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RCA ref 14302-766/0

6 December 2024

Johnson Property Group
Corner of Whistler Drive & Armitage Way
Cooranbong NSW 2265

Attention: Mr Michael Wratten

OCTOBER 2024 GROUNDWATER AND SEDIMENT SAMPLING TRINITY POINT MARINA, MORISSET PARK

1 INTRODUCTION

This report details the findings of groundwater and sediment sampling conducted at the Trinity Point Marina, Morisset Park NSW.

The sampling was undertaken to comply with the requirements for monitoring outlined in Sections 2.4 and 2.5 of the Construction Environmental Management Plan (CEMP, Ref [1]) for the Marina as detailed below.

Section 2.4 of the CEMP states that groundwater monitoring is to be undertaken upstream and downstream of the Underground Petroleum Storage System (UPSS) at points 'E' and 'F' as per the site Environment Protection Licence (EPL) No 20631. The groundwater monitoring locations are shown below on **Figure 1**, as extracted from the "EPL Boundary and Water Quality Sampling Points" plan provided as part of the Environmental Monitoring information on the Trinity Point Marina website (https://trinitypointmarina.com.au/about/trinity-point-marina-monitoring). Monthly groundwater monitoring, which is undertaken separately, involves the inspection of groundwater for visual assessment of the presence of oil and grease. Annual groundwater monitoring, which forms part of the scope of this assessment, requires collected samples to be analysed for total petroleum hydrocarbons (TPH). It is noted that **Figure 1** includes surface water monitoring locations, assessment of which are not included in this report.

Section 2.5 of the CEMP (Ref [1]) states that Section C13 of the Concept Approval for the Marina requires that analysis of contaminant levels in the bed sediments in the area of the proposed marina is undertaken as part of the Stage 1 Marina Environmental Performance Monitoring. The CEMP (Ref [1]) states that an assessment of baseline sediment quality data indicated that lakebed sediments at the site are generally not contaminated, although slightly elevated concentrations of arsenic and cadmium have been detected. Sediment samples were required to be collected once midway through the Stage 1 construction period and then annually for a maximum of five (5) years following commencement of operation to demonstrate that marina operations do not impact sediment quality conditions. The CEMP (Ref [1]) states that the sediment samples are to be collected from four (4) 'impact' locations within the current marina layout as were assessed during the baseline monitoring period with an additional two (2) locations positioned in adjacent non-impacted areas to provide reference data for the four (4) 'impact' locations. The two (2) non-impacted sediment locations are identified as EPL Point A and Point C on **Figure 1** below. The four (4) sediment sampling locations as extracted from the CEMP (Ref [1]) are presented on **Figure 2**.

Figure 1 *Trinity Point Marina "EPL Boundary and Water Quality Sampling Points" showing groundwater, surface water and sediment sampling locations.*

Figure 2 *Extract from CEMP (Ref [1]) identifying sediment 'impact' locations.*

It is understood that this round of monitoring comprises the second of the post construction annual monitoring events. RCA have been provided with the results of sediment sampling conducted by Enviropacific in April 2019 (Ref [2]) which RCA understands were collected to establish background contaminant levels present proximal to the marina prior to occupation and these have been used in RCA's assessment.

2 FIELDWORK

An environmental technician undertook the fieldwork on 25 October 2024. The scope of work included:

- The collection of groundwater samples from existing monitoring wells MW5 and MW6 which are identified as points 'E' and 'F' in the site EPL as shown above in **Figure 1**.
    - Both bores were dipped to determine the depth of groundwater and then purged of at least three (3) bore volumes prior to sample collection.

  - Samples were collected by designated hand bailer and were analysed by a NATA accredited laboratory for total recoverable hydrocarbons (TRH[1]) and benzene, toluene, ethylbenzene, xylene (BTEX).

- The collection of six (6) sediment samples comprising the four (4) sediment sample locations identified in the CEMP as shown on **Figure 2** and two (2) sediment samples from a boat within Lake Macquarie at EPL Points A and C as shown on **Figure 1**.

  - All sediment samples were collected with a (Petite) Ponar sampler which facilitates the collection of sediment samples from below the water. The samples were collected from the surface of the sediment to approximately 0.1m below the surface.

  - Samples were analysed by a NATA accredited laboratory for metals, total organic carbon (TOC) and tributyl tin (TBT) as specified in the CEMP (Ref [1]).

There were no other indications of contamination observed during sampling of groundwater or sediment.

Field sheets are attached.

3 APPLICABLE GUIDELINE CRITERIA

3.1 GROUNDWATER

The Guidelines for the Assessment and Management of Groundwater Contamination have been introduced by the NSW DECC (Ref [3]) and recommend that AWQ Guidelines (Ref [4]) investigation levels be adopted as groundwater investigation levels (GIL) for aquatic ecosystems and ADWG (Ref [5]) for drinking water GIL. It is noted that the AWQ Guidelines (Ref [4]) have since been replaced by ANZG (Ref [6]) and as such RCA have used the most recent guidelines in accordance with the following information.

The ANZG (Ref [6]) are complex guidelines that consider not only the level of protection (e.g. 99% or 95%) but also the state of the receiving water (e.g. moderately disturbed). For the protection of aquatic ecosystems the DECC recommend the use of 95% protection for all analytes with the exception of carcinogenic analytes for which the 99% protection value should be used. The following comments are additionally made:

- Where the existing generic GIL is below the naturally occurring background concentration of a particular contaminant, the background concentration becomes the default GIL.

[1] Laboratory analysis of hydrocarbons is reported as total recoverable hydrocarbons (TRH). This testing method includes all forms of hydrocarbons, not just petroleum hydrocarbons and therefore can be considered a conservative measure against the chosen TPH criteria. Further laboratory analysis using a silica gel clean up (TRH_{sg}) is considered to enable a better identification of the extent of petroleum based contamination

- Where PQL are greater than the recommended GIL the PQL is adopted as the GIL. Where background concentrations are proven to be greater than the GIL, the background concentration is adopted as the GIL.

