2.9	
R_S148a	49050	SBRC-G	39300	80.1	Rail Corridor
		SBRC-I	19600	40	
		Rel-SBRC-I		~100	
R_S149a	4400	SBRC-G	565	12.8	Eastern embankment
		SBRC-I	56	1.3	
		Rel-SBRC-I		12.3	
QA201	1485	SBRC-G	824	55.5	Replicate of R_S123a
		SBRC-I	126	8.5	
		Rel-SBRC-I		82	
QC1^{W}	6400	SBRC-G	4760	74.4^{W}	Laboratory reference
		SBRC-I	938	14.7	
		Rel-SBRC-I		~100	

Two QC samples were analysed. Lead bioaccessibility for the QC1 (laboratory reference sample) soil was within a suitable gastric phase extraction range for this reference material. QC201 was the replicate for sample R_S123a and has a calculated relative percent difference (RPD) of 97.6%. The RPDs for total lead in the bioaccessible fraction and SBRC-G are the same indicating that variable gastric phase bioaccessibility that has been reported is a function of variability in total lead concentrations (or other soil properties that result in variable total lead concentrations – eg: multiple contaminant sources) rather than variability in analysis.

For the derivation of SSGVs, the bioaccessibility results from the rail corridor were not considered. The history of the rail corridor indicates spillage of ore concentrate during rail loading and the contaminant profile (higher total lead and TCLP) are unique compared to other public areas of the Precinct. For these reasons rail corridor SBRC-G values were excluded. Additionally, rail corridor contamination is being managed separately to the rest of the Precinct and is being regulated under a VMP, subject to site audit and that interim measures including fencing and signage to restrict access to the corridor have already been implemented.

The SBRC-G values considered for deriving the SSGVs are shown in Table 3-2. Statistics for the dataset are also shown in that table.

Table 3-2: Bioaccessibility values (SBRC-G) considered for deriving lead SSGVs for the Precinct.

Soil	Total Pb (mg kg^{-1})	In vitro Phase	Pb Bioacc. (mg kg^{-1})	Pb Bioacc. (%)	Location
R_S117a	3250	SBRC-G	224	6.9	Flood berms
R_S118a	2720	SBRC-G	2010	73.9	Tennis Court
R_S119a	2580	SBRC-G	42	1.6	Flood berms
R_S120a	9090	SBRC-G	5660	62.3	Foxlow Parklett
R_S121a	49250	SBRC-G	30250	61.4	Foxlow Parklett
R_S122a	5055	SBRC-G	3695	73.1	Foxlow Parklett
R_S123a	3865	SBRC-G	740	19.1	Eastern embankment
R_S124a	30650	SBRC-G	7015	22.9	Eastern embankment
R_S125a	7510	SBRC-G	4900	65.2	Eastern embankment
R_S145a	3125	SBRC-G	1080	34.6	Eastern embankment
R_S146a	1965	SBRC-G	223	11.3	Eastern embankment
R_S149a	4400	SBRC-G	565	12.8	Eastern embankment
Pb Bioaccessibility % Statistics					
n				12	
min				1.6	
max				73.9	
Mean				37.1	
Median				28.8	
SD				28	
95% UCL				51.6	
95 %ile				73.5	
80 %ile				64.6	

Based on the maximum, 75% bioaccessibility has been adopted for deriving the SSGVs.

4. Adopted Target Blood Lead Level (BLL)

Potential health effects of lead vary greatly depending upon a person's age, exposure levels, duration of exposure and presence of any pre-existing conditions. Children and foetuses (via pregnant women) are most at risk. In pregnant women, lead in the bloodstream can cross the placenta into the foetal blood. Children and babies (including foetuses) are more sensitive to health effects from lead than adults (NHMRC 2016). There is an association between blood lead levels of 5 to 10 μg/dL and adverse cognitive effects (reduced Intelligence Quotient (IQ) and academic achievement) and behavioural problems (effects on attention, impulsivity and hyperactivity) in children. It is now recommended that for blood lead levels greater than 5 μg/dL the sources of exposure should be investigated and reduced particularly for children and pregnant women (NHMRC 2016).

The main receptors at the site include Precinct residents and visitors including children and workers. The most sensitive receptors representing these groups are females of reproductive capacity and infants/children. Current NEPM (2013) HILs for lead adopts a BLL of 10 μg/dL for these groups of sensitive receptors. Recent NSW EPA advice on the adoption of this BLL is as follows:

The EPA support the use of 10ug/dL blood lead levels in bioavailability modelling for the Captains Flat lead management plan and for developing site specific health investigation levels. We note that:

1. *This trigger level was used to derive the current HIL's for lead and until the NEPM is revised, it is still considered the acceptable value. This approach would be consistent with the National Environment Protection measure (Assessment of Site Contamination). For reference, the relevant clause in the NEPM (schedule B7, section 5.4) states: […]. For the purpose of deriving the HILs, lead has been assumed to act as a threshold contaminant and a blood lead concentration of 10 μg dL^{-1} has been applied as the maximum tolerable level for adults, children and the developing fetus (NHMRC 2009). It should be noted that it is generally recognised that there may be no threshold for the neurotoxic action of lead (DEFRA 2002).*
2. *We have received advice from NSW Health (and indirectly from the NHMRC lead committee) that the value of 10ug/dL should still be used for the time being. They did however note that where background levels of blood leads in an area are likely to exceed 5ug/dL, additional protection measures should be established.*

Based on the advice from NSW EPA and to be consistent with current NEPM (2013) lead HILs, a BLL of 10 μg/dL was adopted for all exposure scenarios/receptors in this report.

5. Approach to Modelling

The effects of lead exposure have often been evaluated based on the blood lead content, which is generally considered to be the most accurate means of characterising exposure. Other measures of exposure such as bone lead, hair lead and urine lead, can be used but are considered less reliable. Physiologically based pharmacokinetic models, such as the US EPA IEUBK model, have been used for assessment of lead exposure risks in children. The model simulates multimedia exposures, uptake and kinetics of lead in children ages 0-7 years for predicting pseudo-steady state relationships between lead exposure and blood lead. US EPA also developed a slope factor model called ALM for assessing lead exposures in adults. Lead biokinetics are represented with a simple linear relationship between blood lead and lead uptake called the biokinetic slope factor. Using this model, a foetus being carried by a pregnant woman is the most sensitive receptor. Both these models are lifetime models and rely upon an equilibrium of lead distribution that is established over an extended period. Normally, they cannot be used to characterise short-term kinetics of blood lead (ATSDR 2019), however exposure adjusted approaches can be used (US EPA 2016 and 2003b). The ALM and IEUBK model require a minimum of 90 days exposure to produce quasi-steady state blood lead concentrations (US EPA 2003a).

The derivation of NEPM Health screening levels (HILs) used the IEUBK model for calculating HIL-A, HIL-B and HIL-C where children are main receptors and the ALM for calculating HIL-D where an adult female of reproductive capacity (foetus) is the most sensitive receptor. Accordingly, all of these values are derived assuming long-term, consistent exposure is occurring. However, the level and frequency of exposure can vary at the site, especially under recreational exposure scenario where exposures may not occur frequently for 365 days of the year. Never-the-less approach consistent with NEPM (2013) has been adopted for the derivation of relevant SSGVs for lead.

6. Existing HILs

The NEPM (2013) guidelines provide default HILs for lead under different land use scenarios. The most relevant default HIL values applicable to different site receptors are:

- Precinct residents – HIL A (residential 300 mg/kg): residential areas within the Precinct are typical of low density housing with accessible soils. Other applicable locations such as childcare/preschools are also present.
- Precinct residents and visitors – HIL C (recreational; 600 mg/kg): Precinct residents and visitors may use public open space such as parks, playgrounds and playing fields.
- Workers – HIL D (1500 mg/kg): workers may be present in commercial/industrial properties within the Precinct.

The HILs are applicable for assessing human health risk via all relevant pathways of exposure. HILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or ‘screening’) of an assessment of potential risks to human health from chronic exposure to contaminants. They are intentionally conservative and are based on a reasonable worst-case scenario. The HILs are generally derived by integrating exposure estimates with toxicity reference values, that is, tolerable daily intakes (TDI), acceptable daily intakes (ADI), and reference doses (RfD), to estimate the soil concentration of a substance that will prevent exceedance of the toxicity reference value under the defined land use scenario. The toxicity reference values are generally based on the known most sensitive significant toxicological effect.

HILs establish the concentration of a contaminant above which further appropriate health investigation and evaluation will be required. Levels slightly in excess of the HILs do not necessarily imply unacceptable conditions or that a significant health risk is likely to be present. Exceeding a HIL means further investigation is required and does not indicate that ‘clean-up’ is required. The use of investigation and screening levels as default remediation criteria may result in unnecessary remediation and increased development costs, unnecessary disturbance to the site and local environment, and potential waste of valuable landfill space. As such, default HILs are not intended to be clean-up levels. The decision on whether clean-up is required, and to what extent, should be based on site-specific assessment triggered by an exceedance of the HIL. Health risk assessment is the primary driver for making site decisions including the need for appropriate risk management options. Other considerations such as practicality, timescale, effectiveness, cost, sustainability and associated ecological risk assessment can also be relevant.

7. Exposure Assessment

The exposure assumptions for Precinct residents, visitors and workers were adopted from NEPM (2013) guidelines. Soil and dust ingestion, and inhalation are likely to be the main routes of exposure. The primary method of assessing exposure to lead contamination was via blood lead modelling, using IEUBK for Precinct residents and visitors (HIL-A and HIL-C) and ALM for workers (HIL-D). The models allow for soil and dust intake via ingestion. The IEUBK model also includes background intake for air, water and dietary lead.

7.1 Intake via Ingestion

Lead concentrations across the site were variable suggesting that lead intake would vary depending on the location of exposure at the site. For workers, the ingested amount would be reduced if sufficient personal protective equipment is used, and dust minimisation protocols are followed.

The health impacts of ingested lead depend on the bioavailability of lead in the ingested material. It is the proportion of an ingested chemical substance that is absorbed from the gut into the body and reaches systematic circulation without change (EA 2009). The bioavailability of lead in the material was analysed and is described in Section 3.

The water use guidelines developed separately (refer to Ramboll 2021 Conceptual Site Model Report) shows that children can have additional lead intake from recreational exposures as follows:

- Incidental ingestion – 0.36 µg/day
- Recreational drinking – 0.23 µg/day

The total estimated intake from recreational water exposure is about 0.6 µg/day. This level of intake is unlikely to cause any material change in the developed SSGV for lead. However, this intake was added to the IEUBK model as alternate intake for all age groups.

7.2 Intake via inhalation

Lead in dust particles would be associated with particles of different sizes and this influences where in the respiratory tract it is deposited. Lead associated with smaller, respirable dust particles are predominantly deposited in the pulmonary region of the respiratory tract, where it can either get absorbed directly into general circulation or be transported via phagocytic cells to the gastrointestinal tract. Lead associated with larger particles would be deposited in the upper and large airways, such as nasal and pharyngeal and tracheobronchial regions of the respiratory tract and may be transported via mucociliary transport to the oesophagus and swallowed. This would also make its way to the gastrointestinal tract.

The dust lung retention factor describes the percentage of respirable dust that is small enough to be retained in lungs and is associated with health effects. For both indoor and outdoor dust exposures, the respirable fraction is estimated at 37.5% of the inspirable fraction. This fraction is recommended by enHealth (2012) where it was considered that 75% of the inhaled (inspirable) dust will be retained in the respiratory tract (25% is exhaled) of which 50% is small enough to reach the pulmonary alveoli, resulting in a respirable fraction of 37.5%. Therefore, a large proportion of the inhaled particles are expected to either be exhaled out or be transported to the gastrointestinal tract where absorption similar to ingested soil fractions would occur.

7.3 Exposure Parameters

The US EPA IEUBK and ALM models were used to undertake blood lead modelling and development of the SSGVs. The input parameters were directly adopted from NEPM (2013) guidelines (as described in EnRisks 2011, NEPM Schedule B7 Appendix A1 and D and elsewhere in NEPM guidelines), except for bioaccessibility information.

8. Toxicity Assessment

Lead (Pb) is a naturally occurring element and can exist in three oxidation states, Pb(0) – metallic lead, Pb(II) – most common and Pb(IV). The most common mineral form of lead is galena (PbS), followed by anglesite ($PbSO_4$) and cerussite ($PbCO_3$). Lead is used in a wide range of materials, including storage batteries, metal alloys, radiation shields, ammunition and chemical resistant linings. Lead has also been widely used as a paint pigment and additive in petrol, although its use in these products has been greatly reduced (ATSDR, 2007).

Natural mobilization of lead occurs via the weathering of mineral deposits and as a result of volcanic activity (ATSDR, 2007). However, these releases are minor compared to emissions from anthropogenic sources, including the mining and smelting of lead-bearing ores, the manufacture of lead-containing products, the combustion of coal and the incineration of lead-based wastes (ATSDR, 2007). The use of lead in products such as petrol, paints, pesticides, ammunition and fishing sinkers has historically resulted in emissions of lead being released to the environment. However, as lead has been phased out as a constituent of these products over the years, their significance as an environmental source of lead has greatly diminished.

Lead is persistent in the environment, the primary sinks being soil and sediment (ATSDR, 2007). Atmospheric lead is mainly present in particulate form, with an average residence time of 10 days (ATSDR, 2007). The transport and bioavailability of lead deposited to soil is dependent upon the pH and mineral composition of the soil, as well as the amount and type of organic matter present (WHO, 1995). Lead strongly adsorbs to organic matter and is not readily leached to groundwater or sub-soils (ATSDR, 2007). Lead deposited to water will partition between the sediment and aqueous phase depending upon the salinity, pH and hardness of the water and the amount of humic material present (WHO, 1995).

To quantify exposure in humans, data are expressed in terms of absorbed lead, and not in terms of external exposure levels (e.g., concentration in water) or dose (e.g., mg/kg/day). Blood lead mainly reflects exposure history of the previous few months and does not necessarily reflect the larger burden and much slower elimination kinetics of lead in bone. Lead in bone is considered a biomarker of cumulative or long-term exposure because lead accumulates in bone over the lifetime and most of the lead body burden resides in bone. Most of the body burden of Pb (the total amount of Pb in the body) is distributed to the bone, with approximately 94% and 76% of the body burden found in bone in adults and children, respectively (ATSDR 2019). The remainder is distributed to blood and soft tissues. Once absorbed, lead is rapidly taken up in the blood and distributed to soft tissues including the kidney, liver and bone marrow and then slowly redistributed to the bone (WHO, 2011). Lead has a half-life of approximately 40 days in blood and soft tissue, and 20 to 30 years in bone (NHMRC, 2011). Lead is primarily excreted in faeces and urine, with minor excretion via sweat, saliva, hair, nails and breast milk (ATSDR, 2007).

Lead exposure can cause increases in blood lead concentrations with blood lead concentrations between 5 to 39 µg/dL potentially associated with short-term impacts relating to spontaneous abortion, postnatal developmental delay and reduced birth weight (SafeWork Australia 2013). Short-term effects of blood lead >40 µg/dL could also include neurocognitive deficits, sperm abnormalities, anaemia, colic, encephalopathy and other nonspecific symptoms such as headache, fatigue, sleep disturbance, anorexia, constipation, arthralgia and myalgia. Signs and symptoms of gastrointestinal and neurological toxicity can also occur at blood lead levels >30 µg/dL, with severity increasing with blood lead following short-term exposure (ATSDR 2019). While inorganic lead compounds are classified by the International Agency for Research on Cancer (IARC) as Group 2A agents that are probably carcinogenic to humans, the non-carcinogenic effects (threshold) are more sensitive and have a more pronounced effects in exposed children and adults. For risk assessment purposes, clean-up determinations and levels based on the more sensitive, non-cancer endpoint are expected to be protective against other effect requiring higher exposures, including cancer endpoints.

8.1.1 Threshold (non-carcinogenic) Health Effects

The majority of information regarding the toxicity of lead has been gathered from studies of workers in occupational settings and from studies of adults and children in the general population. Exposure to lead can have effects on multiple organs and bodily functions due to its multi-mode action in biological systems (ATSDR, 2007). The developing nervous system, haematological and cardiovascular systems and the kidneys are considered the most sensitive targets for lead toxicity (ATSDR, 2007). However, health effects observed as a result of lead exposure can differ substantially between individuals depending on age, the amount of lead, the length of exposure and the presence of other health conditions (NHMRC, 2015).

Occupational studies of lead workers suggest long-term exposure to lead may be associated with increased mortality due to cerebrovascular disease (ATSDR, 2007). Population studies have reported significant associations between lead levels measured in both bone and blood and increases in blood pressure (ATSDR, 2007). Lead is also known to inhibit heme biosynthesis, shorten erythrocyte lifespan and induce inappropriate production of the erythropoietin hormone, leading to inadequate maturation of red cell progenitors and contributing to anaemia (ATSDR, 2007). Indeed, low levels of haemoglobin have been observed in both adults and children following long-term exposure to lead (NHMRC, 2015). Lead also affects kidney function by reducing glomerular filtration rates (ATSDR, 2007). Kidney inflammation, renal impairment and chronic nephropathy causing death, have been observed following short-term exposures to lead, with the more severe effects associated with increasing blood lead levels (NHMRC, 2015).

Encephalopathy (severe abnormal brain function) has been associated with prolonged exposure to high amounts of lead in adults and children (NHMRC, 2015). Symptoms can include irritability, agitation, poor attention span, headache, confusion, uncoordinated movements, drowsiness, constipation, convulsions, vomiting, seizures, coma and death (NHMRC, 2015). Lead poisoning in children has been linked to residual cognitive deficits that can be still detected in adulthood (ATSDR, 2007). Other neurobehavioral effects observed after long-term, high concentration exposure in adults and children include problems with thinking, anxiety, mood change, dizziness, fatigue, sleep disturbance, lethargy, impotence, decreased libido, dizziness, weakness, paresthesia and paralysis (NHMRC, 2015). Associations between blood and/or bone lead and poorer performance in neurobehavioral tests have been reported in studies of older populations, with lead also shown to affect nerve conduction velocity and postural balance in workers (ATSDR, 2007).

