

# MEMO

Date: 28 May 2021  
To: Simon Poggioli (Project Engineer)  
From: Alan Foley  
Pages: 9 inc. this page excluding attachments  
Regarding: Surface Water Quality – Event #10 Summary

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## Fremantle Swan River Crossing – Surface Water Quality Monitoring Event #10

### Background

Laing O'Rourke on behalf of Fremantle Bridges Alliance (the Alliance), has commissioned RPS Australia West Pty Ltd (RPS) to provide environmental services to support the Swan River Crossing (SRC) project development. The works include the replacement of the Fremantle Traffic Bridge and the improvement/duplication of the Fremantle Rail Bridge. As detailed within the Preliminary Environmental Impact Assessment (Main Roads Western Australia, 2020), surface water quality has the potential to be impacted during new bridge construction and demolition of the old structure. As such, a baseline assessment of the surface water quality is being completed to inform a future Construction Environment Management Plan (CEMP) monitoring program.

RPS has previously undertaken eight monitoring events while contracted to Arup/MRWA. This memo provides details on the surface water monitoring Event #10, completed in May 2021, and is a continuation of the program undertaken by RPS for MRWA, between August 2020 and March 2021.

### Sampling locations

The program includes collection of surface water samples from five locations. Further details on sampling locations are presented in Figure A and Table 1.

*For previous sampling events, Event #1 (August 2020) and Event #2 (September 2020), the program was reduced to four locations with background location WS-5 excluded due to the project awaiting Department Biodiversity, Conservation and Attractions (DBCA) access approval. Approval was received for sampling within the Swan River DBCA control area on 5 October 2020. As such, all sampling locations have been included from Event #3 onwards.*

A copy of the DBCA approval, 2020-1928 Permit P12652, has been included in Appendix A.

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**Table 1: Surface water sampling locations summary**

Sampling point	Swan River Bathymetry <sup>1,2</sup> (m)	Commentary
WS1	~4.0-6.0 <sup>1</sup>	<ul style="list-style-type: none"><li>Central channel (northern side)</li><li>Sample collected from Fremantle Traffic Bridge northern access point</li></ul>
WS2	~4.0-6.0 <sup>1</sup>	<ul style="list-style-type: none"><li>Central channel (southern side)</li><li>Sample collected from Fremantle Traffic Bridge southern access point</li></ul>
WS3	~2.0-4.0 <sup>1</sup>	<ul style="list-style-type: none"><li>Northern shoreline</li></ul>
WS4	~4.0-5.0 <sup>1</sup>	<ul style="list-style-type: none"><li>Southern shoreline</li><li>Small craft pen jetty</li></ul>
WS5	~2.0-6.0 <sup>2</sup>	<ul style="list-style-type: none"><li>Southern shoreline</li><li>Public jetty</li><li>Background location</li></ul>

Notes: 1. Results of a geophysical survey of the portions of the site was undertaken in 2012 (Marine & Earth Sciences, 2012), which was used inform the Arup reports (Arup, 2013a and 2013b)

2. Swan and Canning Rivers navigation chart 1:25,000. April 2014, Edition 7. Department of Transport  
[https://www.transport.wa.gov.au/imarine/coastaldata/nauticalcharts/pdfs/WA898\\_swam\\_and\\_canning\\_rivers.pdf](https://www.transport.wa.gov.au/imarine/coastaldata/nauticalcharts/pdfs/WA898_swam_and_canning_rivers.pdf).

## Sampling program schedule overview

The proposed SWQS sampling program schedule is presented in Table 2.

**Table 2: Sampling program**

Event	Sampling locations	Event Date	Date Completed	Status
Event 1	WS2, WS4	August 2020	7/08/2020	Completed
Event 2	WS1-WS4	September 2020	10/09/2020	Completed
Event 3	WS1-WS5	October 2020	7/10/2020	Completed
Event 4	WS1-WS5	November 2020	5/11/2020	Completed
Event 5	WS1-WS5	December 2020	3/12/2020	Completed
Event 6	WS1-WS5	January 2021	13/01/2021	Completed
Event 7	WS1-WS5	February 2021	11/02/2021	Completed
Event 8	WS1-WS5	March 2021	04/03/2021	Completed
Event 9	WS1-WS5	April 2021	20/04/2021	Completed
Event 10	WS1-WS5	May 2021	05/05/2021	Completed – this round
Event 11	WS1-WS5	June 2021	-	TBC
Event 12	WS1-WS5	July 2021	-	TBC

Notes: To be completed (TBC). Event 9 (previous event) was the first monitoring event completed as part of the current contract.

## Surface water sampling methodology

Surface water sampling was conducted in accordance with the following relevant guidance:

- Department of Water and Environmental Regulation, *Assessment and Management of Contaminated Sites – Contaminated Sites Guidelines* (DER, 2014)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, *Schedule B – General Guidelines for the Assessment of Site Contamination* (NEPC, 2013)

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- *Water Quality—Sampling. Part 1: Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples* (Standards Australia, 1998. AS/NZS 5667.1:1998)
- *Water Quality—Sampling. Part 6: Guidance on sampling of rivers and streams* (Standards Australia, 1998. AS/NZS 5667.6:1998)
- *Water Quality—Sampling. Part 9: Guidance on sampling from marine waters* (Standards Australia, 1998. AS/NZS 5667.9:1998)
- Heads of EPAs Australia and New Zealand (HEPA), *PFAS National Environmental Management Plan, Version 2.0* (HEPA, 2020).