- Where there is insufficient data for the derivation of marine water criteria it is allowable to use freshwater criteria as low reliability criteria.

RCA considers that the receiving water is Lake Macquarie and so has used the 95% marine water guideline criteria.

The ADWG (Ref [5]) document provides a framework for drinking water quality management and assessment. The framework provided in this document has been adopted for the evaluation of contaminants in groundwater where groundwater can be, or is being, extracted and used for drinking water purpose. It is not considered likely that groundwater would be extracted from use and as such this comparison is considered highly conservative.

Schedule B1 of the ASC NEPM (Ref [7]) provides generic health screening levels (HSL) for groundwater, for protection of human health from petroleum hydrocarbon vapours, based on the following land use scenarios:

- HSL 'A' Residential with garden/ accessible soil (home grown produce <10% fruit and vegetable intake (no poultry). This category includes children's day care centres, preschools and primary schools.

- HSL 'B' Residential with minimal opportunities for soil access includes dwellings with fully and permanently paved yard space such as high-rise buildings and flats.

- HSL 'C' Public open space such as parks, playgrounds, playing fields (e.g. ovals) secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves).

- HSL 'D' Commercial/industrial such as shops, offices, factories and industrial sites.

RCA considers that the marina comprises both public open space and commercial/industrial areas: the HSL 'D' criteria presume that there is some potential for accumulation of vapours within enclosed spaces. For the purpose of this assessment the HSL 'D' criteria which are the most conservative have been used for this assessment.

It is noted that the HSL apply to groundwater at 2m below the surface. Both monitoring wells had shallower groundwater depth and as such the HSL are not directly applicable.

3.2 SEDIMENT

Two (2) criteria for the assessment of sediment are listed in Table 1 of the ANZG toxicant default guideline values for sediment quality (Ref [6]). The default guideline values (DGV) indicate the concentrations below which there is a low risk of unacceptable effects occurring, and should be used, with other lines of evidence, to protect aquatic ecosystems where the DGV is exceeded or where toxicant concentrations in the sediment are trending towards the DGV. The 'upper' guideline values (GV-High) provide an indication of concentrations at which toxicity-related adverse effects would be expected to be observed. The ANZG (Ref [6]) states that the GV-High value should only be used as an indicator of potential high-level toxicity problems, not as a guideline value to ensure protection of ecosystems.

4 RESULTS

Results have been compared against the guidelines detailed in the previous section and are presented in the tables attached to this report. A summary is as follows:

- All TRH and BTEX concentrations in groundwater were below the laboratory limit of detection and were therefore below the relevant guideline human health and ecological criteria.
- Sed-1 and Sed 4 sampling site which had previously exceeded the DGV limit for copper but did not exceed the GV-High limit has returned to below guideline limit.
- Concentrations of metals and TBT in all sediment samples were below the default guideline values.
- Results of total organic carbon were low and relatively consistent across all samples. The samples from the 'impact' locations were slightly higher than those from 'non-impact' locations. There are no guidelines for total organic carbon.
- The trend for Aluminium and iron has indicated it has remained consistent in the sediment across all sites. Sed 4 saw a dramatic increase in 2023 however these limits have returned to the similar levels found from previous years..
- There were no exceedances in any sediment samples. The previous years higher concentrations have all returned to established monitoring levels.

Laboratory report sheets are attached.

5 DISCUSSION AND CONCLUSION

The concentrations observed in the groundwater samples upgradient and downgradient of the UPSS were all below the laboratory detection limit and indicate that there has been no detectable impact to the groundwater from the UPSS.

Whilst the October 2024 results show a return to previous concentrations in most metals , the concentrations reported in the sediment samples were all below the default guideline values and as such not considered to be potential for adverse environmental impact from the concentrations.

The cause of some slightly increased concentrations is unknown and may be related to sediment movement within Lake Macquarie, new sediment being deposited on the base of the Lake from flood events or different sampling methodology between events. It is not considered that there would be significant biodegradation effects for the analysed compounds.

Results of the sampling points do not exceed the guidelines and therefore, do not pose a risk

Based on these results RCA makes no further recommendations than the next annual monitoring event be undertaken as per the requirements of the CEMP (Ref [1]).

Yours faithfully
RCA AUSTRALIA

Laura Schofield
Environmental Laboratory Manager

ATTACHMENTS
Field Sheets
Summary of Results
Laboratory Report Sheets

REFERENCES

[1] Haskoning Australia Pty Ltd, *Trinity Point Marina – CEMP*, December 2015

[2] Enviropacfic, *Annual Sediment Sampling and analysis Report*, January 2021

[3] DECC, *Contaminated Sites – Guidelines for the Assessment and Management of Contaminated Groundwater*, March 2007.

[4] ANZECC, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, October 2000.

[5] ANZG, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.,* August 2018. Available at www.waterquality.gov.au/anz-guidelines.

[6] National Health and Medical Research Council, *Australian Drinking Water Guidelines*, 2011.

NEPC, *National Environment Protection (Assessment of Site Contamination) Measure*, 1999 as amended 2013.