Lead has been associated with accelerated skeletal maturation in children, which may predispose them to the development of osteoporosis in later life (ATSDR, 2007). Increased occurrence of dental caries in children and periodontal bone loss have also been linked to lead exposure, as has a reduction in circulating levels of vitamin D, which is required for maintenance of calcium homeostasis (ATSDR, 2007).

Changes in the circulating levels of thyroid hormones and reproductive hormones have been observed in workers exposed to lead, as well as altered immune parameters with reported effects including changes in T-cell populations, response to T-cell mitogens and reduced chemotaxis of polymorphonuclear leukocytes (ATSDR, 2007). Lead exposure has been linked to increases in serum IgE in children, a primary mediator for type-1 hypersensitivity involved in allergic diseases such as asthma, leading to suggestions that lead could be a risk factor for childhood asthma (ATSDR, 2007).

8.1.2 Carcinogenic (genotoxic) Health Effects

The IARC has determined that there is sufficient evidence from animal studies and limited evidence from human studies to classify inorganic lead and lead compounds as probably carcinogenic to humans.

Ingestion of high concentrations of lead compounds has been linked to the development of renal tumors in experimental animals (ATSDR, 2007). Human-based research, however, has been less conclusive. Studies of lead workers have shown limited evidence of an increased risk of lung and stomach cancer as a result of occupational exposure to lead, with others showing weak evidence for an association with kidney cancer and gliomas (ATSDR, 2007).

Occupational studies suggest lead is a clastogenic agent, capable of inducing chromosomal aberrations, micronuclei and sister chromatid exchanges in peripheral blood cells (ATSDR, 2007). Mammalian studies testing mutagenicity have correlated DNA damage observed in the lung, liver and kidney with lead exposure, although *in vitro* studies have yielded mostly negative results for lead (ATSDR, 2007).

9. Lead SSGVs

Absolute bioavailability (ABA; absorption fraction) values were calculated from the adopted bioaccessibility data and used in IEUBK and ALM models. The values were calculated as follows and are shown in **Table 9-1** together with NEPM defaults:

$$AF_{S,D} = AF_{Soluble} \times RBA_{Soil/Soluble} \ldots eq\ 11.1$$

where,

$AF_{S,D}$	Absorption fraction (same for soil and dust)
$AF_{soluble}$	Absorption factor in children (0.5) and adults (0.2)
RBA	Relative bioavailability

Table 9-1: Bioavailability input data for modelling.

Approach	**ABA ($AF_{S,D}$)**	**$AF_{Soluble}$**	**RBA**
NEPM Default	50.0%	50%	100%
Site Specific - HIL A & C	37.5%	50%	75%
Site Specific - HIL D	15.0%	20%	75%

The IEUBK model was used to derive SSGVs for to update HIL-A and HIL-C guideline values. The algorithms and background information about the IEUBK model are provided elsewhere (NEPC 2013d; US EPA 1994). IEUBK models blood lead levels in children aged 0-84 months (0-7 years) and calculates blood lead concentrations in 7 age groups separately (0-1 yrs, 1-2 yrs, 2-3 yrs, 3-4yrs, 4-5 yrs, 5-6 yrs and 6-7 yrs). The age range 1−2 years is considered to be the most sensitive as a result of lowest body weight combined with high hand-to-mouth activity and crawling. Parameters associated with air, water, diet, soil and dust were adopted from NEPM defaults.

The ALM was used was used to derive SSGV to update HIL-D guideline value. The algorithms and background information about this methodology are provided elsewhere (NEPC 2013d; US EPA 2003a). The baseline blood lead concentration input parameter of the model represents the geometric mean blood lead concentration in woman of child-bearing age and the geometric standard deviation (GSD) input parameter is a measure of the inter-individual variability in these concentrations. The default input parameters in the model comes from a survey of US women 17-45 years of age under the National Health and Nutrition Examination Survey (NHANES). The most recent update of the model default parameters was conducted in 2014, with previous updates conducted in 2002, 2007 and 2010 (US EPA 2017a). Consistent with the NEPM derivation of lead HIL-D values, these latest default parameters were used in the model calculations.

The calculated SSGVs for different exposure scenarios are shown in Table 9-2 and model print outs are provided in Appendices 2 to 4.

Table 9-2: Lead SSGVs developed using site-specific bioaccessibility data.

Landuse	NEPM Ref	Units	Default Value	SSGV-estimated (75% Bioacc)	Adopted SSGV Based on 75% Bioacc
				10 µg/dL BLL Target	
Residential	HIL A	mg/kg	300	399	400
Public open space	HIL C	mg/kg	600	683	700
Commercial / industrial	HIL D	mg/kg	1500	3675	4000

10. Blood Lead Level Check

The SSGVs were used to predict blood lead levels in receptor groups to ensure sensitive sub populations would be protected from the proposed SSGVs. These are shown in Table 10-1 and Table 10-2.

Table 10-1: Summary of IEUBK modelling results for SSGVs, HIL-A and HIL-C

IEUBK Output Description	Children Age Groups (Years)	Units	Output Value (HILA – 400 mg/kg)	Output Value (HILC – 700 mg/kg)	Comments
Geometric mean blood lead level	0.5 - 1	µg/dL	3.5	3.6	Mean blood lead level in children of different age group. The most sensitive age group of 1-3 years has the highest predicted blood lead level but is below the adopted BLL of 10 µg/dL.
	1 - 2	µg/dL	5.5	5.5	
	2 - 3	µg/dL	5.5	5.6	
	3 - 4	µg/dL	4.9	5.0	
	4 - 5	µg/dL	4.6	4.7	
	5 - 6	µg/dL	4.4	4.5	
	6 - 7	µg/dL	4.2	4.2	
	0 - 7	µg/dL	4.6	4.7	Mean blood lead level in children of age 0-7 years.
Percent above the target	0 - 7	%	5	5.4	NHMRC guidelines require that at least 95% of the Australian population should be below the target blood lead level.
Percent below the target	0 - 7	%	95	94.6	

Table 10-2: Summary of ALM modelling results

ALM Output Description	Units	Output Value (HILD – 4000 mg/kg)	Comments
Geometric mean blood lead of adult worker (female of reproductive capacity)	µg/dL	4.5	This value applies to females of reproductive capacity. However, if it is assumed that model default input parameters also apply to 'males and females not of reproductive capacity' then this value would be a good estimate of their blood lead concentration. Value is below target of 10 µg/dL.
95th percentile blood lead among foetuses of adult workers	µg/dL	10.8	This is the expected blood lead concentration against a target of 10 µg/dL. The estimated blood lead level is slightly exceeded due to rounding-off of the SSGV.
Probability that foetal blood lead exceeds target blood lead (assuming lognormal distribution)	%	6.4	This is the expected probability that foetuses of exposed sensitive onsite workers exceed the target value of 10 µg/dL. NHMRC guidelines require that at least 95% of the Australian population should be below the target blood lead level. Therefore, acceptable probability for exceeding the target is 5%. The estimated probability is slightly exceeded due to rounding-off of the SSGV.

11. Uncertainty and Sensitivity

The SSGVs were mainly developed by updating the bioaccessibility estimate from NEPM assumptions. Therefore, only parameters relating to bioavailability measurements are discussed here. NEPM (2013) and references therein should be consulted for uncertainties and sensitivities relating to other modelling parameters.

A SSGV has been derived for land uses contemplated under HIL-A though Ramboll has only considered its application to the pre-school and school. The NSW EPA is providing guidance on private land and may consider this SSGV applicable to private residences.

The bioaccessibility of lead in soil in public areas was observed to range around 10% at the Eastern Embankment to maximums of around 74% in Foxlow Parklet. EnRisks (2011) states that where *only a minimal number of RBA samples are collected, and these show a large range of RBA values…such assessments defaults to the use of the maximum RBA values*. The Precinct bioaccessibility investigation included a comprehensive sampling of different areas of the Precinct with a total of 16 samples and therefore variability in soil lead bioaccessibility is considered to be well characterised. This means that Precinct users are likely to be exposed to soil with a range of bioavailability and is highly unlikely that someone (including children) are exposed to soils with highest bioaccessibility all of the exposure time.

Furthermore, note that bioaccessibility measurements are performed on <250 μm soils samples to simulate soil particle sizes associated with hand-mouth action of children in the most sensitive age group (1–2-year-olds). Parts of the public areas where samples were collected from are grassed and therefore soil access is restricted. Hence the level of exposure assumed in a continuous long-term exposure model such as IEUBK is not likely to exist, at least from public areas.

Based on the above, a more realistic bioaccessibility estimate, commensurate with the expected level of exposure, would have been represented by 95% upper confidence limit (UCL) of mean or 80th percentile. A sensitivity analysis is presented in Table 11-1 to demonstrate the range of SSGVs that may result from such a consideration.

Table 11-1: Sensitivity analysis of SSGVs from different bioaccessibility statistics.

Bioaccessibility Statistics	Bioaccessibility value (%)	SSGV – HIL A (mg/kg)	SSGV – HIL C (mg/kg)	SSGV – HIL D (mg/kg)
Maximum	75	400	700	4000
95th percentile	73.5	406	696	3750
80th percentile	65	460	800	4200
95% UCL	50	600	1000	5500

*values for maximum biocc has been rounded-off

12. Conclusions

Site-specific lead guideline values (SSGVs) were developed using lead bioaccessibility data collected from various areas of the Precinct with target blood lead level of 10 µg/dL. The following SSGVs were developed for different landuse scenarios using conservative estimates of overall soil bioavailability at the site:

- SSGV – HIL A: 400 mg/kg
- SSGV – HIL C: 700 mg/kg
- SSGV – HIL D: 4000 mg/kg

The above SSGVs can be applied for screening assessment of soil concentrations within public spaces in the Precinct and to determine areas which require remediation and/or management. Marginal exceedance of these SSGVs may not constitute an immediate risk of adverse effects, however further investigation including exposure assessment may be warranted.

13. References

1. ATSDR (2007) *Toxicological Profile for Lead*. Agency for Toxic Substances and Disease Registry. August, 2007.
2. ATSDR (2019) Toxicological Profile for Lead – Draft for Public Comment https://www.atsdr.cdc.gov/toxprofiles/tp13.pdf
3. EA (2009) Updated technical background to the CLEA model. Science report SC050021/SR3, Environment Agency, Bristol, UK.
4. enHealth (2012) Australian Exposure Factor Guide. Department of Health and Ageing and enHealth Council, Commonwealth of Australia
5. enHealth (2012) Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards
6. EPA (2015) Preliminary waste classification – suburbs surrounding the former Pasminco smelter. July 2015.
7. International Agency for Research on Cancer (IARC) (2006) IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, Inorganic and Organic Lead Compounds. Volume 87. IARC Press, World Health Organisation, Lyon, France.
8. Juhasz, A. L., Smith, E., Weber, J., Rees, M., Rofe, A., Kuchel, T., Sansom, L., Naidu, R. (2007). Comparison of in vivo and in vitro methodologies for the assessment of arsenic bioavailability in contaminated soils. Chemosphere 69: 961-966.
9. Juhasz, A. L., Weber, J., Smith, E., Naidu, R., Marchner, B., Rees, M., Rofe, A., Kuchel, T., Sansom, L. (2009) Evaluation of SBRC-Gastric and SBRC-Intestinal Methods for the Prediction of In Vivo Relative Lead Bioavailability in Contaminated Soils. Environ. Sci. Technol. 43: 4503-4509.
10. Model WHS Regulations (2019) Model Work Health and Safety Regulations as at 15 January 2019. Released by SafeWork Australia and Published by the Parliamentary Counsel's Committee https://www.safeworkaustralia.gov.au/system/files/documents/1902/model-whs-regulations-15-january-2019.pdf
11. Mushak, P (1991) Gastro-Intestinal Absorption of Lead in Children and Adults: Overview of Biological and Biophysico-Chemical Aspects, Chemical Speciation & Bioavailability, 3:3-4, 87-104, DOI: 10.1080/09542299.1991.11083160
12. National Health and Medical Research Council (NHMRC) (2011) Australian Drinking Water Guidelines. Australian Government.
13. NEPC (2013a) Assessment of Site Contamination: Schedule B4 – Site-specific Health Risk Assessment Methodology. National Environment Protection Council, Adelaide
14. NEPC (2013b) Assessment of Site Contamination: Schedule B1 – Investigation Levels for Soil and Groundwater. National Environment Protection Council, Adelaide
15. NEPC (2013c) Guidance note – Lead: Supplementary information to Schedule B7 section 5.4. NEPM Toolbox. http://www.nepc.gov.au/nepms/assessment-site-contamination/toolbox
16. NEPC (2013d) Guideline on derivation of health-based investigation levels. National Environment Protection Council, Adelaide

17. NHMRC (2016) Managing individual exposure to lead in Australia – A guide for health professionals. Canberra: National Health and Medical Research Council
18. NHMRC (2015) NHMRC Information Paper: Evidence on the Effects of Lead on Human Health. National Health and Medical Research Council, Australian Government.
19. SafeWork Australia (2013) Lead (Inorganic) https://www.safeworkaustralia.gov.au/system/files/documents/1702/lead_inorganic.pdf
20. SafeWork NSW lead work guidance (2019) https://www.safework.nsw.gov.au/hazards-a-z/hazardous-chemical/lead-work accessed 20 September 2019.
21. Smith, E.; Kempson, I. M.; Juhasz, A. L.; Weber, J.; Rofe, A.; Gancarz, D.; Naidu, R.; McLaren, R. G.; Grafe, M. (2011) In vivo ̈ −in vitro and XANES spectroscopy assessments of lead bioavailability in contaminated periurban soils. Environ. Sci. Technol. 45: 6145−6152.
22. US EPA (1989) Risk Assessment Guidance for Superfund, Volume I. Human Health Evaluation Manual (Part A)
23. US EPA (1994) Guidance Manual for the IEUBK model for Lead in Children. Office of Solid Waste and Emergency Response (OSWER) 9285.7-15-1. EPA: Washington, DC, 1994.
24. US EPA (2002) Supplemental guidance for developing soil screening levels for superfund sites. OSWER 9355.4-24. EPA: Washington, DC, 2002.
25. US EPA (2003a) Recommendations of the technical review workgroup for lead for an approach to assessing risks associated with adult exposures to lead in soil. EPA-540-R-03-001.
26. US EPA (2003b) Assessing Intermittent or Variable Exposures at Lead Sites. OSWER #9285.7-76. November 2003. https://semspub.epa.gov/work/HQ/176288.pdf
27. US EPA (2007). Estimation of relative bioavailability of lead in soil and soil-like material using in vivo and in vitro methods; OSWER 9285.7-77, EPA: Washington, DC, 2007
28. US EPA (2016) Recommendations for assessing short-term exposure scenarios involving lead at superfund sites. OLEM Directive 9285.6-54.
29. US EPA (2017a) Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters and The Integrated Exposure Uptake Biokinetic Model's Default Maternal Blood Lead Concentration at Birth Variable. OLEM Directive 9285.6-56. May 2017.
30. US EPA (2017b) Update for Chapter 5 of the exposure factors handbook: soil and dust ingestion. EPA/600/R-17/384F, EPA: Washington DC, 2017.
31. US EPA)2021) Guidance for Sample Collection for In Vitro Bioaccessibility Assay for Arsenic and Lead in Soil and Applications of Relative Bioavailability in Human Health Risk Assessment
32. World Health Organisation (WHO) (1995) Environmental Health Criteria 165 – Inorganic Lead, International Program on Chemical Safety, World Health Organisation, Geneva.
33. World Health Organisation (WHO) (2011) Lead in Drinking Water, Background Document for Development of WHO Guidelines for Drinking Water Quality. World Health Organisation, Geneva.

14. Limitations

Ramboll prepared this letter report in accordance with the agreed scope of work for Regional NSW and in accordance with our understanding and interpretation of current regulatory standards in NSW, Australia.

The report has derived health-based site-specific guideline values (SSGVs) for lead based on currently available data and information about the site. Where such data is inadequate, the report has used protective assumptions in the derivation. The report has also assumed that there will not be any change in exposure scenario in the future. The outcomes of this report are based on the assumptions and calculations/modelling used for assessment of exposures. The SSGVs provided in this report should be used according to the guideline provided and apply only to exposure scenarios discussed in this report. The conclusions are applicable to the extent these assumptions remain relevant for the site.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment. Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this assessment. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

The report must not be reproduced in whole or in part except with the prior consent of Ramboll Australia Pty Ltd and subject to inclusion of an acknowledgement of the source. No information as to the contents or subject matter of this document or any part thereof may be communicated in any manner to any third party without the prior consent of Ramboll Australia Pty Ltd.