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CERTIFICATE OF ANALYSIS 364677

Client Details

Client	RCA Australia
Attention	Laura Schofield
Address	PO Box 175, Carrington, NSW, 2294

Sample Details

Your Reference	**14302 - Trinity Point**
Number of Samples	6 Soil, 2 Water
Date samples received	24/10/2024
Date completed instructions received	24/10/2024

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	31/10/2024
Date of Issue	31/10/2024

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Results Approved By
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Liam Timmins, Organics Supervisor
Nick Sarlamis, Assistant Operation Manager
Steven Luong, Senior Chemist

Authorised By
Nancy Zhang, Laboratory Manager

Acid Extractable metals in soil						
Our Reference		364677-1	364677-2	364677-3	364677-4	364677-5
Your Reference	UNITS	102414302003	102414302004	102414302005	102414302006	102414302007
Sample ID		Sed 1	Sed 2	Sed 3	Sed 4	Point A
Date Sampled		23/10/2024	23/10/2024	23/10/2024	23/10/2024	23/10/2024
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/10/2024	25/10/2024	25/10/2024	25/10/2024	25/10/2024
Date analysed	-	25/10/2024	25/10/2024	25/10/2024	25/10/2024	25/10/2024
Aluminium	mg/kg	11,000	7,400	9,900	5,100	4,000
Iron	mg/kg	19,000	14,000	16,000	8,900	12,000
Antimony	mg/kg	<10	<10	<10	<10	<10
Arsenic	mg/kg	8	15	10	7	15
Cadmium	mg/kg	1	0.4	0.6	<0.4	<0.4
Chromium	mg/kg	20	10	13	8	8
Copper	mg/kg	59	37	47	31	18
Cobalt	mg/kg	5	6	6	4	4
Lead	mg/kg	19	12	14	9	9
Manganese	mg/kg	190	190	220	130	85
Nickel	mg/kg	9	5	6	4	3
Selenium	mg/kg	3	<2	2	<2	<2
Silver	mg/kg	<1	<1	<1	<1	<1
Vanadium	mg/kg	36	19	26	15	22
Zinc	mg/kg	140	76	99	55	46
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1

Acid Extractable metals in soil		
Our Reference		364677-6
Your Reference	UNITS	102414302008
Sample ID		Point C
Date Sampled		23/10/2024
Type of sample		Soil
Date prepared	-	25/10/2024
Date analysed	-	25/10/2024
Aluminium	mg/kg	8,800
Iron	mg/kg	16,000
Antimony	mg/kg	<10
Arsenic	mg/kg	12
Cadmium	mg/kg	0.6
Chromium	mg/kg	12
Copper	mg/kg	44
Cobalt	mg/kg	6
Lead	mg/kg	14
Manganese	mg/kg	240
Nickel	mg/kg	6
Selenium	mg/kg	<2
Silver	mg/kg	<1
Vanadium	mg/kg	22
Zinc	mg/kg	88
Mercury	mg/kg	<0.1

Misc Inorg - Soil						
Our Reference		364677-1	364677-2	364677-3	364677-4	364677-5
Your Reference	UNITS	102414302003	102414302004	102414302005	102414302006	102414302007
Sample ID		Sed 1	Sed 2	Sed 3	Sed 4	Point A
Date Sampled		23/10/2024	23/10/2024	23/10/2024	23/10/2024	23/10/2024
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	30/10/2024	30/10/2024	30/10/2024	30/10/2024	30/10/2024
Date analysed	-	30/10/2024	30/10/2024	30/10/2024	30/10/2024	30/10/2024
Total Organic Carbon in soil/solids	mg/kg	55,000	10,000	21,000	9,200	7,400

Misc Inorg - Soil		
Our Reference		364677-6
Your Reference	UNITS	102414302008
Sample ID		Point C
Date Sampled		23/10/2024
Type of sample		Soil
Date prepared	-	30/10/2024
Date analysed	-	30/10/2024
Total Organic Carbon in soil/solids	mg/kg	19,000

Tributyl Tin in Soil						
Our Reference		364677-1	364677-2	364677-3	364677-4	364677-5
Your Reference	UNITS	102414302003	102414302004	102414302005	102414302006	102414302007
Sample ID		Sed 1	Sed 2	Sed 3	Sed 4	Point A
Date Sampled		23/10/2024	23/10/2024	23/10/2024	23/10/2024	23/10/2024
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	29/10/2024	29/10/2024	29/10/2024	29/10/2024	29/10/2024
Date analysed	-	30/10/2024	30/10/2024	30/10/2024	30/10/2024	30/10/2024
Tributyltin as Sn	µg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate Tripropyltin	%	83	135	136	123	121

Tributyl Tin in Soil		
Our Reference		364677-6
Your Reference	UNITS	102414302008
Sample ID		Point C
Date Sampled		23/10/2024
Type of sample		Soil
Date extracted	-	29/10/2024
Date analysed	-	30/10/2024
Tributyltin as Sn	µg/kg	<0.5
Surrogate Tripropyltin	%	130

Moisture						
Our Reference		364677-1	364677-2	364677-3	364677-4	364677-5
Your Reference	UNITS	102414302003	102414302004	102414302005	102414302006	102414302007
Sample ID		Sed 1	Sed 2	Sed 3	Sed 4	Point A
Date Sampled		23/10/2024	23/10/2024	23/10/2024	23/10/2024	23/10/2024
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/10/2024	25/10/2024	25/10/2024	25/10/2024	25/10/2024
Date analysed	-	28/10/2024	28/10/2024	28/10/2024	28/10/2024	28/10/2024
Moisture	%	73	55	67	42	34

Moisture		
Our Reference		364677-6
Your Reference	UNITS	102414302008
Sample ID		Point C
Date Sampled		23/10/2024
Type of sample		Soil
Date prepared	-	25/10/2024
Date analysed	-	28/10/2024
Moisture	%	57

vTRH(C6-C10)/BTEXN in Water			
Our Reference		364677-7	364677-8
Your Reference	UNITS	102414302009	102414302010
Sample ID		MW 5	MW 6
Date Sampled		23/10/2024	23/10/2024
Type of sample		Water	Water
Date extracted	-	25/10/2024	25/10/2024
Date analysed	-	28/10/2024	28/10/2024
TRH C_6 - C_9	µg/L	<10	<10
TRH C_6 - C_{10}	µg/L	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	<10	<10
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Naphthalene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	103	102
Surrogate Toluene-d8	%	98	96
Surrogate 4-Bromofluorobenzene	%	101	101

svTRH (C10-C40) in Water			
Our Reference		364677-7	364677-8
Your Reference	UNITS	102414302009	102414302010
Sample ID		MW 5	MW 6
Date Sampled		23/10/2024	23/10/2024
Type of sample		Water	Water
Date extracted	-	25/10/2024	25/10/2024
Date analysed	-	26/10/2024	26/10/2024
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
Total +ve TRH (C10-C36)	µg/L	<50	<50
TRH >C_{10} - C_{16}	µg/L	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH >C_{16} - C_{34}	µg/L	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100
Total +ve TRH (>C10-C40)	µg/L	<50	<50
Surrogate o-Terphenyl	%	81	72

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
INORG-137	Total Carbon Nitrogen Sulfur by high temperature catalytic combustion with IR detection.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
ORG-25	Determination of Organometallic Compounds by derivatisation and analysis by GC-MSMS.

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	364677-2
Date prepared	-			25/10/2024	1	25/10/2024	25/10/2024		25/10/2024	25/10/2024
Date analysed	-			25/10/2024	1	25/10/2024	25/10/2024		25/10/2024	25/10/2024
Aluminium	mg/kg	10	Metals-020	<10	1	11000	12000	9	98	#
Iron	mg/kg	10	Metals-020	<10	1	19000	19000	0	107	#
Antimony	mg/kg	10	Metals-020	<10	1	<10	<10	0	103	88
Arsenic	mg/kg	4	Metals-020	<4	1	8	9	12	111	108
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	1	1	0	103	92
Chromium	mg/kg	1	Metals-020	<1	1	20	19	5	104	100
Copper	mg/kg	1	Metals-020	<1	1	59	61	3	104	104
Cobalt	mg/kg	1	Metals-020	<1	1	5	5	0	104	96
Lead	mg/kg	1	Metals-020	<1	1	19	18	5	107	97
Manganese	mg/kg	1	Metals-020	<1	1	190	180	5	111	107
Nickel	mg/kg	1	Metals-020	<1	1	9	8	12	105	96
Selenium	mg/kg	2	Metals-020	<2	1	3	3	0	101	98
Silver	mg/kg	1	Metals-020	<1	1	<1	<1	0	106	112
Vanadium	mg/kg	1	Metals-020	<1	1	36	38	5	104	103
Zinc	mg/kg	1	Metals-020	<1	1	140	130	7	109	101
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	<0.1	0	97	106

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-6	[NT]
Date prepared	-			30/10/2024	2	30/10/2024	30/10/2024		30/10/2024	[NT]
Date analysed	-			30/10/2024	2	30/10/2024	30/10/2024		30/10/2024	[NT]
Total Organic Carbon in soil/solids	mg/kg	100	INORG-137	<100	2	10000	11000	10	98	[NT]

QUALITY CONTROL: Tributyl Tin in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	364677-2
Date extracted	-			29/10/2024	1	29/10/2024	29/10/2024		29/10/2024	29/10/2024
Date analysed	-			30/10/2024	1	30/10/2024	30/10/2024		30/10/2024	30/10/2024
Tributyltin as Sn	µg/kg	0.5	ORG-25	<0.5	1	<0.5	<0.5	0	92	96
Surrogate Tripropyltin	%		ORG-25	113	1	83	127	42	128	136

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			25/10/2024	[NT]	[NT]	[NT]	[NT]	25/10/2024	[NT]
Date analysed	-			28/10/2024	[NT]	[NT]	[NT]	[NT]	28/10/2024	[NT]
TRH C_6 - C_9	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	116	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	116	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	116	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	103	[NT]	[NT]	[NT]	[NT]	103	[NT]
Surrogate Toluene-d8	%		Org-023	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-Bromofluorobenzene	%		Org-023	99	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			25/10/2024	[NT]	[NT]	[NT]	[NT]	25/10/2024	[NT]
Date analysed	-			26/10/2024	[NT]	[NT]	[NT]	[NT]	26/10/2024	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	123	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	123	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	120	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	114	[NT]
Surrogate o-Terphenyl	%		Org-020	99	[NT]	[NT]	[NT]	[NT]	123	[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.

Where matrix spike recoveries fall below the lower limit of the acceptance criteria (e.g. for non-labile or standard Organics <60%), positive result(s) in the parent sample will subsequently have a higher than typical estimated uncertainty (MU estimates supplied on request) and in these circumstances the sample result is likely biased significantly low.

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

8 metals in soil - # Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

RCA LABORATORIES
• ENVIRONMENTAL • CONSTRUCTION MATERIALS TESTING

ENV-F108-3

Ground Water Sampling Field Sheet

Client: trinity point Job Number: 14302

Technician: SK SJ Date Sampled: 23/10/24

Meter(s) Used: ENV - 10459

Sample Number	Bore ID	Time Sampled	Depth to Aquifer (m)	Pipe Height (m)	Depth to Aquifer from Surface (m)	Temp (°C)	pH	Other Analysis (Include Measurement Units)			
								EC	µS/cm		
10241430209	MW5	9:55	1.05	0.09	1.05	18	7.54	5630			
10241430210	MW6	9:42	1.00	0.09	1.00	18	7.48	5210			
524063 J24eSJ	QCs						7.03	1409			

Comments: N/A

RCA LABORATORIES
• ENVIRONMENTAL •
CONSTRUCTION MATERIALS TESTING

ENV-F033-4

BOREHOLE PURGING LOG SHEET – KOORAGANG ISLAND

Bore No. ***KOORAGANG ISLAND:***	Date	Start Time	End Time	Depth to Water Surface (m) x	Depth Bore Bottom (m) y	Water Column (m) z	Calculated Water Volume (L)* v	Calculated Volume to Purge (L) p	Actual Volume Purged (L)	Start Colour of Water	End Colour of Water	Purged By:	Comments
				x (value)	y (value)	$z = (y-x)$	$v = z \times 1.96$	$p = v \times 3$					
MW 5	23/9/24	09:43	09:55	1.05	2.70	1.65	3.234	9.70	9 L	clear	clear	SJ	Slight odour
MW 6	23/9/24	09:23	09:42	1	3.05	2.05	3.895	11.68	11 L	Turbid	clear	SJ	"

*Calculated water volume based on 1 linear meter of 50mm bore pipe using equation $V = \pi r^2 h$. Where V = volume in Litres.