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

APPENDIX 1
UNISA BIOACCESSIBILITY REPORT

University of South Australia

Assessment of Pb Bioaccessibility in Impacted Soil – Captains Flat

Prepared for:	Ramboll Pty Ltd Level 2, Suite 18 Eastpoint, 50 Glebe Rd, The Junction, NSW, 2291
Attention:	Stephen Maxwell
Telephone:	0478 658 194
Email:	smaxwell@ramboll.com

Prepared by:	Dr Albert Juhasz Future Industries Institute University of South Australia Mawson Lakes Boulevard Mawson Lakes, SA 5095
Telephone:	08 8302 5045
Facsimile:	08 8302 3057
Email:	Albert.Juhasz@unisa.edu.au

Date of issue: 30 August 2021

Table of Contents

INTRODUCTION

This report was prepared for Ramboll Pty Ltd to assess lead bioaccessibility in impacted soil. The bioaccessibility testing was conducted at the Future Industries Institute, based at the Mawson Lakes Campus of the University of South Australia (UniSA). UniSA's Flagship Institute focuses on building knowledge and capacity in core research strengths of physical chemistry and environmental science and management. The Institute has four distinct yet inter-related strands: Minerals and Resources; Energy and Advanced Manufacturing; Environmental Science and Engineering; and Bioengineering and Nanomedicine. The Institute aggregates and builds upon existing expertise and infrastructure from the Ian Wark Research Institute, the Mawson Institute and the Centre for Environmental Risk Assessment and Remediation. The vision for the Future Industries Institute aligns strongly with South Australian and National economic and research priorities by building a critical mass of trans-disciplinary research capacity focused on pressing real-world challenges.

OBJECTIVES

The objective of this assessment was to:

- Assess the concentration of lead in the < 2 mm and < 250 μm soil particle size fractions;
- Assess lead bioaccessibility in the < 250 μm soil particle size fraction using the gastric phase of the SBRC assay;
- Assess lead bioaccessibility in the < 250 μm soil particle size fraction using the intestinal phase of the SBRC assay; and
- Calculate lead relative bioaccessibility in the < 250 μm soil particle size fraction.

OUTCOMES AND DELIVERABLES

The expected outcome from this assessment was:

- A report assessing the bioaccessibility of lead in soil. The report was to include:
    - Assessment of lead concentration in the < 2 mm and < 250 μm soil particle size fractions;
    - Assessment of lead bioaccessibility in the < 250 μm soil particle size fractions using an in vitro method;
    - Methodology procedures; and
    - QA/QC protocols

PROJECT BACKGROUND

Soil testing was initiated at the invitation of Ramboll Pty Ltd for an assessment of lead bioaccessibility in impacted soil. Human exposure to a contaminant may be through a number of pathways including inhalation, dermal absorption and ingestion. For many metal contaminants, the most significant metal exposure pathway is via soil ingestion. Generally, soil ingestion results from the accidental or, in the case of children less than 5 years old, the incidental ingestion of soil (< 250 μm particle size fraction) via hand-to-mouth contact (Basta et al., 2001). In assessing contaminant exposure, it is often assumed that the contaminant is 100% bioaccessible / bioavailable, however, there is growing evidence to suggest that contaminant bioaccessibility / bioavailability in soil may be less than 100%. Therefore, incorporation of metal bioaccessibility / bioavailability may reduce the uncertainty in estimating exposure associated with the incidental ingestion of contaminated soil.

Contaminant bioaccessibility may be estimated using *in vitro* assays that simulate processes that occur in the human body that lead to the release of contaminants from the soil matrix. A frequently used assay for the determination of contaminant bioaccessibility is the Solubility Bioaccessibility Research Consortium (SBRC) method (Kelly *et al.,* 2002). The gastric phase of this method (termed the Simplified Bioaccessibility Extraction Test [SBET] for arsenic or the Relative Bioavailability Leaching Procedure [RBALP] for lead) has been correlated to *in vivo* arsenic and lead relative bioavailability when determined using juvenile swine (Juhasz *et al*., 2007; USEPA 2007).

FINDINGS

Total lead concentration for each sample is shown in Table 1 while lead bioaccessibility results are shown in Tables 2 (SBRC-G lead bioaccessibility), 3 (SBRC-I lead bioaccessibility) and 4 (summary of data).

- Total lead concentration in the < 2 mm particle size fraction ranged from 1350 mg kg^{-1} (QA201) to 104000 mg kg^{-1} (R_S126a) (Table 1) with concentrations in the < 250 μm particle size fraction ranging from 1485 mg kg^{-1} (QA201) to 91800 mg Pb kg^{-1} (R_S126a) (Table 1).

- Lead bioaccessibility determined using gastric phase extraction (SBRC-G) ranged from 1.6% (R_S119a) to 80.1% (R_S148a) (Tables 2 and 4).

- When assays parameters were modified to reflect intestinal phase conditions (SBRC-I), lead bioaccessibility was reduced (0.1-40.0%), presumably as a result of re-adsorption of lead onto soil particles and / or precipitation at the neutral intestinal phase pH (Tables 3 and 4).

- Lead relative bioaccessibility (Rel-SBRC-I) was calculated by adjusting the solubility of lead from contaminated soil by the solubility of lead acetate at the corresponding intestinal phase pH value. Lead relative bioaccessibility ranged from 0.9% (R_S119a) to ~100% (R_S148a) (Table 4).

- Gastric phase lead bioaccessibility for QC1 was within an acceptable range for this reference material.

Table 1. Total Pb concentration in the < 2 mm and < 250 µm soil particle size fractions.

Soil	ID #	< 2 mm soil particle size fraction		Sample #	< 250 µm soil particle size fraction	
		Pb (mg kg^{-1})	Mean Pb (mg kg^{-1})		Pb (mg kg^{-1})	Mean Pb (mg kg^{-1})
R_S117a	R_S117a-1	2610		R_S117a-3	3270	
	R_S117a-2	2490	2550	R_S117a-4	3230	3250
R_S118a	R_S118a-1	3620		R_S118a-3	2710	
	R_S118a-2	3550	3585	R_S118a-4	2730	2720
R_S119a	R_S119a-1	2240		R_S119a-3	2600	
	R_S119a-2	2210	2225	R_S119a-4	2560	2580
R_S120a	R_S120a-1	8630		R_S120a-3	9090	
	R_S120a-2	8980	8805	R_S120a-4	50800†	9090
R_S121a	R_S121a-1	52100		R_S121a-3	58100	
	R_S121a-2	51200	51650	R_S121a-4	40400	49250
R_S122a	R_S122a-1	5610		R_S122a-3	4420	
	R_S122a-2	5140	5375	R_S122a-4	5690	5055
R_S123a	R_S123a-1	4220		R_S123a-3	3870	
	R_S123a-2	4390	4305	R_S123a-4	3860	3865
R_S124a	R_S124a-1	22100		R_S124a-3	30600	
	R_S124a-2	22300	22200	R_S124a-4	30700	30650
R_S125a	R_S125a-1	7420		R_S125a-3	7540	
	R_S125a-2	7420	7420	R_S125a-4	7480	7510
R_S126a	R_S126a-1	102500		R_S126a-3	92600	
	R_S126a-2	105500	104000	R_S126a-4	91000	91800
R_S145a	R_S145a-1	3210		R_S145a-3	3130	
	R_S145a-2	3170	3190	R_S145a-4	3120	3125

R_S146a	R_S146a-1	1870		R_S146a-3	1960	
	R_S146a-2	1920	1895	R_S146a-4	1970	1965
R_S147a	R_S147a-1	30400		R_S147a-3	30800	
	R_S147a-2	30400	30400	R_S147a-4	30900	30850
R_S148a	R_S148a-1	44800		R_S148a-3	49200	
	R_S148a-2	44000	44400	R_S148a-4	48900	49050
R_S149a	R_S149a-1	4370		R_S149a-3	4440	
	R_S149a-2	4140	4255	R_S149a-4	4360	4400
QA201	QA201-1	1370		QA201-3	1500	
	QA201-2	1330	1350	QA201-4	1470	1485

†Data from sample R_S120a-4 was considered an outlier given Pb concentrations in R_S120a-1, R_S120a-2 and R_S120a-3 (plus XRF data) were ~5-fold lower. The value of 50800 mg kg^{-1} was not used to calculate the average Pb concentration in R_S120a.

Table 2. Lead bioaccessibility in contaminated soils determined using gastric phase extraction (SBRC-G).

Soil	Sample #	ICP-AES Pb (mg l^{-1})	Soil:Solution Ratio	Dilution	Gastric Phase Pb Bioaccessibility (mg kg^{-1})	Mean Gastric Phase Pb Bioaccessibility (mg kg^{-1})
R_S117a	S117a-G1	0.221	100	10	221	
	S117a-G2	0.227	100	10	227	224
R_S118a	S118a-G1	1.99	100	10	1990	
	S118a-G2	2.03	100	10	2030	2010
R_S119a	S119a-G1	0.042	100	10	42	
	S119a-G2	0.042	100	10	42	42
R_S120a	S120a-G1	5.11	100	10	5110	
	S120a-G2	6.21	100	10	6210	5660
R_S121a	S121a-G1	30.9	100	10	30900	
	S121a-G2	29.6	100	10	29600	30250
R_S122a	S122a-G1	3.70	100	10	3700	
	S122a-G2	3.69	100	10	3690	3695
R_S123a	S123a-G1	0.838	100	10	838	
	S123a-G2	0.642	100	10	642	740
R_S124a	S124a-G1	6.61	100	10	6610	
	S124a-G2	7.42	100	10	7420	7015
R_S125a	S125a-G1	5.07	100	10	5070	
	S125a-G2	4.73	100	10	4730	4900
R_S126a	S126a-G1	58.0	100	10	58000	
	S126a-G2	46.8	100	10	46800	52400
R_S145a	S145a-G1	1.09	100	10	1090	
	S145a-G2	1.07	100	10	1070	1080

R_S146a	S146a-G1	0.248	100	10	248	
	S146a-G2	0.198	100	10	198	223
R_S147a	S147a-G1	0.752	100	10	752	
	S147a-G2	0.799	100	10	799	776
R_S148a	S148a-G1	39.6	100	10	39600	
	S148a-G2	39.0	100	10	39000	39300
R_S149a	S149a-G1	0.555	100	10	555	
	S149a-G2	0.575	100	10	575	565
QA201	QA201-G1	0.817	100	10	817	
	QA201-G2	0.830	100	10	830	824
QC1†	QC1-G	4.76	100	10	4760	
QC2‡	QC2-G	<0.001	-	10	<0.01	

†QC1 comprised of a lead-contaminated (6400 mg Pb kg^{-1}) reference soil.
‡QC2 comprised of SBRC gastric phase solution without soil addition (assay blank).

Table 3. Lead bioaccessibility in contaminated soils determined using gastro-intestinal phase extraction (SBRC-I).

Soil	Sample #	ICP-AES Pb ($mg\ l^{-1}$)	Soil:Solution Ratio	Dilution	Intestinal Phase Pb Bioaccessibility ($mg\ kg^{-1}$)	Mean Intestinal Phase Pb Bioaccessibility ($mg\ kg^{-1}$)
R_S117a	S117a-I1	0.010	100	10	10	
	S117a-I2	0.009	100	10	9.0	9.5
R_S118a	S118a-I1	0.247	100	10	247	
	S118a-I2	0.200	100	10	200	224
R_S119a	S119a-I1	0.003	100	10	3.0	
	S119a-I2	0.002	100	10	2.0	2.5
R_S120a	S120a-I1	1.98	100	10	1980	
	S120a-I2	2.18	100	10	2180	2080
R_S121a	S121a-I1	13.1	100	10	13100	
	S121a-I2	13.2	100	10	13200	13150
R_S122a	S122a-I1	1.28	100	10	1280	
	S122a-I2	1.14	100	10	1140	1210
R_S123a	S123a-I1	0.091	100	10	91	
	S123a-I2	0.089	100	10	89	90
R_S124a	S124a-I1	1.27	100	10	1270	
	S124a-I2	1.70	100	10	1700	1485
R_S125a	S125a-I1	0.702	100	10	702	
	S125a-I2	0.526	100	10	526	614
R_S126a	S126a-I1	26.4	100	10	26400	
	S126a-I2	25.4	100	10	25400	25900
R_S145a	S145a-I1	0.181	100	10	181	

	S145a-I2	0.155	100	10	155	168
R_S146a	S146a-I1	0.033	100	10	33	
	S146a-I2	0.032	100	10	32	33
R_S147a	S147a-I1	0.085	100	10	85	
	S147a-I2	0.098	100	10	98	92
R_S148a	S148a-I1	20.7	100	10	20700	
	S148a-I2	18.5	100	10	18500	19600
R_S149a	S149a-I1	0.023	100	10	23	
	S149a-I2	0.088	100	10	88	56
QA201	QA201-I1	0.114	100	10	114	
	QA201-I2	0.137	100	10	137	126
QC1†	QC1-I	0.967	100	10	967	
QC2‡	QC2-I	0.019	-	10	0.19	

†QC1 comprised of a lead-contaminated (6400 mg Pb kg^{-1}) reference soil.
‡QC2 comprised of SBRC intestinal phase solution without soil addition (assay blank).

Table 4. Total lead concentration and bioaccessible lead in contaminated soils (< 250 μm soil particle size fraction).

Soil	Total Pb (mg kg^{-1})	In vitro Phase	Pb Bioacc. (mg kg^{-1})	Pb Bioacc.‡ (%)
R_S117a	3250	SBRC-G	224	6.9
		SBRC-I	9.5	0.3
		Rel-SBRC-I*		2.8
R_S118a	2720	SBRC-G	2010	73.9
		SBRC-I	224	8.2
		Rel-SBRC-I*		79.6
R_S119a	2580	SBRC-G	42	1.6
		SBRC-I	2.5	0.1
		Rel-SBRC-I*		0.9
R_S120a	9090	SBRC-G	5660	62.3
		SBRC-I	2080	22.9
		Rel-SBRC-I*		60.8
R_S121a	49250	SBRC-G	30250	61.4
		SBRC-I	13150	26.7
		Rel-SBRC-I*		70.9
R_S122a	5055	SBRC-G	3695	73.1
		SBRC-I	1210	23.9
		Rel-SBRC-I*		63.6
R_S123a	3865	SBRC-G	740	19.1
		SBRC-I	90	2.3
		Rel-SBRC-I*		22.5
R_S124a	30650	SBRC-G	7015	22.9
		SBRC-I	1485	4.8
		Rel-SBRC-I*		12.9
R_S125a	7510	SBRC-G	4900	65.2
		SBRC-I	614	8.2
		Rel-SBRC-I*		21.7
R_S126a	91800	SBRC-G	52400	57.1
		SBRC-I	25900	28.2
		Rel-SBRC-I*		75.0
R_S145a	3125	SBRC-G	1080	34.6
		SBRC-I	168	5.4
		Rel-SBRC-I		52.0
R_S146a	1965	SBRC-G	223	11.3

		SBRC-I	33	1.7
		Rel-SBRC-I		16.2
R_S147a	30850	SBRC-G	776	2.5
		SBRC-I	92	0.3
		Rel-SBRC-I		2.9
R_S148a	49050	SBRC-G	39300	80.1
		SBRC-I	19600	40.0
		Rel-SBRC-I		~100
R_S149a	4400	SBRC-G	565	12.8
		SBRC-I	56	1.3
		Rel-SBRC-I		12.3
QA201	1485	SBRC-G	824	55.5
		SBRC-I	126	8.5
		Rel-SBRC-I		82.0
QC1[Ω]	6400	SBRC-G	4760	74.4[Ω]
		SBRC-I	938	14.7
		Rel-SBRC-I		~100

[‡]Percentage lead bioaccessibility following gastric or gastrointestinal phase extraction was calculated by dividing the bioaccessible lead (SBRC-G or SBRC-I) by the total lead concentration multiplied by 100.

*Lead relative bioaccessibility was calculated by adjusting the solubility of lead from contaminated soil by the solubility of lead acetate at the corresponding intestinal phase pH value.

[Ω]Lead bioaccessibility for the QC1 soil was within a suitable gastric phase extraction range for this reference material.

REFERENCES

Basta, N. T., Rodriguez, R. R., Casteel, S. W. (2001). Bioavailability and risk of arsenic exposure by the soil ingestion pathway. *In* W T Frankenberger Jr (ed): *Environmental Chemistry of Arsenic*. Marcel Dekker, New York, 2001, 117-139.

Kelly, M. E., Brauning, S. E., Schoof, R. A., Ruby, M. V. (2002). Assessing oral bioavailability of metals in soils. Batelle Memorial Institute, Ohio. pp 75-78.

Juhasz, A. L., Smith, E., Weber, J., Rees, M., Rofe, A., Kuchel, T., Sansom, L., Naidu, R. (2007). Comparison of in vivo and in vitro methodologies for the assessment of arsenic bioavailability in contaminated soils. *Chemosphere* **69**: 961-966.

USEPA (2007). *Estimation of relative bioavailability of lead in soil and soil-like material using in vivo and in vitro methods*; OSWER 9285.7-77, EPA: Washington, DC, 2007

CONFIDENTIALITY

We acknowledge the confidential nature of the results of this project and will treat the results and project reports with appropriate confidentiality and security.

APPENDIX 1 - METHODOLOGY

Soil samples

Samples supplied by Ramboll Pty Ltd were oven-dried at 105°C for 24 hours and sieved to obtain 2 soil particle size fractions; < 2 mm and < 250 μm. The < 250 μm soil particle size fraction was used to assess lead bioaccessibility.

Assessment of total lead concentration in the < 2 mm and < 250 μm soil fractions

Total lead concentration in the < 2 mm and < 250 μm soil fractions were determined by ALS Geochemistry. A copy of the ALS Geochemistry analytical report is included in Appendix 3.

Assessment of lead bioaccessibility in the < 250 μm soil particle size fraction

A frequently used assay for the determination of contaminant bioaccessibility is the Solubility Bioaccessibility Research Consortium (SBRC) method (Kelly *et al*., 2002). The gastric phase of this method (termed the Relative Bioavailability Leaching Procedure [RBALP] for lead) has been correlated to *in vivo* lead relative bioavailability when determined using juvenile swine (USEPA 2007). Contaminated soil and gastric solution (30.03 g l^{-1} glycine adjusted to pH 1.5 with concentrated HCl) were combined in polyethylene screw cap flasks at a soil:solution ratio of 1:100. The pH was noted then the flasks were incubated at 37°C, 40 rpm on a Ratek suspension mixer. After 1 hour incubation, the pH was determined and gastric phase samples (10 ml) were collected, filtered through 0.45 μm filters and analysed by ICP-MS.