RCA LABORATORIES
• ENVIRONMENTAL • CONSTRUCTION MATERIALS TESTING

CMT-WS1028/1

SAMPLING DETAIL SHEET

Job No: 14302 Client Ref: trinity point Date Received: 23/10/24
Location: point A Material Description: Sandy silt brown (dark)
Date Sampled: 23/10/24 By: SN SJ Supplied by Client: Yes / No
Sampling Method: Petite ponar Jars ~~Bag~~ 1 of 2 - 2 of 2
Tests Requested: See CoC

Job No: 14302 Client Ref: trinity point Date Received: 23/10/24
Location: SED 1 Material Description: sandy silt brown (dark)
Date Sampled: 23/10/24 By: SN SJ Supplied by Client: Yes / No
Sampling Method: Petite ponar Jar ~~Bag~~ 1 of 2 - 2 of 2
Tests Requested: See CoC

Job No: 14302 Client Ref: trinity point Date Received: 23/10/24
Location: Sed 2 Material Description: silty sand brown (dark)
Date Sampled: 23/10/24 By: SN SJ Supplied by Client: Yes / No
Sampling Method: Petite ponar Jar ~~Bag~~ 1 of 2 - 2 of 2
Tests Requested: See CoC

Job No: 14302 Client Ref: trinity point Date Received: 23/10/24
Location: SED 3 Material Description: silty sand
Date Sampled: 23/10/24 By: SN/SJ Supplied by Client: Yes / No
Sampling Method: Petite ponar Bag 1 of 2 - 2 of 2
Tests Requested: See CoC

Job No: 14302 Client Ref: trinity point Date Received: 23/10/24
Location: SED 4 Material Description: silty sand brown (dark)
Date Sampled: 23/10/24 By: SN/SJ Supplied by Client: Yes / No
Sampling Method: Petite ponar Jar ~~Bag~~ 1 of 2 - 2 of 2
Tests Requested: See CoC

RCA Australia	**Tested by**: SN	**Date**: 23/10/24
Laboratory Site No: ~~9804~~ / _____ (Circle one)	**Checked by**:	**Date**:

RCA LABORATORIES
• ENVIRONMENTAL •
CONSTRUCTION MATERIALS TESTING

CMT-WS1028/1

SAMPLING DETAIL SHEET

Job No: 14302 Client Ref: trinity Point Date Received: 23/10/24
Location: Point C Material Description: silty sand brown (dark)
Date Sampled: 23/10/24 By: SV / SJ Supplied by Client: Yes /No (circled: No)
Sampling Method: Petite Ponar Jar ~~Bag~~ 1 of 2 2 of 2
Tests Requested: see COC

Job No: ____ Client Ref: ____ Date Received: ____
Location: ____ Material Description: ____
Date Sampled: ____ By: ____ Supplied by Client: Yes /No
Sampling Method: ____ Bag 1 of ____
Tests Requested: ____

Job No: ____ Client Ref: ____ Date Received: ____
Location: ____ Material Description: ____
Date Sampled: ____ By: ____ Supplied by Client: Yes /No
Sampling Method: ____ Bag 1 of ____
Tests Requested: ____

Job No: ____ Client Ref: ____ Date Received: ____
Location: ____ Material Description: ____
Date Sampled: ____ By: ____ Supplied by Client: Yes /No
Sampling Method: ____ Bag 1 of ____
Tests Requested: ____

Job No: ____ Client Ref: ____ Date Received: ____
Location: ____ Material Description: ____
Date Sampled: ____ By: ____ Supplied by Client: Yes /No
Sampling Method: ____ Bag 1 of ____
Tests Requested: ____

RCA Australia	**Tested by**: SV	**Date**: 23/10/24
Laboratory Site No: 9804 / ____ (Circle one)	**Checked by**:	**Date**:

Sample Identification	PQL	Guideline[A]		Sed-1	Sed-1	Sed-1	Sed-1	Sed-1	Sed-2	Sed-2	Sed-2	Sed-2	Sed-2
Date		DGV	GV-High	19/7/23	26/5/21	22/6/22	19/7/23	25/10/24	19/8/20	26/5/21	22/6/22	19/7/23	25/10/24
Sample Profile				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Purpose				Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK
Metals													
Aluminium	50			3560	7460	11800	12400	11000	3980	7560	8810	8800	7400
Antimony	5	2	25	<5	<5	<5	<0.50	<10	<5	<5	<5	<0.50	<10
Arsenic	5	20	70	10	9	6	9.35	8	11	12	11	12.8	15
Cadmium	1	1.5	10	<1	1	1	1.3	1	<1	<1	<1	0.5	0.4
Chromium	2	80	370	9	11	14	19.3	20	5	10	10	12.4	10
Cobalt	2			3	4	4	6.2	59	4	6	5	6.5	37
Copper	5	65	270	33	44	**83**	**68.7**	**5**	19	35	30	42.7	6
Iron	50			7090	14600	15300	18800	19000	8630	15400	12200	14500	14000
Lead	5	50	220	12	13	14	20.7	19	7	14	10	13.2	12
Manganese	5			58	163	158	217	190	121	192	151	187	190
Nickel	2	21	52	4	6	7	8.8	9	3	6	4	5.6	5
Selenium	5			<5	<5	<5	2.6	3	<5	<5	<5	1.2	<2
Silver	2	1	4	<2	<2	<2	<0.1	<1	<2	<2	<2	<0.1	<1
Vanadium	5			11	26	31	36	36	11	24	19	21	19
Zinc	5	200	410	78	97	132	153	140	53	94	78	90.6	76
Mercury	0.1	0.15	1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Organometallics													
Tributyltin	0.5	9	70	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organics													
Total Organic Carbon	0.02			1.61	2	4.46	4.64		2	1.63	1.96	1.6	