Following gastric phase dissolution, the gastric solution was modified to the intestinal phase by adjusting the pH from 1.5 to 6.5-7.0 using 5 or 50% NaOH and by the addition of bovine bile (1750 mg l^{-1}) and porcine pancreatin (500 mg l^{-1}). After a further 4 hours incubation, intestinal phase samples (10 ml) were collected, filtered through 0.45 μm filters and analysed by ICP-MS. Gastric and intestinal phase extractions were performed in triplicate for each soil sample. Lead bioaccessibility was calculated by dividing the gastric or intestinal phase extractable lead by the total soil lead concentration. Lead relative bioaccessibility was determined by adjusting the dissolution of lead from contaminated soils by the solubility of lead acetate at the corresponding pH value. All extracts were analysed by ICP-MS by ALS Environmental; a copy of the ALS Environmental analytical report is included in Appendix 3.

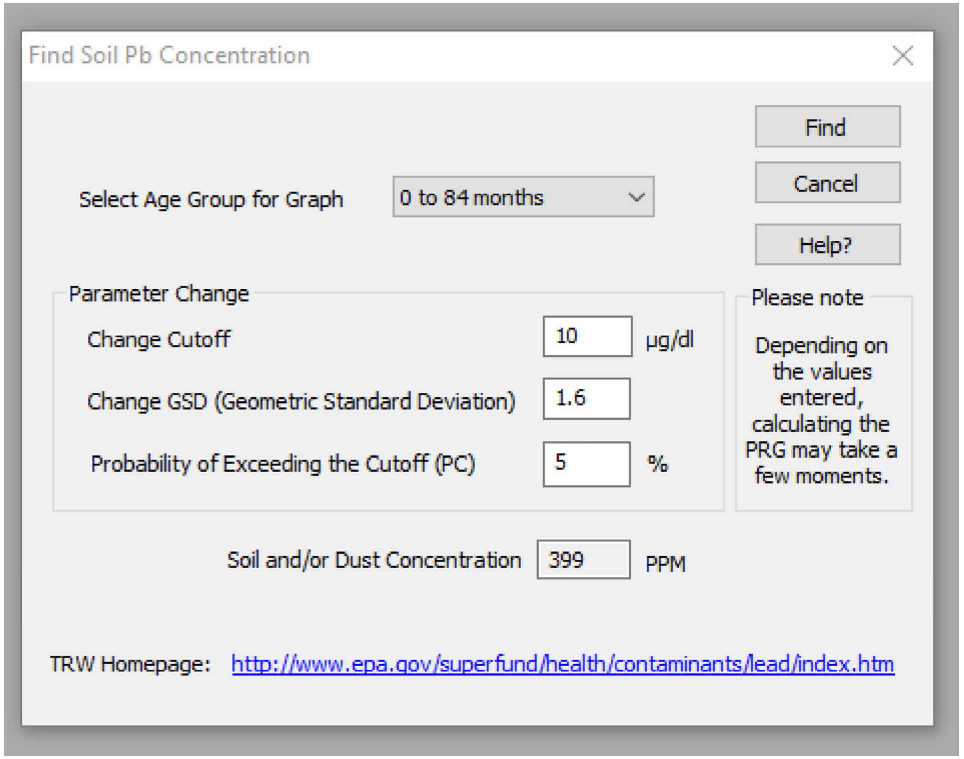
QA/QC procedures

ALS Environmental conducted the analysis for total and bioaccessible lead concentrations for all samples. ALS Environmental is a NATA accredited laboratory for the chemical testing of environmental materials. Quality Control results are reported in Appendix 2. Two additional samples were included in bioaccessibility assays for quality assurance and quality control. The samples consisted of:

a. QC1 – Lead-contaminated (6400 mg Pb kg^{-1}) reference soil.
b. QC2 – SBRC solution without soil addition (assay blank).

APPENDIX 2 – CHAIN OF CUSTODY FORMS

APPENDIX 2
SSGV – HIL A


Find Soil Pb Concentration
Find
Cancel
Help?
Select Age Group for Graph
0 to 84 months
Parameter Change
Change Cutoff
10
µg/dl
Change GSD (Geometric Standard Deviation)
1.6
Probability of Exceeding the Cutoff (PC)
5
%
Please note
Depending on the values entered, calculating the PRG may take a few moments.
Soil and/or Dust Concentration
399
PPM
TRW Homepage:
http://www.epa.gov/superfund/health/contaminants/lead/index.htm

LEAD MODEL FOR WINDOWS Version 2.0

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate.

While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

==

Model Version: 2.0 Build1
User Name: Anand Chandra
Date: 15 November 2021
Site Name: Captains Flat
Operable Unit: Ramboll Australia
Run Mode: Site Risk Assessment

Air Data

==

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Month	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
6-12	1.000	3.216	32.000	0.100
12-24	2.000	4.970	32.000	0.100
24-36	3.000	6.086	32.000	0.100
36-48	4.000	6.954	32.000	0.100
48-60	4.000	7.682	32.000	0.100
60-72	4.000	8.318	32.000	0.100
72-84	4.000	8.887	32.000	0.100

****** Diet ******

Month	Diet Intake(µg/day)
6-12	5.100
12-24	5.800
24-36	6.700
36-48	3.200
48-60	3.600
60-72	4.100
72-84	4.700

****** Drinking Water ******

Water Consumption:

Month	Water (L/day)
6-12	0.490
12-24	0.308
24-36	0.356
36-48	0.417
48-60	0.417
60-72	0.417
72-84	0.480

Drinking Water Concentration: 0.700 µg Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 280.050 µg/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 0.500
Use alternate indoor dust Pb sources? No

Month	Soil (µg Pb/g)	House Dust (µg Pb/g)
6-12	400.000	280.050
12-24	400.000	280.050
24-36	400.000	280.050
36-48	400.000	280.050
48-60	400.000	280.050
60-72	400.000	280.050
72-84	400.000	280.050

****** Alternate Intake ******

Month	Alternate (µg Pb/day)
6-12	0.600
12-24	0.600
24-36	0.600
36-48	0.600
48-60	0.600
60-72	0.600
72-84	0.600

****** Maternal Contribution: Infant Model ******

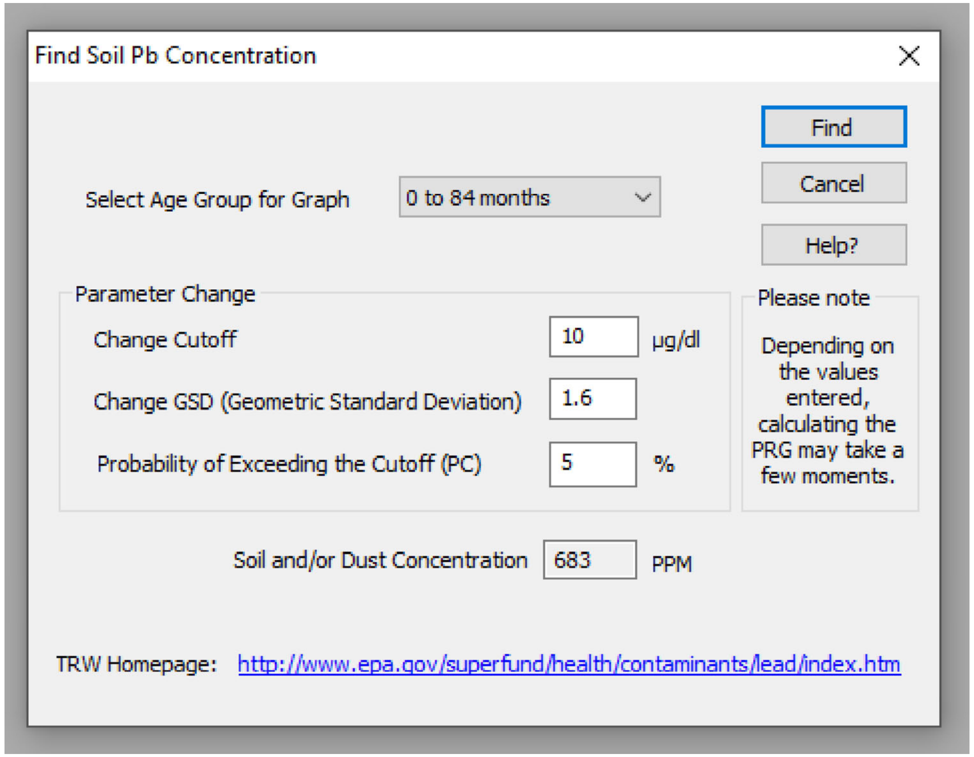
Maternal Blood Concentration: 1.000 µg Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Month	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
6-12	0.034	2.365	0.278	0.159
12-24	0.057	2.557	0.265	0.095
24-36	0.075	2.997	0.268	0.111
36-48	0.093	1.467	0.275	0.134
48-60	0.102	1.667	0.278	0.135
60-72	0.111	1.912	0.280	0.136
72-84	0.118	2.201	0.281	0.157

Month	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
6-12	3.785	6.621	3.5
12-24	11.244	14.218	5.5
24-36	11.408	14.860	5.5
36-48	11.690	13.659	4.9
48-60	11.811	13.993	4.6
60-72	11.895	14.334	4.4
72-84	11.944	14.703	4.2

APPENDIX 3
SSGV -HIL C


Find Soil Pb Concentration
Find
Cancel
Help?
Select Age Group for Graph
0 to 84 months
Parameter Change
Change Cutoff
10
µg/dl
Change GSD (Geometric Standard Deviation)
1.6
Probability of Exceeding the Cutoff (PC)
5
%
Please note
Depending on the values entered, calculating the PRG may take a few moments.
Soil and/or Dust Concentration
683
PPM
TRW Homepage:
http://www.epa.gov/superfund/health/contaminants/lead/index.htm

LEAD MODEL FOR WINDOWS Version 2.0

These IEUBK Model results are valid as long as they were produced with an official, unmodified version of the IEUBK Model with a software certificate.

While IEUBK Model output is generally written with three digits to the right of the decimal point, the true precision of the output is strongly influenced by least precise input values.

==

Model Version: 2.0 Build1
User Name: Anand Chandra
Date: 15 November 2021
Site Name: Captains Flat
Operable Unit: Ramboll Australia
Run Mode: Site Risk Assessment

 # Alternate Source Data
From Recreational water expsoure
 # GI Values + Bioavailability Data
Rec Water 50%
 # GI Values + Bioavailability Data
N
 # GI Values + Bioavailability Data
Yes
 # GI Values + Bioavailability Data
Y
 # GI Values + Bioavailability Data
Yes
 # Soil/Dust Data
Check

==

******** Air ********

Indoor Air Pb Concentration: 0.000 percent of outdoor.
Other Air Parameters:

Month	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (µg Pb/m^3)
6-12	1.000	3.216	32.000	0.100
12-24	2.000	4.970	32.000	0.100
24-36	2.000	6.086	32.000	0.100
36-48	2.000	6.954	32.000	0.100
48-60	2.000	7.682	32.000	0.100
60-72	2.000	8.318	32.000	0.100
72-84	2.000	8.887	32.000	0.100

******** Diet ********

Month	Diet Intake(µg/day)
6-12	5.100
12-24	5.800
24-36	6.700
36-48	3.200
48-60	3.600
60-72	4.100
72-84	4.700

******** Drinking Water ********

Water Consumption:

Month	Water (L/day)
6-12	0.490
12-24	0.308
24-36	0.356
36-48	0.417
48-60	0.417
60-72	0.417
72-84	0.480

Drinking Water Concentration: 0.700 µg Pb/L

******** Soil & Dust ********

Month	Soil (µg Pb/g)	House Dust (µg Pb/g)
6-12	700.000	0.000
12-24	700.000	0.000
24-36	700.000	0.000
36-48	700.000	0.000
48-60	700.000	0.000
60-72	700.000	0.000
72-84	700.000	0.000

******** Alternate Intake ********

Month	Alternate (µg Pb/day)
6-12	0.600
12-24	0.600
24-36	0.600
36-48	0.600
48-60	0.600
60-72	0.600
72-84	0.600

******** Maternal Contribution: Infant Model ********

Maternal Blood Concentration: 1.000 µg Pb/dL

****

CALCULATED BLOOD LEAD AND LEAD UPTAKES:

****

Month	Air (µg/day)	Diet (µg/day)	Alternate (µg/day)	Water (µg/day)
6-12	0.004	2.362	0.278	0.159
12-24	0.013	2.551	0.264	0.095
24-36	0.016	2.990	0.268	0.111
36-48	0.019	1.464	0.274	0.134
48-60	0.020	1.664	0.277	0.135
60-72	0.022	1.909	0.279	0.136
72-84	0.024	2.198	0.281	0.157

Month	Soil+Dust (µg/day)	Total (µg/day)	Blood (µg/dL)
6-12	3.891	6.694	3.6
12-24	11.544	14.466	5.5
24-36	11.716	15.101	5.6
36-48	12.009	13.899	5.0

48-60	**12.135**	**14.232**	**4.7**
60-72	**12.224**	**14.571**	**4.5**
72-84	**12.276**	**14.936**	**4.2**

APPENDIX 4
SSGV HIL - D

Calculations of Preliminary Remediation Goals (PRGs) for Soil in Nonresidential Areas

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 06/14/2017

EDIT RED CELLS

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014	GSDi and PbBo from Analysis of NHANES 2007-2010	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal, 0.95}$	Target PbB in fetus (e.g., 2-8 µg/dL)	µg/dL	10	10	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	1.7	1.8	2.1
PbB_0	Baseline PbB	µg/dL	0.6	0.7	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025	0.025	0.025	0.025
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.15	0.15	0.15	0.15
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	240	240	240	240
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PRG in Soil for no more than 5% probability that fetal PbB exceeds target PbB		**ppm**	**3,675**	**3,996**	**3,270**	**1,803**

Calculations of Blood Lead Concentrations (PbBs) and Risk in Nonresidential Areas
U.S. EPA Technical Review Workgroup for Lead
Version date 06/14/2017

Edit Red Cells

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 2009-2014	GSDi and PbBo from Analysis of NHANES 2007-2010	GSDi and PbBo from Analysis of NHANES 2004-2007	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
PbS	Soil lead concentration	µg/g or ppm	4000	3675	3675	3675
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9
BKSF	Biokinetic Slope Factor	µg/dL per µg/day	0.4	0.4	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	1.7	1.8	2.1
PbB_0	Baseline PbB	µg/dL	0.6	0.7	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025	0.025	0.025	0.025
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	--	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	--	--
K_{SD}	Mass fraction of soil in dust	--	--	--	--	--
$AF_{S,D}$	Absorption fraction (same for soil and dust)	--	0.15	0.15	0.15	0.15
$EF_{S,D}$	Exposure frequency (same for soil and dust)	days/yr	240	240	240	240
$AT_{S,D}$	Averaging time (same for soil and dust)	days/yr	365	365	365	365
PbB_{adult}	PbB of adult worker, geometric mean	µg/dL	4.5	4.3	4.6	5.1
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	µg/dL	10.8	9.3	10.9	15.6
PbB_t	Target PbB level of concern (e.g., 2-8 ug/dL)	µg/dL	**10.0**	**10.0**	**10.0**	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB exceeds target PbB, assuming lognormal distribution**	**%**	**6.4%**	**3.8%**	**6.8%**	**14.8%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

APPENDIX 8
CAPTAINS FLAT PRECINCT INTERIM WATER USE GUIDELINES

CAPTAINS FLAT LEAD MANAGEMENT PLAN – INTERIM WATER USE GUIDELINES

Project name	**Captains Flat Lead Management Plan**
Project no.	**318001193**
Recipient	**Department of Regional NSW**
Document type	**Technical Note**
Version	**0**
Date	**25/11/2021**
Prepared by	**Anand Chandra**
Checked by	**Stephen Maxwell**
Approved by	**Rowena Salmon**

Summary

These Interim Water Use Guidelines should be read in conjunction with the Conceptual Site Model Captains Flat Lead Management Plan (Ramboll 2021) and have been prepared as guidance to manage risks associated with exposure to contaminants from historic mining during use of public waters at Captains Flat. It is anticipated that these interim guidelines will be reviewed after mine site rehabilitation and abatement measures proposed for public lands within Captains Flat.

A water treatment plant and reticulated watermains provide potable water within Captains Flat. Ramboll understands treated public water quality is managed under the NSW Health Drinking Water Monitoring Program. The quality of treated public water supply is not considered further in these guidelines.

Surface waters in the Precinct consist predominantly of the local water supply dam and the Molonglo River. They also consist of tributaries to Molonglo River such as Copper Creek and drainage lines primarily associated with acidic water discharges. A water use survey conducted in the Precinct indicated that surface waters are used mainly for primary contact recreation such as swimming and secondary contact recreation such as fishing, pet washing and livestock watering. Potable use of water (drinking and cooking) is primarily obtained from a reticulated water supply where available and rainwater tanks. Regular potable use of surface waters including untreated water from the local water supply dam should generally be avoided. However, exposure risks associated with contaminants from historic mining practices that may occur through occasional potable use of untreated water from the local water supply dam are low.

A summary of the maximum frequencies and durations for use of Precinct surface waters (Local water supply dam, Molonglo River and Copper Creek) to limit risk from exposure to contaminants associated with historic mining practices to acceptable levels are provided in ***Table 6-1*** *of this report. The recommended frequencies and durations are not different from the current usage pattern as indicated by the water use survey. Hence there may not be a need to alter the current usage pattern of surface waters in the Precinct. However, contact with acidic discharge waters which are associated with discoloured water and/or sediments (yellow-orange) should be avoided where possible.*

Responses to the water use survey indicate that groundwater within the Precinct is currently not being extracted for any use; however, any future extraction bore should be licensed and water quality tested to assess suitability for the intended use.