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that presented by laboratory

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

Tributyltin ug/kg

Sample Identification	PQL	Guideline[A]		Sed-3	Sed-3	Sed-3	Sed-3	Sed-3	Sed-4	Sed-4	Sed-4	Sed-4	Point A
Date		DGV	GV-High	19/8/20	26/5/21	22/6/22	19/7/23	25/10/24	26/5/21	22/6/22	19/7/23	25/10/24	17/4/19
Sample Profile				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Purpose				Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	Enviropacific
Metals													
Aluminium	50			4380	9990	11700	5800	9900	5340	6310	16400	5100	7530
Antimony	5	2	25	<5	<5	<5	<0.5	<10	<5	<5	<0.50	<10	<0.5
Arsenic	5	20	70	8	12	8	8.3	10	7	5	15.2	7	11.2
Cadmium	1	1.5	10	<1	<1	<1	0.5	0.6	<1	<1	1.1	<0.4	0.7
Chromium	2	80	370	5	13	13	8.5	13	7	7	23.1	8	12.6
Cobalt	2			3	6	5	4.6	47	4	3	9.5	31	5.5
Copper	5	65	270	16	39	48	26.1	6	26	28	67.1	4	41.6
Iron	50			8140	18500	15800	9040	16000	10200	8300	26600	8900	18400
Lead	5	50	220	7	16	14	9.2	14	8	8	27.2	9	19.2
Manganese	5			116	247	218	142	220	154	130	365	130	243
Nickel	2	21	52	2	7	6	4.3	6	4	3	10.2	4	5.8
Selenium	5			<5	<5	<5	1.1	2	<5	<5	2.3	<2	1.9
Silver	2	1	4	<2	<2	<2	<0.1	<1	<2	<2	<0.1	<1	<0.1
Vanadium	5			12	30	26	15	26	18	15	40	15	28.9
Zinc	5	200	410	52	102	112	63.8	99	64	57	175	55	93
Mercury	0.1	0.15	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.06
Organometallics													
Tributyltin	0.5	9	70	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organics													
Total Organic Carbon	0.02			1.69	1.99	2.5	1.55		1.35	1.0	2.18		1.56

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

Tributyltin ug/kg

Sample Identification	PQL	Guideline[A]		Point A	Point A	Point A	Point A	Point A	Point B	Point C	Point C	Point C	Point C	Point C
Date		DGV	GV-High	19/8/20	26/5/21	22/6/22	19/7/23	25/10/24	17/4/19	17/4/19	19/8/20	26/5/21	22/6/22	17/7/23
Sample Profile				Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Sample Purpose				Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK	RCA-SK	RCA-SK	RCA-SK	Enviropacific	Enviropacific	RCA-SK	RCA-SK	RCA-SK	RCA-SK
Metals														
Aluminium	50			2870	4260	5620	8740	4000	10700	10400	1940	15700	7860	12000
Antimony	5	2	25	<5	<5	<5	<0.50	<10	<0.5	<0.5	<5	<5	<5	<0.5
Arsenic	5	20	70	7	10	13	17.2	15	19.6	15.8	<5	19	8	9.87
Cadmium	1	1.5	10	<1	<1	<1	0.5	<0.4	0.6	0.9	<1	<1	<1	0.7
Chromium	2	80	370	4	6	7	13.6	8	17.8	17.3	2	19	9	16.3
Cobalt	2			2	3	4	6	18	7.5	7.4	<2	8	4	6.3
Copper	5	65	270	11	20	15	36.6	4	67.4	53.4	10	44	26	50.2
Iron	50			6800	9320	11800	19100	12000	25100	22500	3280	28500	9860	17100
Lead	5	50	220	6	8	8	14.6	9	25.4	25.6	<5	20	10	16.9
Manganese	5			58	85	85	427	85	401	348	43	408	106	267
Nickel	2	21	52	<2	4	3	7.3	3	8.1	7.6	<2	10	4	7.3
Selenium	5			<5	<5	<5	1.5	<2	2	2.4	<5	<5	<5	1.5
Silver	2	1	4	<2	<2	<2	<0.1	<1	<0.1	<0.1	<2	<2	<2	<0.1
Vanadium	5			12	14	17	34	22	36.1	39.3	5	48	19	27
Zinc	5	200	410	35	50	46	87.8	46	147	138	25	152	64	120
Mercury	0.1	0.15	1	<0.1	<0.1	<0.1	0.06	<0.1	0.08	0.07	<0.1	<0.1	<0.1	<0.1
Organometallics														
Tributyltin	0.5	9	70	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organics														
Total Organic Carbon	0.02			0.88	1.28	0.76	0.369		2.33	2.36	0.96	1.92	0.98	2.07

All results are in units of mg/kg except Total Organic Carbon which is in %.