CONTENTS

APPENDICES

1. Introduction

A water use survey was recently conducted to better understand how surface water is being used within the Precinct. The survey results generally indicates that exposure to surface waters within the Precinct occurs via primary and secondary contact recreational activities such as swimming, fishing, agricultural use and washing of pets. There is some indication that untreated water from the water supply dam is being used for drinking and/or potable purposes during camping in the area. Regular potable use of untreated surface waters within the Precinct is not recommended and residents should rely on reticulated water and/or rainwater where available.

Surface waters within the Precinct consists of:

1) Local water supply dam
2) Molonglo River
3) Copper Creek
4) Various drainage lines such as main adit spring, acidic discharge drainage and smaller tributaries.

The water use survey also indicates that groundwater within the Precinct is not being used for any purposes.

The water use guidelines developed in this report therefore considers potential exposures to the above surface water bodies. Additional consideration is included for potential future exposures to groundwater.

Recommendations are provided to limit exposure risks to contaminants associated with historic mining as identified in the Conceptual Site Model Captains Flat Lead Management Plan (Ramboll 2021) and do not apply to any other risk (eg: biological contamination).

2. Objectives

The objective of this report is to develop interim guidelines that appropriately limit contaminant exposure risks related to historic mining during use of public water within the Precinct.

3. Exposure Pathways

Exposure pathways (identified from water use survey) relevant for surface water use guidelines presented in this report are:

- Primary contact recreational:
    - Swimming – adults and children are likely to swim in surface waters at locations which are suitable for swimming.
    - Recreational drinking – adults and children may also occasionally use water from the local water supply dam to drink and/or cook whilst camping.
- Secondary contact recreational:
    - Fishing – adults and children are likely to fish in surface waters at locations which are suitable for fishing.
    - Washing pets – adults and children may use surface water to wash pets at suitable locations. While this may not be a recreational activity, exposure is considered to be similar to secondary contact recreational.
    - Washing pets – adults and children may use surface water to wash pets at suitable locations. While this may not be a recreational activity, exposure is considered to be similar to secondary contact recreational.

- Livestock watering – adults may use surface water from suitable locations to provide stock watering needs. While this may not be a recreational activity, exposure is considered to be similar to secondary contact recreational.

Frequent long-term use of surface waters from the Precinct for potable purposes such as drinking and cooking is not considered to be a complete exposure pathway (source-pathway-receptor) as residents in the precinct either have reticulated water or use rainwater tank. As noted above the only drinking/potable use scenario considered is while camping near the water supply dam.

The water usage survey indicates that none of the respondents are extracting groundwater within the Precinct for potable or non-potable use. In addition, based on a search of the DR NSW Geoscience MinView GIS portal conducted by Ramboll on 25/11/2021 there are no registered groundwater bores within the Precinct. This data appears current to November 2018 and further confirmation of groundwater extraction within the Precinct is recommended.

4. Exposure Adjusted Recreational Guideline Values

Exposure adjusted recreational guideline values (EARGV) were calculated for some contaminants for which default guideline values were exceeded, using the approach of NHMRC (2019). **Table 4-1** shows the derivation of EARGV and Appendix 1 provides a validation of the derivation approach against water use survey results.

Table 4-1: Exposure adjusted recreational guideline values.

Analyte	Toxicity	TDI (mg/kg-bw/day)	Ingestion volume (L/event)	Event Frequency (events/year)	Body Weight (kg)	Proportion of intake from water	Exposure Adjusted Recreational GV	Comments
Cadmium	Threshold	0.0007	0.2	150	70	0.1	0.06	Based on NHMRC, NMMRC (2011)
Cobalt	Threshold	0.0003	0.2	150	70	0.1	0.03	Based on USEPA Regional Screening Levels. Assumed 10% of TDI
Iron	Threshold	0.7	0.2	150	70	0.2	119	Based on USEPA Regional Screening Levels. Assumed 20% of TDI
Lead - child	Threshold	0.0035	0.1	150	13	0.2	0.22	Based on NHMRC, NMMRC (2011). 1L/d based on children and therefore 10% (100 mL) recreational intake
Lead - adult	Threshold	0.0035	0.2	150	70	0.2	0.60	Adopted child (infant) TDI from NHMRC, NMMRC (2011)
Manganese	Threshold	10 mg/day	0.2	150	70	0.1	12	Based on NHMRC, NMMRC (2011)
Zinc	Threshold	0.3	0.2	150	70	0.1	26	Based on USEPA Regional Screening Levels Assumed 10% of TDI

TDI – tolerable daily intake

EARGVs were generally calculated using an exposure frequency of 150 events per year with an average ingestion rate of 200 mL/day (or per event, assuming one event per day). For lead the EARGV was based on exposure to children as the most sensitive receptor, which included 150 events per year with an average ingestion rate of 100 mL/day. Therefore, adults were assumed to have incidental ingestion of 30 L of water per year while children were assumed to have 15 L of water per year.

Average water ingestion rates were assumed to be 10% of the drinking water ingestion rates provided in the Australian Drinking Water Guidelines (NHMRC, NRMMC 2011). The NHMRC, NRMMC (2011) states that the '*World Health Organization (WHO) has estimated that adults consume an average of 2 L of water per day, and this figure is believed to be an appropriate average figure for Australia'*. For contaminants that have effects based on exposure to children e.g., lead, NHMRC, NRMMC (2011) uses 1 L as the average water intake rate. As the Precinct surface waters are not used for long-term potable purposes, the use of intake rates based on recreational exposure scenario is considered to be most appropriate. Note that while a conservative intake rate of 10% drinking water intake rate was used for calculating the EARGV, the Australian Exposure Factors Guidance (enHealth 2012) provides more realistic recommendations for incidental water ingestion rates by adults and children in a recreational water exposure scenario. As the Australian Drinking Water Guidelines are based on average water intake volumes, average intake rates from enHealth (2012) was adopted in this assessment.

5. Exposure Assessment

5.1 Exposure Assessment based on Contaminant Concentrations

Water quality data were collected from various different surface waters present in the Precinct. The following summarises the results of total metal concentrations screened against EARGV:

- Molonglo River – no exceedance at any sampling location
- Local water supply dam – no exceedance at any location
- Copper Creek – exceedances were found
- Drainage lines and other tributaries to Molonglo River – exceedances were found

The exceedances found within Copper Creek and drainage lines are further summarised and discussed in Table 5-1 below. The maximum magnitude of exceedance of the recreational guideline for any of the metals listed is considered to be low (7-times exceeded for lead). Furthermore, the higher metal concentrations in drainage lines appear to be associated with acidic discharge and such locations are not suitable for recreational water activities. Where drainage lines discharge into Molonglo River, no downstream exceedance is noted most likely due to change in pH (and chemistry) within the river together with dilution. Where drainage lines enter Copper Creek, some exceedance of lead EARGV are noted. As the drainage lines are not suitable locations for recreational activities, with restricted access especially for young children, any potential exposure would be considered to be rare or infrequent. Copper Creek however is accessible by landowners only (not general public) and has potential for secondary contact recreational activities.

Table 5-1: Metal concentrations and locations where recreational guideline values were exceeded together with potential for exposure.

Metals	Concentrations (mg/L)						Notes	Potential for Exposure
	Cd	Co	Fe	Mn	Pb	Zn		
Rec Criteria	0.06	0.03	119	12	0.2	26		
SW5	0.1	0.086	150		1.2	120	Location is the main adit spring which feeds directly into Molonglo River via a 50 m long channel. No exceedances noted in downstream samples from Molonglo River. There is no public access as it is located behind the STP. Any access and therefore contact is expected to be minimal (incidental) and not likely to be suitable for swimming or any other recreational water activity	Rare / infrequent - secondary contact
SW6					0.29		Part of Copper Creek downstream from the rail corridor. The area has little or no public access and not likely to be suitable for swimming or any other recreational water activity	Rare / infrequent - secondary contact
SW7					0.3		Part of Copper Creek upstream from the rail corridor. This area is part of private land used for rural residential / hobby farm with pigs, goats and chickens. There is no public access, but potential exists for secondary contact of site users with surface water relating to irrigation, pet washing and stock watering. The location is not likely to be suitable for frequent swimming activities.	Frequent - secondary contact
SW8	0.11	0.04			1.2	67	Part of drainage line downstream from the rail corridor leading into Copper Creek. The area has little or no public access and not likely to be suitable for swimming or any other recreational water activity	Rare / infrequent - secondary contact
SW9	0.16	0.04			1.3	95	Part of drainage line upstream from the rail corridor leading into Copper Creek. The area has little or no public access and not likely to be suitable for swimming or any other recreational water activity	Rare / infrequent - secondary contact
SW12		0.13		14		67	Part of a drainage line leading into Molonglo River. The area is accessible to the public but is not suitable for any recreational water activity including swimming, fishing, pet washing or livestock watering. Any contact with waters in this drainage line is expected to be incidental.	Rare / infrequent - secondary contact

5.2 Precinct Groundwater

Filtered groundwater concentrations of metals were collected from various locations in the Precinct. Assessment of the filtered concentrations against drinking water guidelines values and EARGV suggests that Precinct groundwater is unsuitable for direct use for potable and non-potable purposes. Filtered samples may under-represent metals in groundwater which may also be associated with mobile colloidal particles greater than the filter size (0.45 μm) and therefore can also be consumed via drinking and/or incidental ingestion during activities such as irrigation, stock watering and bathing/washing. Furthermore, groundwater quality was seen to vary across the Precinct and therefore groundwater concentrations of metals at any future extraction bore cannot be predicted. Any future extraction bores must be appropriately licensed and water quality tested to verify suitability for the intended use.

5.3 Exposure Assessment Based on Intake Volume

An exposure assessment has been completed comparing incidental intake volumes for exposure pathways developed integrating water usage survey results against Tolerable Daily Intakes (TDIs) adopted in development of the EARGV. The total mean incidental water intake volumes (30L/year for adults and 15 L/year for children) are considered to be safe intake volumes that will not exceed the proportion of TDI (tolerable daily intake) allowed for water intake for each contaminant. Recommended exposure frequencies and durations were designed to yield lower mean intake volumes compared to that used in the derivation of EARGV, as well as providing a safety net for any higher exposure frequencies. The exposure assessment and recommended water use frequencies and durations are provided in **Table 5-2** and Table 5-3 for all considered exposure pathways except recreational drinking from the local water supply dam which is considered separately under Section 5.3.1.

Table 5-2: Recommended recreational surface water exposure frequencies and durations for adults

Exposure media	Pathway	Type	Receptor	Recommended Exp Frequency (events / year)	Recommended Event Duration (minutes per event)	Mean Water intake volume (L) per event (hour)	Mean Yearly volume intake (L)	Notes
Surface Water - Molonglo River, Local Water Supply Dam and Copper Creek	Swimming	Primary contact	Adults	120	60	0.025	3	The recommended exposure frequency has conservatively been put at 120 events per year and is higher than most exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than the duration stated in the survey. Water intake rates per hour is based on enHealth (2012) recommended intake volumes during swimming for adults.
	Fishing	Secondary contact	Adults	120	60	0.0025	0.3	The recommended exposure frequency has conservatively been put at 120 events per year and is higher than most exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than durations described by survey respondents. Secondary contact intake volume has been adopted as 10% of primary contact intake volume. Note that Dorevitch et al. (2011) provides mean estimate of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL.
	Washing pets	Secondary contact	Adults	240	60	0.0025	0.6	The recommended exposure frequency has conservatively been put at 240 events per year and is higher than most exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than durations described by survey respondents. Secondary contact intake volume has been adopted as 10% of primary contact intake volume. Note that Dorevitch et al. (2011) provides mean estimate of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL.
	Livestock watering	Secondary contact	Adults	240	60	0.0025	0.6	The recommended exposure frequency has conservatively been put at 240 events per year and is higher than majority exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than durations described by survey respondents. Secondary contact intake volume has been adopted as 10% of primary contact intake volume. Note that Dorevitch et al. (2011) provides mean estimate of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL.
Total average surface water intake volume (Target 30 L/year)							4.5 (6.75 for Copper Creek)	Based on the mean intake volumes, adults can safely engage in higher frequencies of exposure without exceeding the allowable daily intake of contaminants from recreational exposure. The recommended exposure frequencies are conservative and provides a level of safety net if exposure frequencies of any individuals get higher than recommended, especially if such individuals did not take part in the survey.

Table 5-3: Recommended recreational surface water exposure frequencies and durations for children

Exposure media	Pathway	Type	Receptor	Recommended Exp Frequency (events / year)	Recommended Event Duration (minutes per event)	Mean Water intake volume (L) per event (hour)	Mean Yearly volume intake (L)	Notes
Surface Water - Molonglo River, Local Water Supply Dam and Copper Creek	Swimming	Primary contact	Children	120	60	0.05	6	The recommended exposure frequency has conservatively been put at 120 events per year and is higher than majority exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than duration stated in the survey. Water intake rates per hour is based on enHealth (2012) recommended intake volumes during swimming for children. Note that rates are based on an hourly basis and intake rate is expected to be half if exposed only for 30mins. Also note that young children in the most sensitive age group are not likely to swim throughout the year and durations are expected to be shorter than adults. Based on this the recommended exposure duration for children is 30-60 mins.
	Fishing	Secondary contact	Children	120	60	0.005	0.6	The recommended exposure frequency has conservatively been put at 120 events per year and is higher than majority exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than duration stated in the survey. Secondary contact intake volume has been adopted as 10% of primary contact intake rate Note that Dorevitch et al. (2011) provides mean estimate of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity and durations are expected to be shorter than adults. Based on this the recommended exposure duration for children is 30-60 mins.
	Washing pets	Secondary contact	Children	240	60	0.005	1.2	The recommended exposure frequency has conservatively been put at 120 events per year and is higher than majority exposure frequencies stated in the water use survey. Exposure duration has been assumed to be 1 hour per event and this is higher than duration stated in the survey. Secondary contact intake volume has been adopted as 10% of primary contact intake rate. Note that Dorevitch et al. (2011) provides mean estimate of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity and durations are expected to be shorter than adults. Based on this the recommended exposure duration for children is 30-60 mins.
	Livestock watering	Secondary contact	Children	0	0	0.005	0	Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity and therefore no recommendations are provided
Total average surface water intake volume (Target 15 L/year)							7.8 (11.7 for Copper Creek)	Based on the mean intake volumes, children can safely engage in higher frequencies of exposure without exceeding the allowable daily intake of contaminants from recreational exposure. Note that a 30 min exposure in all scenarios considered will yield a mean water intake volume of ~4 L/year. The recommended exposure frequencies are conservative and provides a level of safety net if exposure frequencies of any individuals get higher than recommended, especially if such individuals did not take part in the survey.

Exceedances were noted in Copper Creek, with lead concentrations (about 0.3 mg/L) exceeding the EARGV by about 1.5-times. Therefore, anyone undertaking recreational activities in Copper Creek would be expected to have lead intake at 1.5-times higher rate than comparative activities in either Molonglo River or Local water supply dam. This is equivalent to 1.5-times higher mean intake water volume. The following would apply to Copper Creek:

- Adults - total average surface water intake volume for Copper Creek would be 4.5 L/year x 1.5 = 6.75 L/year.
- Children - total average surface water intake volume for Copper Creek would be 7.8 L/year x 1.5 = 11.7 L/year.

As both the estimated intake volumes for adults and children are below the target volumes, then adults and children undertaking recreational activities in Copper Creek are also considered to be safe. Note that the above volume estimates for Copper Creek includes swimming exposure, although it may not be practical to swim in the creek.

The recommended exposure frequencies and durations are higher than the frequencies/durations stated in the water use survey for the majority of the participants. Therefore, there may not be a need to alter the current usage pattern of surface waters in the precinct. However, contact with acidic discharge waters which are associated with discolored water and/or sediments (yellow-orange) should be avoided.

5.3.1 Consumption of Water from the Water Supply Dam

The water use survey results indicated that some residents may be drinking untreated water from the water supply dam while camping. This may primarily relate to use for cooking, beverages e.g. tea and direct consumption. The water use is expected to be supplemented by other sources of water and drinks and therefore the following assumptions are considered to be reasonable for recreational drinking of dam waters:

- Adults – 1 L per day while camping adopted as 50% of average drinking water intake volume (2 L/day) defined by NHMRC, NRMMC (2011). 50% of the remaining intake is considered to be supplemented by other sources of water eg. bottled water, water from reticulated supply and other bottled drinks.
- Children – 0.5 L per day while camping adopted as 50% of average drinking water intake volume (1 L/day) defined by NHMRC, NRMMC (2011).

A camping frequency of 10-times per year is considered to be a reasonable estimate of camping being conducted by members of the public at the dam. Based on the rates of recreational drinking water the following can be concluded:

- Adults – will consume about 10 L of untreated dam water. The total water intake volume allowing for incidental water ingestion from other possible recreational activities would be 14.5 L/year (10 L + 4.5 L). This total average volume of water ingestion is lower than that allowed for in derivation of EARGV, which is 30 L.
- Children – will consume about 5 L of untreated dam water. The total water intake volume allowing for incidental water ingestion from other possible recreational activities would be 12.8 L/year (10 L + 7.8 L). This total average volume of water ingestion is lower than that allowed for in derivation of EARGV, which is 15 L.

6. Interim Water Use Guidelines

The recommended usage frequencies and duration of surface water in the precinct is summarised in Table 6-1.

Note:

- The water use guidelines consider exposure to users of the water such as adult and child residents. It does not consider exposure to pets, livestock or vegetation
- The water use guidelines do not consider cumulative exposures from water on private land
- Sediment related intake has not been considered for the water use guidelines. Sediment intake is considered to be negligible during primary and secondary contact activities and water use guidelines will also limit sediment exposure
- No recommendations for consumptions rates of fish and/or crustacean (prawns/yabbies) caught from the precinct surface waters can be made at this stage. Tissue concentrations from edible portions of these local food items is required before any such recommendations can be made.

Table 6-1: Summary of the interim water use guidelines. Note that frequencies and durations are total for all of the surface water bodies considered.

Surface Water Body	Water Use Activity	Recommended Frequency of Use		Recommended Duration of Use			Recommendations
		Per month	Per Year	Per event (hours)	Per Month (hours)	Per Year (hours)	
Local water supply dam, Molonglo River and Copper Creek	Drinking (everyday)	0	0	0	0	0	Members of the public (adults and children) should use reticulated water.
	Recreational Drinking (Dam water only)	-	10	-	-	-	Members of the public should limit use of untreated dam water to 5-10 L per year for potable purposes. The lower volume is applicable to children.
	Swimming	10	120	0.5 - 1	5 - 10	60 - 120	Members of the public should limit swimming in Precinct surface waters to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
	Fishing	20	240	0.5 - 1	5 - 10	120 - 240	Members of the public should limit fishing in Precinct surface waters to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
	Livestock watering	20	240	1	10	240	Members of the public should limit use of Precinct surface waters for livestock watering to 10-times per month for 60 minutes.
	Pet Washing	20	240	0.5 - 1	5 - 10	120 - 240	Members of the public should limit use Precinct surface waters for pet washing to 10-times per month for 30 to 60 minutes. The lower duration is applicable to children.
Various drainage lines - main adit spring, acidic discharge drainage and smaller tributaries.	None	0	0	0	0	0	Frequent contact with acidic discharge waters which are associated with discolored water and/or sediments (yellow-orange) should be avoided where possible

Surface Water Body	**Water Use Activity**	**Recommended Frequency of Use**		**Recommended Duration of Use**			**Recommendations**
		Per month	Per Year	Per event (hours)	Per Month (hours)	Per Year (hours)	
Groundwater	Potable and non-potable	Exposure assessment will need to be conducted to determine suitability of any future use					Any future groundwater extraction bore should be appropriately licensed with water quality tested to determine suitability for the intended use.

7. Uncertainties

The exposure assessment conducted in this report uses mean water intake rates provided by Australian Exposure Factors Guidance. The recommended mean intake rates are derived by local and overseas data. While such rates are considered to be applicable to the general population, variations in intake rates can exist. The recommended water use frequencies and durations allows for a safety net that may account for any large variations in intake rates during recreational activities. Note that water intake rates during swimming provided by enHealth (2012) includes all outdoor activities and therefore using additional rates to account for intake during secondary contact recreational activities is very conservative.

NHMRC, NRMMC (2011) allows for a 20% TDI for water sources of lead intake, as shown in **Table 7-1**. An estimate of lead daily intake (mg/day) is shown in for all sources of water intake, including incidental ingestion from primary and secondary recreational, recreational drinking and everyday drinking water. The concentrations adopted are for local water supply dam (0.017 mg/L) as a mid-point of historical concentration range of 0.03 – 0.003 mg/L (note recent Ramboll concentrations measured in dam waters were maximum of 0.005 mg/L total lead). Drinking water concentration (0.0007 mg/L) was obtained from NEPM (2013) as used in the derivation of relevant lead HILs. The calculated daily intake of lead from all sources of water does not exceed 20% of TDI and only contributes around 1% of TDI for adults and 3% for children.

It is noted that NHMRC, NRMMC (2011) currently uses a tolerable daily intake value of 0.0035 mg/kg/day that was originally adopted by World Health Organisation. This TDI was withdrawn by WHO in 2010 (WHO 2010) but is adopted in this assessment in the absence of any other value or approach provided by NHMRC, NRMMC (2011). The effects of lead exposure have often been evaluated based on the blood lead content, which is generally considered to be the most accurate means of assessing exposure. The relationship between acceptable TDI and blood lead levels is generally not available, especially within Australia. OEHHA (2009) determined that a daily lead intake from water ingestion of 2.86 μg/day corresponds to a 1 μg/dL increase in blood lead level. In other words, 2.86 μg/day can be used as a benchmark for daily oral intake from water that corresponds to a level of concern for neurobehavioral effects in children, designated as a decrease of 1 IQ point. The calculated daily intake of lead from all water sources are below the value of 2.86 μg/day. Therefore, water intake (hence lead intake) from recommended water usage guidelines is not likely to cause significant change in blood lead levels for residents of the Precinct.

Table 7-1: Tolerable daily intake (TDI) for lead allowed from all water sources.

Metal	TDI NHMRC, NRMMC (2011) (mg/kg/day)	Child (13kg) Intake (mg/day)	Adult (70kg) Intake (mg/day)	Intake from all water sources (20% of TDI) (mg/day)	
				Child	Adult
Lead	0.0035	0.0455	0.245	0.0091	0.049

Table 7-2: Tolerable daily intake (TDI) for lead allowed from all water sources.

Receptor	Intake Source	Average Yearly Volume (L/year)	Lead Conc (mg/L)	Total Lead Intake from Water sources per year (mg/year)	Lead Intake per day (mg/day)	% of TDI
Adult	Incidental ingestion	4.5	0.017	0.0765	0.00021	0.09
	Recreational drinking	10	0.017	0.17	0.00047	0.2
	Everyday drinking (2L/d)	730	0.0007	0.511	0.0014	0.6
Total					0.0021	0.8
Children	Incidental ingestion	7.8	0.017	0.1326	0.00036	0.8
	Recreational drinking	5	0.017	0.085	0.00023	0.5
	Everyday drinking (1L/d)	365	0.0007	0.2555	0.0007	1.5
Total					0.0013	2.8

8. Conclusion

The report provides an assessment of exposure to Precinct surface waters by adults and children. Recommendations on the safe usage (frequency and duration) of surface waters is also provided, although based on water use survey results, a change in current usage pattern may not be required. While groundwater within the precinct is currently not being extracted, future extraction bores need to be licensed and water quality tested. Furthermore, edible tissue concentrations of fish and crustaceans need to be measured to assess if any controls on consumption rate is required.

9. References

Dorevitch, S., Panthi, S., Huang, Y., Li, H., Michalek, A. M., Pratap, P., Wroblewski, M., Liu, L., Scheff, P. A. and Li, A. (2011). Water ingestion during water recreation. Water Research. 45 (5): 2020-2028

enHealth (2012) Australian Exposure Factor Guidance. Guidelines for assessing human health risks from environmental hazards. Department of Health and Ageing, GPO Box 9848, Canberra ACT 2601. Online ISBN: 978-1-74241-769-1

NHMRC, NRMMC (2011) Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra.

NHMRC (2019) Guidance on Per and Polyfluoroalkyl (PFAS) in Recreational Water, Canberra: National Health and Medical Research Council.

OEHHA (2009) Public Health Goals for Chemicals in Drinking Water: Lead. April 2009. California Environmental Protection Agency. Office of Environmental Health Hazard Assessment.

WHO 2010, Joint FAO/WHO Expert Committee on Food Additives (JECFA), Seventy-third meeting, Geneva, Summary and Conclusions, Issue 24.

10. Limitations

Ramboll prepared this letter report in accordance with the agreed scope of work for Regional NSW and in accordance with our understanding and interpretation of current regulatory standards in NSW, Australia.

The report has derived health-based recommendations for precinct surface water use based on currently available data and information about the site. Where such data is inadequate, the report has used protective assumptions in the derivation. The report has also assumed that there will not be any change in exposure scenario in the future. The outcomes of this report are based on the assumptions and calculations/modelling used for assessment of exposures. The interim water use guidelines provided in this report should be used according to the guideline provided and applies only to exposure scenarios discussed in this report. The conclusions are applicable to the extent these assumptions remain relevant for the site. Risks to site ecological receptors, pets or vegetation were not explicitly considered in this assessment.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment. Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this assessment. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

The report must not be reproduced in whole or in part except with the prior consent of Ramboll Australia Pty Ltd and subject to inclusion of an acknowledgement of the source. No information as to the contents or subject matter of this document or any part thereof may be communicated in any manner to any third party without the prior consent of Ramboll Australia Pty Ltd.

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

APPENDIX 1
VALIDATION OF EXPOSURE ADJUSTED RECREATIONAL GUIDELINE VALUE

Validation of Exposure Adjusted Recreational Guideline Values

Table 1 shows the exposure assessment based on water use survey results. Average water intake volumes were calculated based on survey results and compared against average water intake volume used in exposure adjusted guideline values (**Table 2** and **Table 3**). The water intake volume used for exposure adjusted recreational guideline values is higher and therefore is conservative and protective of all possible routes of exposure and different receptors. As such, exposure adjusted recreational guideline values can be used for screening assessment of surface water quality of the precinct.

Table 1: Exposure assessment based on water use survey.

Exposure media	Pathway	Type	Receptor	Exp Frequency (events / year)	Event Duration (minutes per event)	Mean Water intake volume (L) per event (hour)	Mean Yearly volume intake (L)	Notes
Local water supply dam	Swimming	Primary contact	Adults and children	120	10	0.05	6	Survey suggests swimming for less than 10 times per month. Conservatively, this equals less than 120 times per year. Maximum duration stated in the survey was 60 minutes per month. This equates to about 6 minutes per event. A value of 10 minutes per event can be adopted, however note that event duration has not been included in 'exposure adjusted' recreation guideline values (GVs), hence does not affect final calculated value. Water intake rates per hour is based on enHealth (2012) recommended intake volumes for children. Corresponding intake rates of adults are 0.025 L/hr. Note that the adopted volumes assume swimming (and other secondary contact activities as shown below) occur for one hour. This is conservative as survey results suggests duration to be much shorter. Also note that young children in the most sensitive age group are not likely to swim throughout the year and durations are expected to be shorter than adults.
	Fishing	Secondary contact	Adults and children	120	ND	0.005	0.6	Survey suggests less than 10-times per month. Conservatively, a yearly frequency of <120-times can be considered. Maximum duration of activity from survey was more than 60 minutes per month. Secondary contact intake volume has been adopted as 10% of primary contact intake rate. Note that Dorevitch et al. (2011) provides mean and upper confidence estimates of water ingestion during limited-contact recreation (canoeing, kayaking and fishing) on surface waters as approximately 3-4 mL and 10-15 mL respectively. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity but are included to be conservative.
	Washing pets	Secondary contact	Adults and children	240	ND	0.005	1.2	Maximum frequency from the survey was 21-30 times per month. Note that majority of the respondents reported frequency of less than 10-times per month. A representative value of 20-times per month was adopted. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity but are included to be conservative.
	Livestock watering	Secondary contact	Adults	240	ND	0.005	1.2	Maximum frequency from the survey was 21-30 times per month. Note that majority of the respondents reported frequency of less than 10-times per month. A representative value of 20-times per month was adopted. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity.
Molonglo River	Swimming	Primary contact	Adults and children	120	10	0.05	6	Survey suggests swimming for less than 10 times per month. Conservatively, this equals less than 120 times per year. Survey suggests maximum swimming duration of more than 30 minutes per month in total. A value of 10 minutes per event can be adopted, however note that event duration has not been included in 'exposure adjusted' recreation guideline values (GVs), hence does not affect final calculated value. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity.
	Fishing	Secondary contact	Adults	240	ND	0.005	1.2	Survey data suggests maximum fishing duration of more than 60 minutes per month. Maximum fishing frequency from the survey was 21-30 times per month. Note that majority of the respondents reported fishing for less than 10-times per month. A representative value of 20-times per month was adopted for Molonglo River. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity but are included to be conservative.
	Washing pets	Secondary contact	Adults	240	ND	0.005	1.2	Maximum frequency from the survey was 11-20 times per month. Note that majority of the respondents reported frequency of less than 10-times per month. A representative value of 10-times per month was adopted. Children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity but are included to be conservative.
Groundwater	No pathway							None of the survey participants reported having groundwater bore

RAMBOLL

Table 2: Comparison of yearly incidental water intake volume for adults and children except for lead.

Exposure Route	Receptor	Approach used for Exposure Adjusted Recreational GVs			Local Water Supply Dam	Molonglo River
		Intake Volume (L)	Exposure Frequency per year	Total yearly water intake volume (L)	Mean yearly water intake volume (L)	Mean yearly water intake volume (L)
Swimming	Adults and children (except for lead)	0.2	150	30	6	6
Fishing					0.6	1.2
Pet Washing					1.2	1.2
Livestock watering					1.2	-
Total		0.2	150	30	9	8.4

Table 3: Comparison of yearly incidental water intake volume for children for lead.

Exposure Route	Receptor	Approach used for Exposure Adjusted Recreational GVs			Local Water Supply Dam	Molonglo River	Note
		Intake Volume (L)	Exposure Frequency per year	Total yearly water intake volume (L)	Mean yearly water intake volume (L)	Mean yearly water intake volume (L)	
Swimming	Children (lead only)	0.1	150	15	6	6	Australian drinking water guidelines are based on average water intake volumes and therefore the mean yearly water intake volume is appropriate for comparison. Exposure adjusted recreational GV for lead is based on the value derived for children assuming average water intake of 100 ml (10% of daily average drinking water consumption). The total yearly intake volume assumed in the exposure adjusted guideline for lead is below mean intake volume estimated from survey results. It is unlikely that young children in the most sensitive age group will swim for long durations and partake frequently in some of the secondary contact recreational activities. The activity duration for the recreational GV has been assumed to be one hour with a frequency of 150 days per year (equates to 150 hours per year). enHealth (2012) recommends using a representative median swimming frequency (including all sport and outdoor activity) of 52 days/year (upper estimate of 150 days/year) for ≥5 years of age, with a duration of 0.5 hours/day for general population (equates to mean of 26 hours/year and upper estimate of 75 hours per year). For children aged <5 years a maximum value of 27 hours per year (2.25 hours per month) is recommended. Furthermore, enHealth (2012) states that only 18.7 % of Australian population participate in swimming for more than 53-times per year. Therefore, realistic upper estimates of yearly incidental water intake volumes are 3.75L (0.05 L/hour x 75hours) for ≥5 year olds and 1.4L (0.05 L/hour X 27hours) for <5 year olds. The assumption used in the derivation of exposure adjusted recreational GV for lead, applicable to children, is more conservative than these estimates. Note that the lead recreational value based on children has also been adopted for adults and is considered to be protective of all adults as well. Note that no intake volumes are included for livestock watering exposure as children, especially young children in the most sensitive age group are unlikely to frequently engage in this activity.
Fishing					0.6	1.2	
Pet Washing					1.2	1.2	
Livestock watering					-	-	
Total		0.1	150	15	7.8	8.4	

Note:

- The above assessment considers the worst-case scenario where the same adults or children undertake all possible activities based on results from the survey.
- The assessment also suggests that individuals either are exposed to the local water supply dam or the Molonglo River, as exposure frequencies cited in Table 1 are considered to be maximum possible frequencies to any surface water body. In reality, individuals may get exposed to both sources of surface water. However, the total frequency of exposure to any surface water is considered to remain same. For example: While the calculations in Table 1 suggests that an individual only swims in the Molonglo River for 120 days of the year, that individual can also swim in the water supply dam for a fraction of that time. That hypothetical individual may for example swim for 60 days of the year in Molonglo River and 60 days in water supply dam. As the total frequency of exposure still remains same (60 + 60 = 120 days/yr), total intake volumes would also remain same.

ND - no data/information;

References:
Dorevitch, S., Panthi, S., Huang, Y., Li, H., Michalek, A. M., Pratap, P., Wroblewski, M., Liu, L., Scheff, P. A. and Li, A. (2011). Water ingestion during water recreation. Water Research. 45 (5): 2020-2028
enHealth (2012) Australian Exposure Factor Guidance. Guidelines for assessing human health risks from environmental hazards. Department of Health and Ageing, GPO Box 9848, Canberra ACT 2601. Online ISBN: 978-1-74241-769-1

APPENDIX 9
CAPTAINS FLAT MEN'S SHED LEAD INVESTIGATION REPORT AND EXPOSURE ASSESSMENT

ENVIRONMENT
& HEALTH

Department of Regional NSW
PO Box 344 Hunter Region Mail Centre
2310 NSW
Attention: Paul McBain

Delivered: by email

Dear Paul,

Date 25/11/2021

Captains Flat Men's Shed – Foxlow Street Captains Flat NSW Lead Investigation Report

This report presents the findings of an investigation of lead at the property currently occupied by the Captains Flat Men's Shed, undertaken as part of the investigation of contaminants related to the historic loading and transport of ore concentrates in the rail corridor at Captains Flat.

Investigation at the property comprised collection of samples as shown in **Table 1** and the attached figure (**Attachment 1**). Soil samples were collected by the NSW EPA in February 2021 and were selected to target areas of elevated lead determined using a field portable x-ray fluorescence metals analyser (fpXRF). Dust samples were collected 17 June 2021 using swabs and a high flow cyclonic vacuum by Ramboll. Paint samples were collected from building surfaces with hand tools on 4 August 2021 by Ramboll. Further detail is presented in the Captains Flat Surface Soil Testing Report (NSW EPA 2021) and the Conceptual Site Model Captains Flat Lead Management Plan (Ramboll 2021).

Table 1: Samples Collected

Type	Number of samples collected
Soil	2
Dust (from inside property) - swabs	4
Dust (from inside property) - vacuum	3
Paint	3

Sample locations are presented on a site features plan presented as **Attachment 1**.