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is

[A] ANZG Toxicant default guideline values for sediment quality, Table 1

DGV = Detault Guideline Value

GV-High = Upper Guideline Value

Results shown in **BOLD** are in excess of the DGV

Results shown in shading are in excess of the GV-High

Tributyltin ug/kg

Sample Identification	PQL	Guideline[A]		Point C
Date		DGV	GV-High	25/10/24
Sample Profile				Sediment
Sample Purpose				Monitoring
Sample collected by				RCA-SK
Metals				
Aluminium	50			8800
Antimony	5	2	25	<10
Arsenic	5	20	70	12
Cadmium	1	1.5	10	0.6
Chromium	2	80	370	12
Cobalt	2			44
Copper	5	65	270	6
Iron	50			16000
Lead	5	50	220	14
Manganese	5			240
Nickel	2	21	52	6
Selenium	5			<2
Silver	2	1	4	<1
Vanadium	5			22
Zinc	5	200	410	88
Mercury	0.1	0.15	1	<0.1
Organometallics				
Tributyltin	0.5	9	70	<0.5
Organics				
Total Organic Carbon	0.02			

All results are in units of mg/kg except Total Organic Carbon which is in %.
Blank Cell indicates no criterion available
PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is
[A] ANZG Toxicant default guideline values for sediment quality, Table 1
DGV = Detault Guideline Value
GV-High = Upper Guideline Value
Results shown in **BOLD** are in excess of the DGV
Results shown in shading are in excess of the GV-High
Tributyltin ug/kg

Sample Identification	PQL	Human Health (Vapour Based) Guideline [A]		MW5	MW5	MW5
Sample Depth (m) [B]		HSL 'D'		1.13	1.02	1.9
Date		SAND 2-<4m	SAND 4-<8m	26/5/21	22/6/22	19/7/23
Dominant Stratum [C]				Sand	Sand	Sand
Sample Purpose				Monitoring	Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)						
Benzene	1	5000	5000	<1	<1	<1
Toluene	2	NL	NL	<2	<2	<2
Ethylbenzene	2	NL	NL	<2	<2	<2
meta- and para-Xylene	2			<2	<2	<2
ortho-Xylene	2			<2	<2	<2
Total Xylenes	4	NL	NL	2	<2	<2
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	5	NL	NL	<5	<5	<5
Total Recoverable Hydrocarbons (TRH)						
TRH C_6-C_{10}	20			<20	<20	<20
TRH >C_{10}-C_{16}	100			<100	<100	<100
TRH >C_{16}-C_{34}	100			<100	<100	<100
TRH >C_{34}-C_{40}	100			<100	<100	<100
F1	20	6000	6000	<20	<20	<20
F2	100	NL	NL	<50	<50	<50

All results are in units of μg/L
Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from

F1 = TRH C_6-C_{10} minus BTEX. F1 PQL deemed equal TRH C_6-C_{10}.

F2 = TRH >C_{10}-C_{16} minus naphthalene. F2 PQL deemed = TRH >C_{10}-C_{16}.

[A] ASC NEPM 1999 (as amended 2013) Vapour Based Health Screening Level (HSL) 'C' (Parks/Open space)

[B] Sample depths presented are as encountered prior to commencement of sampling

[C] Note that this is a generalisation for the purpose of comparing to the HSL criteria. Where two strata equally represented, most c

NL designates 'Not Limiting' indicating that the pore water concentration required to constitute a vapour risk is higher than the sol compound based on a petroleum mixture. Vapour is therefore not a risk for this compound.

Results for TRH have been compared to TPH guidelines.

Results shown in shading are in excess of the HSL

Where summation required (Xylene, F1, F2) calculation includes components reported as non detected as 1/2 PQL.

Sample Identification	PQL	Human Health (Vapour Based) Guideline [A]		MW5	MW6	MW6
Sample Depth (m) [B]		HSL 'D'		1.05	0.96	1.4
Date		SAND 2-<4m	SAND 4-<8m	23/10/24	26/5/21	22/6/22
Dominant Stratum [C]				Sand	Sand	Sand
Sample Purpose				Monitoring	Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)						
Benzene	1	5000	5000	<1	<1	<1
Toluene	2	NL	NL	<2	<2	<2
Ethylbenzene	2	NL	NL	<2	<2	<2
meta- and para-Xylene	2			<2	<2	<2
ortho-Xylene	2			<2	<2	<2
Total Xylenes	4	NL	NL	<2	2	<2
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	5	NL	NL	<1	<5	<5
Total Recoverable Hydrocarbons (TRH)						
TRH C_6-C_{10}	20			<10	<20	<20
TRH >C_{10}-C_{16}	100			<50	<100	<100
TRH >C_{16}-C_{34}	100			<100	<100	<100
TRH >C_{34}-C_{40}	100			<100	<100	<100
F1	20	6000	6000	<10	<20	<20
F2	100	NL	NL	<50	<50	<50

All results are in units of μg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all comn that presented by laboratory

F1 = TRH C_6-C_{10} minus BTEX. F1 PQL deemed equal TRH C_6-C_{10}.

F2 = TRH >C_{10}-C_{16} minus naphthalene. F2 PQL deemed = TRH >C_{10}-C_{16}.

[A] ASC NEPM 1999 (as amended 2013) Vapour Based Health Screening Level (HSL

[B] Sample depths presented are as encountered prior to commencement of sampling

[C] Note that this is a generalisation for the purpose of comparing to the HSL criteria. Conservative criterion used

NL designates 'Not Limiting' indicating that the pore water concentration required to ubility capacity for that compound based on a petroleum mixture. Vapour is therefore not a risk for this con

Results for TRH have been compared to TPH guidelines.

Results shown in shading are in excess of the HSL

Where summation required (Xylene, F1, F2) calculation includes components report

Sample Identification	PQL	Human Health (Vapour Based) Guideline [A]		MW6	MW6
Sample Depth (m) [B]		HSL 'D'		1.02	1.00
Date		SAND 2-<4m	SAND 4-<8m	19/7/23	23/10/24
Dominant Stratum [C]				Sand	Sand
Sample Purpose				Monitoring	Monitoring
Sample collected by				RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)					
Benzene	1	5000	5000	<1	<1
Toluene	2	NL	NL	<2	<2
Ethylbenzene	2	NL	NL	<2	<2
meta- and para-Xylene	2			<2	<2
ortho-Xylene	2			<2	<2
Total Xylenes	4	NL	NL	<2	<2
Polycyclic Aromatic Hydrocarbons (PAH)					
Naphthalene	5	NL	NL	<5	<1
Total Recoverable Hydrocarbons (TRH)					
TRH C_6-C_{10}	20			<20	<10
TRH >C_{10}-C_{16}	100			<100	<50
TRH >C_{16}-C_{34}	100			<100	<100
TRH >C_{34}-C_{40}	100			<100	<100
F1	20	6000	6000	<20	<10
F2	100	NL	NL	<50	<50

All results are in units of μg/L
Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all com

F1 = TRH C_6-C_{10} minus BTEX. F1 PQL deemed equal TRH C_6-C_{10}.
F2 = TRH >C_{10}-C_{16} minus naphthalene. F2 PQL deemed = TRH >C_{10}-C_{16}.

[A] ASC NEPM 1999 (as amended 2013) Vapour Based Health Screening Level (HSL

[B] Sample depths presented are as encountered prior to commencement of sampling

[C] Note that this is a generalisation for the purpose of comparing to the HSL criteria.

NL designates 'Not Limiting' indicating that the pore water concentration required to compound based on a petroleum mixture. Vapour is therefore not a risk for this con

Results for TRH have been compared to TPH guidelines.
Results shown in shading are in excess of the HSL
Where summation required (Xylene, F1, F2) calculation includes components report

Sample Identification	PQL	**Aquatic Ecosystem Guideline [A]**	**Human Health (Ingestion) Guideline [B]**	MW5	MW5
Sample Depth (m) [C]		95% Marine		1.13	1.02
Date				26/5/21	22/6/22
			Sample Purpose	Monitoring	Monitoring
			Sample collected by	RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)					
Benzene	1	700	1	<1	<1
Toluene	2	*180*	800	<2	<2
Ethylbenzene	2	*5*	300	<2	<2
meta- and para-Xylene	2	*275*		<2	<2
ortho-Xylene	2	*350*		<2	<2
Total Xylenes	4		600	2	2
Total Recoverable Hydrocarbons (TRH)					
TRH C_6-C_{10}	20			<20	<20
TRH >C_{10}-C_{16}	100			<100	<100
TRH >C_{16}-C_{34}	100			<100	<100
TRH >C_{34}-C_{40}	100			<100	<100
TRH C_6-C_{40}	320	*7*		160	<100

All results are in units of μg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQL of all components is summed and may be different from that present laboratory

[A] % Protection Level for Receiving Water Type.

[B] Australian Drinking Water Guidelines, 2011.

[C] Sample depths presented are as encountered prior to commencement of sampling

Ecological guidelines in *italics* are low level reliability guidelines

Results for TRH have been compared to TPH guidelines.

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems guidelines

Results shown in underline are in excess of the human health (ingestion) guideline

Where summation required (Xylene,TRH) calculation includes components reported as non detected as 1/2 PQL.

Sample Identification	PQL	MW5	MW5	MW5	MW5
Sample Depth (m) [C]		1.09	1.05	1.05	1.05
Date		19/7/23	23/10/24	23/10/24	23/10/24
		Monitoring	Monitoring	Monitoring	Monitoring
		RCA-SK	RCA-SK	RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)					
Benzene	1	<1	<1	<1	<1
Toluene	2	<2	<2	<2	<2
Ethylbenzene	2	<2	<2	<2	<2
meta- and para-Xylene	2	<2	<2	<2	<2
ortho-Xylene	2	<2	<2	<2	<2
Total Xylenes	4	2	<u><2</u>	2	2
Total Recoverable Hydrocarbons (TRH)					
TRH C_6-C_{10}	20	<20	<10	<20	<20
TRH >C_{10}-C_{16}	100	<100	<50	<100	<100
TRH >C_{16}-C_{34}	100	<100	<100	<100	<100
TRH >C_{34}-C_{40}	100	<100	<100	<100	<100
TRH C_6-C_{40}	320	<100	<100	160	<100

All results are in units of μg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, P ed by laboratory

[A] % Protection Level for Receiving Water Type.

[B] Australian Drinking Water Guidelines, 2011.

[C] Sample depths presented are as encountered prior to commenceme

Ecological guidelines in *italics* are low level reliability guidelines

Results for TRH have been compared to TPH guidelines.

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems

Results shown in <u>underline</u> are in excess of the human health (ingestic

Where summation required (Xylene,TRH) calculation includes compon

Sample Identification	PQL	MW6	MW6
Sample Depth (m) [C]		1.02	1.00
Date		19/7/23	23/10/24
		Monitoring	Monitoring
		RCA-SK	RCA-SK
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)			
Benzene	1	<1	<1
Toluene	2	<2	<2
Ethylbenzene	2	<2	<2
meta- and para-Xylene	2	<2	<2
ortho-Xylene	2	<2	<2
Total Xylenes	4	2	<2
Total Recoverable Hydrocarbons (TRH)			
TRH C_6-C_{10}	20	<20	<10
TRH >C_{10}-C_{16}	100	<100	<50
TRH >C_{16}-C_{34}	100	<100	<100
TRH >C_{34}-C_{40}	100	<100	<100
TRH C_6-C_{40}	320	<100	<100

All results are in units of μg/L

Blank Cell indicates no criterion available

PQL = Practical Quantitation Limit. Where PQL is for a summation, PQ
laboratory

[A] % Protection Level for Receiving Water Type.

[B] Australian Drinking Water Guidelines, 2011.

[C] Sample depths presented are as encountered prior to commenceme

Ecological guidelines in *italics* are low level reliability guidelines

Results for TRH have been compared to TPH guidelines.

Results shown in **BOLD** are in excess of the 95% aquatic ecosystems

Results shown in underline are in excess of the human health (ingestic

Where summation required (Xylene,TRH) calculation includes compon