Ramboll
Level 2, Suite 18 Eastpoint
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia

T +61 2 4962 5444
https://ramboll.com

Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

Results

Sample results were compared against guidelines relevant for a commercial/industrial property which is relevant to the current site use. A tabulated assessment of sample results against relevant guidelines is presented in summary as **Table 2**. Concentrations shown in **bold** are above the relevant guideline. Laboratory reports are provided in **Attachment 2**.

Table 2: Summary lead concentrations relevant to health investigation levels

Type	Guideline	Result		
Soil	1500 (mg/kg)[1]	ms-a 18	ms-b 560	
Dust Interior – Floors (swab)	1000 (µg/m²)[2,3]	MS_SWAB1 **7111**	MS_SWAB2 **1078**	MS_SWAB3 **2333**
Dust Interior – Floors (vacuum)	1500 (mg/kg)[4]	MS_VAC1 360	MS_VAC2 270	MS_VAC3 300
Dust Interior – window sill	5000 (µg/m²)[3]	MS_SWAB4 244		
Paint	0.1%[5]	PAINT_01 <0.01	PAINT_02 **0.14**	PAINT_03 <0.01

[1]NEPM (2013) Schedule B1: Guideline on investigation levels for soil and groundwater. National Environment Protection (Assessment of Site Contamination) Measure 1999. Federal Register of Legislative Instruments F2013C00288 (HIL D - Commercial/industrial, includes premises such as shops, offices, factories and industrial sites).

[2] The dust swab results presented are lead loadings (µg lead/m²) and were calculated as follows:

Lead loading (µg/m²) = Total lead (µg) / sample area (m²).

[3] AS 4361.2-1998 Guide to lead paint management – Residential and commercial buildings.

[4] There are no guidelines specific to vacuum samples, however In the absence of elevated outdoor soil lead concentrations, it is appropriate for the indoor dust concentrations collected by vacuum to be compared with HIL D..

[5] Australian Government Department of the Environment, Lead Alert: the six step guide to painting your home, 5th Ed. 2016.

Lead concentrations in outdoor soil fall below adopted guidelines and indicate risks associated with lead in soil are low.

The lead loadings (µg/m²) in all floor swab samples exceed the adopted criteria and indicate higher risks from lead in floor dust may exist. The level of lead in dust samples however can be reported as a concentration (mg/kg), just like for outdoor soil. The soil Health Investigation Level adopted (HIL D) is a concentration-based guideline that represents a safe lead concentration for commercial/industrial users where lead exposure can occur from both outdoor soil and indoor dust. In the absence of elevated outdoor soil lead concentrations, the indoor dust concentrations from vacuum samples assessed against HIL D is a relevant indicator of cumulative risk associated with exposure to lead in soil and dust. All lead concentrations inside and outside the Men's Shed building were reported below HIL D and so adopting this approach indicates risks are low and acceptable.

Additionally, the criteria adopted in the assessment described above are appropriate for a generic industrial land use scenario and a more accurate assessment of risks can be achieved by considering how the Captains Flat Men's Shed is used. An exposure assessment that considers site specific details of frequency and duration of potential exposures at the Captains Flat Men's Shed is presented as **Attachment 3**.

Based on the usage of the site the exposure assessment predicted that potential exposure for Men's Shed members to outdoor and indoor lead dust would be approximately three times lower than potential exposure during typical working hours on a commercial/ industrial site. Maximum lead concentrations observed at the Men's Shed were nine - ten times lower than site specific guideline values. Based on these lines of evidence the potential exposure risks from lead indoor dust and/or outdoor soil are considered to be low and acceptable.

Lead in one external paint sample (PAINT02) exceeded the criteria indicative of lead-based paints being present on buildings. Lead-based paints should be managed in accordance *AS 4361.1-2017 Guide to hazardous paint management Part 1 Lead and other hazardous metallic pigments in industrial applications*.

For further information please contact the undersigned.

Yours sincerely

Stephen Maxwell
Managing Consultant

D+61 (2) 4962 5444
M+61 478 658 194
smaxwell@ramboll.com

Rowena Salmon
Principal Contaminated Land Specialist

rsalmon@ramboll.com

Attachments

Attachment 1 - Site Features Plan
Attachment 2 – Laboratory Reports
Attachment 3 – Lead Exposure Assessment Captains Flat SES Compound

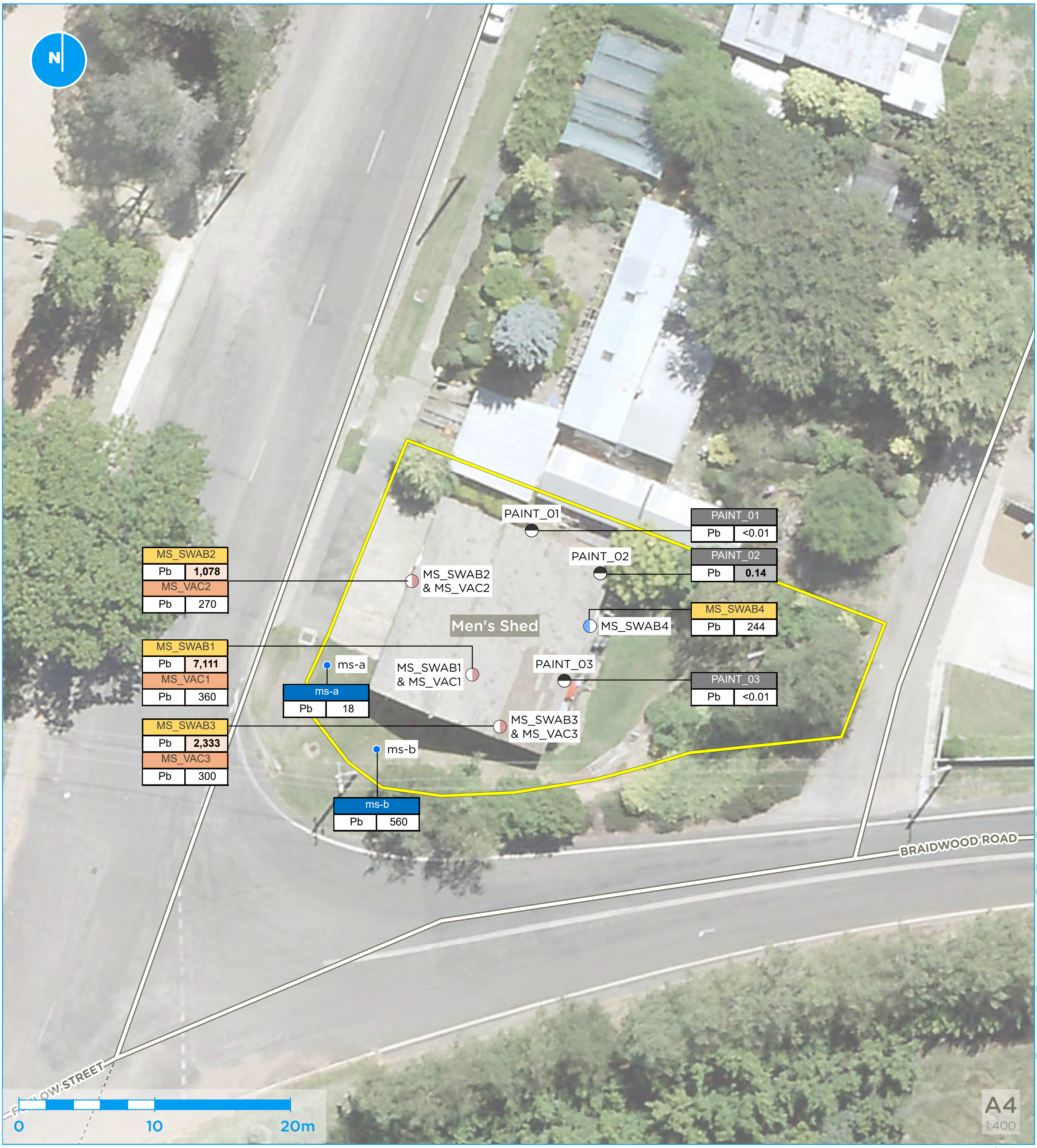
Reference

AS 4361.1-2017 Guide to hazardous paint management Part 1 Lead and other hazardous metallic pigments in industrial applications
NSW EPA (2021) Captains Flat Surface Soil Testing Report
Ramboll (2021) Conceptual Site Model Captains Flat Lead Management Plan

Limitations

Ramboll Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to DR NSW and in accordance with our understanding and interpretation of current regulatory standards. A representative program of sampling and laboratory analyses was undertaken as part of this investigation. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous. Site conditions may change over time. This report is based on conditions encountered at the Site at the time of the report and Ramboll disclaims responsibility for any changes that may have occurred after this time. The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment. Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this investigation. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate. This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

Attachment 1 – Site Features Plan



Aerial photography by metromap flown on 01/03/2021

RAMBOLL AUSTRALIA - GIS MAP file : 318001193_GIS_P006_T30_MensShed | F001_SiteElements_V01 | 23/11/2021

Legend

Site boundary

Sample locations

Dust swab and vacuum sample (floor)

Dust swab sample (window sill)

Paint sample

Soil sample (EPA)

Exceedance criteria

Dust swab (µg/m²)	AS 4361.2 (1998) - Hard Floors	AS 4361.2 (1998) - Window Sill
Pb	1,000	5,000
Dust vacuum (mg/kg)	HIL D (NEPM)	
Pb	1,500	
Soil (mg/kg)	HIL D (NEPM)	
Pb	1,500	
Paint (%)	Aus Dept of Env (2016)	
Pb	0.1	

Location

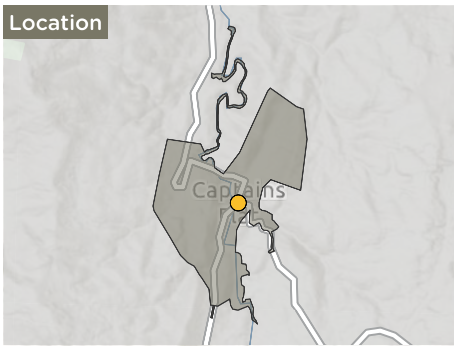


Figure 1 : Site Features Plan

Men's Shed Lead Investigation Report

Attachment 2 – Laboratory Reports

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll Australia Pty Ltd	Project №	318001193	Project Manager	Stephen Maxwell	Sampler(s)	Jake Bourke
Address	Suite 18, 50 Glebe Road, The Junction, NSW 2291	Project Name	Captains Flat Lead Management Plan	EDD Format (ESdat, EQuIS, Custom)		Handed over by	Jake Bourke
Contact Name	Stephen Maxwell					Email for Invoice	asiapac-accounts@ramboll.com
Phone №	0478 658 194					Email for Results	smaxwell@ramboll.com; jbourke@ramboll.com
Special Directions	Page 1 of 1						
Purchase Order	318001193						
Quote ID №							

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Total Lead	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	PAINT_01	4/08/21	S	X									
2	PAINT_02	4/08/21	S	X									
3	PAINT_03	4/08/21	S	X									
4													
5													
6													
7													
8													
9													
10													
	Total Counts			3									

Method of Shipment	☐ Courier (#) ☐ Hand Delivered ☐ Postal	Name		Signature		Date	__/__/__	Time __:__
Eurofins | mgt Laboratory Use Only	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date __/__/__	Time __:__	Temperature —
	Received By	[signature]	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date 6/8/21	Time 8:30	Report № 815203

Sample Receipt Advice

Company name:	Ramboll Australia Pty Ltd
Contact name:	Stephen Maxwell
Project name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID:	318001193
Turnaround time:	5 Day
Date/Time received	Aug 6, 2021 8:30 AM
Eurofins reference	815203

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.
N/A	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

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

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

Results will be delivered electronically via email to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Aug 6, 2021 8:30 AM
Address:	Level 3/100 Pacific Highway	**Report #:**	815203	**Due:**	Aug 13, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254						
Sydney Laboratory - NATA Site # 18217						X
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
Mayfield Laboratory - NATA Site # 25079						
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	PAINT_01	Aug 04, 2021		Paint	N21-Au10998	X
2	PAINT_02	Aug 04, 2021		Paint	N21-Au10999	X
3	PAINT_03	Aug 04, 2021		Paint	N21-Au11000	X
Test Counts						3

eurofins | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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:	**Stephen Maxwell**
Report	**815203-S**
Project name	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Aug 06, 2021

Client Sample ID			**PAINT_01**	**PAINT_02**	**PAINT_03**
Sample Matrix			**Paint**	**Paint**	**Paint**
Eurofins Sample No.			**N21-Au10998**	**N21-Au10999**	**N21-Au11000**
Date Sampled			**Aug 04, 2021**	**Aug 04, 2021**	**Aug 04, 2021**
Test/Reference	LOR	Unit			
Lead (% w/w)	0.01	%	< 0.01	0.14	< 0.01

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
Lead (% w/w)	Sydney	Aug 10, 2021	6 Months

- Method: LTM-MET-3040 Metals in Waters Soils & Sediments by ICP-MS

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 815203
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Aug 6, 2021 8:30 AM
Due: Aug 13, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254						
Sydney Laboratory - NATA Site # 18217						X
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
Mayfield Laboratory - NATA Site # 25079						
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	PAINT_01	Aug 04, 2021		Paint	N21-Au10998	X
2	PAINT_02	Aug 04, 2021		Paint	N21-Au10999	X
3	PAINT_03	Aug 04, 2021		Paint	N21-Au11000	X
Test Counts						3

Date Reported:Aug 10, 2021

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Emma Beesley	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll Australia Pty Ltd	Project №	318001193	Project Manager	Stephen Maxwell	Sampler(s)	JB
Address	Suite 18, 50 Glebe Road, The Junction, NSW 2291	Project Name	Captains Flat Lead Management Plan	EDD Format (ESdat, EQuIS, Custom)		Handed over by	JB
Contact Name	Stephen Maxwell					Email for Invoice	asiapac-accounts@ramboll.com
Phone №	0478 658 194					Email for Results	smaxwell@ramboll.com
Special Directions							
Purchase Order	318001193						
Quote ID №							

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Heavy metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	pH, CEC, % clay	Total Lead	Total Dust	Hardness	Total metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	Dissolved metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	MS_SWAB1	17/06/21				X												1	
2	MS_SWAB2	17/06/21				X												1	
3	MS_SWAB3	17/06/21				X												1	
4	MS_SWAB4	17/06/21				X												1	
5	MS_VAC1	17/06/21																1	Hold
6	MS_VAC2	17/06/21																1	Hold
7	MS_VAC3	17/06/21																1	Hold
8	CH_SWAB1	17/06/21				X												1	
9	CH_SWAB2	17/06/21				X												1	
10	CH_SWAB3	17/06/21				X												1	
	Total Counts					7												10	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	__/__/__	Time	__:__
Eurofins | mgt Laboratory Use Only	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__	Temperature	-
	Received By	Quinn Daw	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	22/6/21	Time	12:30	Report №	804978

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll Australia Pty Ltd	Project №	318001193	Project Manager	Stephen Maxwell	Sampler(s)	JB
Address	Suite 18, 50 Glebe Road, The Junction, NSW 2291	Project Name	Captains Flat Lead Management Plan	EDD Format (ESdat, EQuIS, Custom)		Handed over by	JB
Contact Name	Stephen Maxwell					Email for Invoice	asiapac-accounts@ramboll.com
Phone №	0478 658 194					Email for Results	smaxwell@ramboll.com
Special Directions							
Purchase Order	318001193						
Quote ID №							

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Heavy metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	pH, CEC, % clay	Total Lead	Total Dust	Hardness	Total metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	Dissolved metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	CH_SWAB4	17/06/21				X												1	
2	CH_VAC1	17/06/21																1	Hold
3	CH_VAC2	17/06/21																1	Hold
4	CH_VAC3	17/06/21																1	Hold
5	RFS_SWAB1	17/06/21				X												1	
6	RFS_SWAB2	17/06/21				X												1	
7	RFS_SWAB3	17/06/21				X												1	
8	RFS_SWAB4	17/06/21				X												1	
9	RFS_VAC1	17/06/21																1	Hold
10	RFS_VAC2	17/06/21																1	Hold
	Total Counts					5												10	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	__/__/__	Time	__:__
Eurofins | mgt Laboratory Use Only	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__	Temperature	
	Received By	[illegible]	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	22/6/21	Time	12:30	Report №	804978

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll Australia Pty Ltd	Project №	318001193	Project Manager	Stephen Maxwell	Sampler(s)	JB
Address	Suite 18, 50 Glebe Road, The Junction, NSW 2291	Project Name	Captains Flat Lead Management Plan	EDD Format (ESdat, EQuIS, Custom)		Handed over by	JB
Contact Name	Stephen Maxwell					Email for Invoice	asiapac-accounts@ramboll.com
Phone №	0478 658 194					Email for Results	smaxwell@ramboll.com
Special Directions							
Purchase Order	318001193						
Quote ID №							

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)
☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
☐ Other ( )
* Surcharges apply

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Heavy metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	pH, CEC, % clay	Total Lead	Total Dust	Hardness	Total metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	Dissolved metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	RFS_VAC3	17/06/21																1	Hold
2	STP_SWAB1	17/06/21				X												1	
3	STP_SWAB2	17/06/21				X												1	
4	STP_SWAB3	17/06/21				X												1	
5	STP_SWAB4	17/06/21				X												1	
6	STP_VAC1	17/06/21																1	Hold
7	STP_VAC2	17/06/21																1	Hold
8	STP_VAC3	17/06/21																1	Hold
9	SWAB_QA01	17/06/21				X												1	
10	SWAB_QA02	17/06/21				X												1	
	Total Counts					6												10	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	__/__/__	Time __:__
Eurofins | mgt Laboratory Use Only	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time __:__	Temperature
	Received By	Quinn Daw	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	22/6/21	Time 12:30	Report № 804978

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

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll Australia Pty Ltd	Project №	318001193	Project Manager	Stephen Maxwell	Sampler(s)	JB
Address	Suite 18, 50 Glebe Road, The Junction, NSW 2291	Project Name	Captains Flat Lead Management Plan	EDD Format (ESdat, EQuIS, Custom)		Handed over by	JB
Contact Name	Stephen Maxwell					Email for Invoice	asiapac-accounts@ramboll.com
Phone №	0478 658 194					Email for Results	smaxwell@ramboll.com
Special Directions							
Purchase Order	318001193						
Quote ID №							

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked): ☐ Overnight (9am)* ☐ 1 Day* ☐ 2 Day* ☐ 3 Day* ☑ 5 Day ☐ Other ( ) * Surcharges apply

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Heavy metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	pH, CEC, % clay	Total Lead	Total Dust	Hardness	Total metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	Dissolved metals (As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Pb, Mn, Mo, Ni, Se, Ti, Zn)	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	SWAB_RB	17/06/21				X												1	
2	SWAB_BLANK	17/06/21				X												1	
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
	Total Counts					2												2	

Method of Shipment: ☐ Courier (#) ☐ Hand Delivered ☐ Postal | Name | Signature | Date __/__/__ | Time __:__

Eurofins | mgt Laboratory Use Only								
Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date __/__/__	Time __:__	Temperature	
Received By	Quinn Law	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date 22/6/21	Time 12:30	Report №	804978

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

Sample Receipt Advice

Company name:	Ramboll Australia Pty Ltd
Contact name:	Stephen Maxwell
Project name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID:	318001193
Turnaround time:	5 Day
Date/Time received	Jun 23, 2021 12:30 PM
Eurofins reference	804978

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.
- N/A Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✗ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

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

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

Results will be delivered electronically via email to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MS_SWAB1	Jun 17, 2021		Paint	N21-Jn44554		X
2	MS_SWAB2	Jun 17, 2021		Paint	N21-Jn44555		X
3	MS_SWAB3	Jun 17, 2021		Paint	N21-Jn44556		X
4	MS_SWAB4	Jun 17, 2021		Paint	N21-Jn44557		X
5	CH_SWAB1	Jun 17, 2021		Paint	N21-Jn44558		X
6	CH_SWAB2	Jun 17, 2021		Paint	N21-Jn44559		X
7	CH_SWAB3	Jun 17, 2021		Paint	N21-Jn44560		X
8	CH_SWAB4	Jun 17, 2021		Paint	N21-Jn44561		X
9	RFS_SWAB1	Jun 17, 2021		Paint	N21-Jn44562		X

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 12:30 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	804978	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
10	RFS_SWAB2	Jun 17, 2021		Paint	N21-Jn44563		X
11	RFS_SWAB3	Jun 17, 2021		Paint	N21-Jn44564		X
12	RFS_SWAB4	Jun 17, 2021		Paint	N21-Jn44565		X
13	STP_SWAB1	Jun 17, 2021		Paint	N21-Jn44566		X
14	STP_SWAB2	Jun 17, 2021		Paint	N21-Jn44567		X
15	STP_SWAB3	Jun 17, 2021		Paint	N21-Jn44568		X
16	STP_SWAB4	Jun 17, 2021		Paint	N21-Jn44569		X
17	SWAB_QA01	Jun 17, 2021		Paint	N21-Jn44570		X
18	SWAB_QA02	Jun 17, 2021		Paint	N21-Jn44571		X
19	SWAB_RB	Jun 17, 2021		Paint	N21-Jn44572		X
20	SWAB_BLAN	Jun 17, 2021		Paint	N21-Jn44573		X

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 12:30 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	804978	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
20	SWAB_BLANK	Jun 17, 2021		Paint	N21-Jn44573		
21	MS_VAC1	Jun 17, 2021		Paint	N21-Jn44574	X	
22	MS_VAC2	Jun 17, 2021		Paint	N21-Jn44575	X	
23	MS_VAC3	Jun 17, 2021		Paint	N21-Jn44576	X	
24	CH_VAC1	Jun 17, 2021		Paint	N21-Jn44577	X	
25	CH_VAC2	Jun 17, 2021		Paint	N21-Jn44578	X	
26	CH_VAC3	Jun 17, 2021		Paint	N21-Jn44579	X	
27	RFS_VAC1	Jun 17, 2021		Paint	N21-Jn44580	X	
28	RFS_VAC2	Jun 17, 2021		Paint	N21-Jn44581	X	
29	RFS_VAC3	Jun 17, 2021		Paint	N21-Jn44582	X	

eurofins Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
30	STP_VAC1	Jun 17, 2021		Paint	N21-Jn44583	X	
31	STP_VAC2	Jun 17, 2021		Paint	N21-Jn44584	X	
32	STP_VAC3	Jun 17, 2021		Paint	N21-Jn44585	X	
Test Counts						12	20

eurofins | Environment Testing

Certificate of Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 25079

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:	**Stephen Maxwell**
Report	**804978-A**
Project name	CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jun 23, 2021

Client Sample ID			**MS_SWAB1**	**MS_SWAB2**	**MS_SWAB3**	**MS_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44554**	**N21-Jn44555**	**N21-Jn44556**	**N21-Jn44557**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	640	97	210	22

Client Sample ID			**CH_SWAB1**	**CH_SWAB2**	**CH_SWAB3**	**CH_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44558**	**N21-Jn44559**	**N21-Jn44560**	**N21-Jn44561**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	8.7	2.4	46	210

Client Sample ID			**RFS_SWAB1**	**RFS_SWAB2**	**RFS_SWAB3**	**RFS_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44562**	**N21-Jn44563**	**N21-Jn44564**	**N21-Jn44565**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	43	27	18	8.7

Client Sample ID			**STP_SWAB1**	**STP_SWAB2**	**STP_SWAB3**	**STP_SWAB4**
Sample Matrix			**Wipes**	**Wipes**	**Wipes**	**Wipes**
Eurofins Sample No.			**N21-Jn44566**	**N21-Jn44567**	**N21-Jn44568**	**N21-Jn44569**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	10	18	6.8	< 1

eurofins | Environment Testing

Client Sample ID			SWAB_QA01	SWAB_QA02	SWAB_RB	SWAB_BLANK
Sample Matrix			Wipes	Wipes	Wipes	Wipes
Eurofins Sample No.			N21-Jn44570	N21-Jn44571	N21-Jn44572	N21-Jn44573
Date Sampled			Jun 17, 2021	Jun 17, 2021	Jun 17, 2021	Jun 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	5.8	15	< 1	< 1

Environment Testing

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
Heavy Metals	Sydney	Jun 30, 2021	180 Days

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 12:30 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	804978	**Due:**	Jun 30, 2021
		Phone:	02 9954 8118	**Priority:**	5 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	MS_SWAB1	Jun 17, 2021		Paint	N21-Jn44554		X
2	MS_SWAB2	Jun 17, 2021		Paint	N21-Jn44555		X
3	MS_SWAB3	Jun 17, 2021		Paint	N21-Jn44556		X
4	MS_SWAB4	Jun 17, 2021		Paint	N21-Jn44557		X
5	CH_SWAB1	Jun 17, 2021		Paint	N21-Jn44558		X
6	CH_SWAB2	Jun 17, 2021		Paint	N21-Jn44559		X
7	CH_SWAB3	Jun 17, 2021		Paint	N21-Jn44560		X
8	CH_SWAB4	Jun 17, 2021		Paint	N21-Jn44561		X
9	RFS_SWAB1	Jun 17, 2021		Paint	N21-Jn44562		X

Date Reported:Jun 30, 2021

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	318001193	**Received:**	Jun 23, 2021 12:30 PM
Address:	Level 3/100 Pacific Highway	**Report #:**	804978	**Due:**	Jun 30, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
10	RFS_SWAB2	Jun 17, 2021		Paint	N21-Jn44563		X
11	RFS_SWAB3	Jun 17, 2021		Paint	N21-Jn44564		X
12	RFS_SWAB4	Jun 17, 2021		Paint	N21-Jn44565		X
13	STP_SWAB1	Jun 17, 2021		Paint	N21-Jn44566		X
14	STP_SWAB2	Jun 17, 2021		Paint	N21-Jn44567		X
15	STP_SWAB3	Jun 17, 2021		Paint	N21-Jn44568		X
16	STP_SWAB4	Jun 17, 2021		Paint	N21-Jn44569		X
17	SWAB_QA01	Jun 17, 2021		Paint	N21-Jn44570		X
18	SWAB_QA02	Jun 17, 2021		Paint	N21-Jn44571		X
19	SWAB_RB	Jun 17, 2021		Paint	N21-Jn44572		X
20	SWAB_BLAN	Jun 17, 2021		Paint	N21-Jn44573		X

Date Reported:Jun 30, 2021

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
20	SWAB_BLANK	Jun 17, 2021		Paint	N21-Jn44573		
21	MS_VAC1	Jun 17, 2021		Paint	N21-Jn44574	X	
22	MS_VAC2	Jun 17, 2021		Paint	N21-Jn44575	X	
23	MS_VAC3	Jun 17, 2021		Paint	N21-Jn44576	X	
24	CH_VAC1	Jun 17, 2021		Paint	N21-Jn44577	X	
25	CH_VAC2	Jun 17, 2021		Paint	N21-Jn44578	X	
26	CH_VAC3	Jun 17, 2021		Paint	N21-Jn44579	X	
27	RFS_VAC1	Jun 17, 2021		Paint	N21-Jn44580	X	
28	RFS_VAC2	Jun 17, 2021		Paint	N21-Jn44581	X	
29	RFS_VAC3	Jun 17, 2021		Paint	N21-Jn44582	X	

Date Reported:Jun 30, 2021

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.: 318001193
Report #: 804978
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 23, 2021 12:30 PM
Due: Jun 30, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead (% w/w)
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
30	STP_VAC1	Jun 17, 2021		Paint	N21-Jn44583	X	
31	STP_VAC2	Jun 17, 2021		Paint	N21-Jn44584	X	
32	STP_VAC3	Jun 17, 2021		Paint	N21-Jn44585	X	
Test Counts						12	20

Date Reported:Jun 30, 2021

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	Total ug	< 1			1	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	99			80-120	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

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.

Grace Tuckwell

From:	#AU04_Enviro_Sample_NSW
Subject:	FW: 5 DAY TAT ADDITIONAL ANALYSIS: FW: Extra analyses of dust samples from Eurofins ref: 804978
Attachments:	804978_summary.pdf

From: Stephen Maxwell <SMAXWELL@ramboll.com>
Sent: Monday, 19 July 2021 9:32 AM
To: Andrew Black <AndrewBlack@eurofins.com>
Cc: Nathan McGuire <NMCGUIRE@ramboll.com>
Subject: Extra analyses of dust samples from Eurofins ref: 804978

EXTERNAL EMAIL*

Hi Andrew

Can we co-ordinate analyses of dust samples MS_VAC1 – MSVAC3 described under the attached work summary to be analysed for lead (mg/kg). If sufficient volume exists can we also analyse for titanium and sulfur?

Kind regards
Stephen Maxwell

Lead Consultant
3182675 - Hunter

D +61 478658194
M +61 478658194
smaxwell@ramboll.com

Connect with us

Ramboll
Level 2, Suite 18 Eastpoint
50 Glebe Road
PO Box 435
The Junction
NSW 2291
Australia
https://ramboll.com

Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

Sample Receipt Advice

Company name:	Ramboll Australia Pty Ltd
Contact name:	Stephen Maxwell
Project name:	ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID:	318001193
Turnaround time:	5 Day
Date/Time received	Jul 19, 2021 9:32 AM
Eurofins reference	811512

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.
N/A	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

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

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

Results will be delivered electronically via email to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

Australia

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

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

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

New Zealand

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

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**		**Received:**	Jul 19, 2021 9:32 AM
Address:	Level 3/100 Pacific Highway	**Report #:**	811512	**Due:**	Jul 26, 2021
	North Sydney	**Phone:**	02 9954 8118	**Priority:**	5 Day
	NSW 2060	**Fax:**	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN				
Project ID:	318001193				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Sulphur	Titanium
Melbourne Laboratory - NATA Site # 1254							X	
Sydney Laboratory - NATA Site # 18217						X		X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	MS_VAC1	Jun 17, 2021		Dust	S21-Jl34967	X	X	X
2	MS_VAC2	Jun 17, 2021		Dust	S21-Jl34968	X	X	X
3	MS_VAC3	Jun 17, 2021		Dust	S21-Jl34969	X	X	X
Test Counts						3	3	3

Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

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.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report	**811512-S**
Project name	ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID	318001193
Received Date	Jul 19, 2021

Client Sample ID			**MS_VAC1**	**MS_VAC2**	**MS_VAC3**
Sample Matrix			**Dust**	**Dust**	**Dust**
Eurofins Sample No.			**S21-Jl34967**	**S21-Jl34968**	**S21-Jl34969**
Date Sampled			**Jun 17, 2021**	**Jun 17, 2021**	**Jun 17, 2021**
Test/Reference	LOR	Unit			
Sulphur	5	mg/kg	1000	1100	990
Heavy Metals					
Lead	5	mg/kg	360	270	300
Titanium	10	mg/kg	170	180	150

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
Sulphur	Melbourne	Jul 20, 2021	7 Days
- Method: LTM-MET-3010 Alkali Metals Sulfur Silicon and Phosphorus by ICP-AES			
Heavy Metals	Sydney	Jul 23, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: ADDITONAL CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001193

Order No.:
Report #: 811512
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jul 19, 2021 9:32 AM
Due: Jul 26, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Sulphur	Titanium
Melbourne Laboratory - NATA Site # 1254							X	
Sydney Laboratory - NATA Site # 18217						X		X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	MS_VAC1	Jun 17, 2021		Dust	S21-Jl34967	X	X	X
2	MS_VAC2	Jun 17, 2021		Dust	S21-Jl34968	X	X	X
3	MS_VAC3	Jun 17, 2021		Dust	S21-Jl34969	X	X	X
Test Counts						3	3	3

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

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

Units

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

Terms

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

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

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
Titanium			mg/kg	< 10			10	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	100			80-120	Pass	
Titanium			%	97			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Jl28844	NCP	%	106			75-125	Pass	
Titanium	N21-Jl33907	NCP	%	91			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Jl29409	NCP	mg/kg	17	18	5.0	30%	Pass	
Titanium	S21-Jl29409	NCP	mg/kg	< 10	< 10	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
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

Authorised by:

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal (VIC)
John Nguyen	Senior Analyst-Metal (NSW)

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.

Attachment 3 – Lead Exposure Assessment Captains Flat Men's Shed

Attachment 3: Lead Exposure Assessment: Captains Flat Men's Shed

The Tier 1 risk assessment for members of the Men's Shed using the Foxlow Street building is presented under the results section of the Captains Flat Men's Shed Lead Investigation Report. A lead exposure assessment specific to the current use of the Captains Flat Men's Shed is presented below and was undertaken due to exceedance of the nationally applicable Tier 1 dust guideline values.

Table 1 presents an assessment of standard work hours, work hours adopted for the development of the nationally applicable Tier 1 (HIL-D) guideline values and details of how Men's Shed members use the site. Site specific durations and frequencies are based on Ramboll discussions with a representative of the Captains Flat Men's Shed 22 – 23 November 2021.

Table 1: Exposure assessment against standard work hours

Work Time	Units	Standard Workday hrs	HIL-D hrs	Men's Shed Usage of Site hrs[1]	Comments
Time Spent Outdoors	hours/d	-	1	1	Assumed that Men's Shed members spend 1 hour outside per day.
Time Spent indoors	hours/d	-	8	5.5	Assumed that Men's Shed members spend 5.5 hours indoors where possible dust exposure may occur
Total work hours/day	hours/d	8	9	6.5	Total indoor and outdoor time for Men's Shed members personnel
Workdays/week	days/wk	5	5	2	Assumes Men's Shed members use the facility both days each weekend
Total work hours/week	hours/wk	40	45	13	Assumes standard workdays per year. Exposure at Men's Shed is about 3.5-times lower than under HIL-D hours
Workdays/year	days/yr	240	240	240	
Total work hours/year	hours/yr	9600	10800	3120	

[1]Men's Shed usage of the compound presented in Table 1 is based on anecdotal account from a Men's Shed representative.

Assessment of Men's Shed site usage against generic site usage shows that potential exposure for Men's Shed members is about 3-times lower than workers undertaking standard work hours. Therefore, based on this exposure assessment, the following can be summarised:

- The average lead loading is considered to represent a realistic exposure scenario and relevant indoor dust loading (µg/m^2) guidelines are exceeded by about 3.5-times, while HIL-D guidelines (mg/kg) applied to indoor dust are not exceeded
- Cumulative potential exposure for Men's Shed members to indoor and outdoor lead dust would be 3-times lower than potential exposure during normal work hours
- It is expected that outdoor dusts will primarily be generated from surface soils, and therefore potential outdoor exposure risk to Men's Shed members is from lead in surface soil. HIL-D (1500 mg/kg) assumes standard work hours and given that Men's Shed members are at the site for a third of the time (three times less), applicable site-specific soil guideline value (SSGV) would be three times higher (i.e 1,500 x 3 = 4,500 mg/kg).
- While it is noted that lead loading in internal dust measured at the Men's Shed exceeded Tier 1 guidelines by up to seven times, lead concentrations in internal dust are less than 10% of the site-specific guideline. Furthermore, integrated assessment of indoor and outdoor lead concentrations indicates the maximum concentration (560 mg/kg) is approximately nine times

lower than the site-specific guideline. Based on these lines of evidence the potential exposure risks from lead in indoor dust and/or outdoor soil are considered to be low and acceptable.