Each Swan River surface water sample was collected using a Niskin Flask or surface water sampling pole depending upon water column depth as detailed below:

- Where the water column was >2 m, the following two depths were targeted:
  - Sample 1 (shallow sample): collected at ~1 m below surface level
  - Sample 2 (deep sample): collected ~1 m above riverbed level.
- Where the water column was <2 m (WS3), the sample was collected in the middle of the water column, using a surface water pole sampler.

Field observations were collected during each sampling event and included commentary on weather conditions, tides and vessel movement within the Fremantle port and surrounding waters.

## Analysis program

All samples were analysed for the following analytical suite:

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silicon, silver, and zinc.
- Total metals: aluminium and iron.
- Major anions: sulfate ( $\text{SO}_4^{2-}$ ), chloride ( $\text{Cl}^-$ ), fluoride ( $\text{F}^-$ ), alkalinity (hydroxide  $\text{OH}^-$ , carbonate  $\text{CO}_3^{2-}$ , bicarbonate  $\text{HCO}_3^-$ ).
- Major cations: sodium, potassium, calcium, magnesium.
- Nutrients: total and reactive phosphorus, total nitrogen, total Kjeldahl nitrogen (TKN), total ammonia ( $\text{NH}_4\text{-N} + \text{NH}_3\text{-N}$ ), nitrates and nitrites ( $\text{NO}_x\text{-N}$ ).
- Sulfide ( $\text{S}^{2-}$ )
- Total acidity
- Total dissolved solids (TDS) and Total suspended solids (TSS)
- Turbidity
- Hydrocarbons: Total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAH)

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- Organochlorine Pesticides (OCP)
- Per- and poly-fluoroalkyl substances (PFAS)
- Dissolved organic carbon (DOC)
- Chlorophyll-A and Phaeophytin-A.

Water column profiles for temperature, salinity (electrical conductivity (EC)), pH and dissolved oxygen (DO) were also collected at each sampling location.

## Surface water assessment levels

All analytes were compared against relevant Water Quality Australia 2019 guidelines, nominally (95% species protection) as follows:

- Water Quality Australia (WQA, 2019)
  - Marine Water Guidelines (MWG) 95% species protection level
    - Estuary water (for nutrients and pH only).
  - Recreational Water Guidelines (RWG)
- PFAS National Environmental Management Plan (HEPA, 2020).
  - Marine Guidelines 99% species protection level<sup>1</sup>
  - Recreational Water
- Treatment and management of soil and water in acid sulfate soil landscapes (DER, June 2015b).
  - Guideline levels for ASS surface water quality (ASS)

## Site conditions

Site conditions noted during the monitoring Event #10 are summarised within Table 3.

**Table 3: Site conditions**

Items	Commentary
<b>Weather conditions (during sampling event)</b>	Overcast, calm winds in the morning, turning north-westerly in the afternoon (11 km/hr), maximum temperature of 24.0°C.
<b>Rainfall (noted during the previous week)</b>	A total of 17.4 mm of rain was recorded at the Perth Station (Number: 9225) in the week prior to sampling.
<b>Tide condition and direction</b>	<ul style="list-style-type: none"><li>• Incoming tide.</li><li>• Closest peak:<ul style="list-style-type: none"><li>– Low tide (2:12 am / 0.68 m)</li><li>– High tide (1:04 pm / 1.05 m)</li></ul></li></ul>

<sup>1</sup> The 99% species protection value is considered to most appropriate as PFAS is known bioaccumulate in aquatic organisms.

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## Fremantle Port and Swan River vessel activities

- WS1: Low general harbour / river traffic during sampling.
- WS2: Low general boat traffic / geotechnical barge undertaking works west of bridge.
- WS3: Low general boat traffic.
- WS4: Three ships being unloaded. Low general river traffic during sampling.
- WS5: Low general harbour traffic.

## Monitoring results discussion

Results have been tabulated and are presented in Tables A to E, with laboratory reporting presented in Appendix B. Further commentary on specific analytes is provided below.

## Field parameters

Field parameters were measured throughout the water column prior to sampling at each location. The water column profiles are presented in surface water sampling logs at the rear of the report (Appendix C), with field parameters of sampling depths summarised in Table 4.

**Table 4: Sampling location field parameters**

Sample Location	Depth (m)	Temp (°C)	pH	EC ( $\mu\text{S}/\text{cm}$ )	Redox (mV)	DO (%sat)
WS1-S	1.00	20.3	8.22	53,594	113	80
WS1-D	3.50	20.3	8.23	53,594	114	81
WS2-S	1.00	20.2	8.22	53,493	107	81
WS2-D	4.50	20.2	8.24	53,614	107	81
WS3-S	0.55	20.4	8.23	53,551	18	81
WS4-S	1.00	20.2	8.18	53,220	92	81
WS4-D	4.00	20.2	8.21	53,449	97	79
WS5-S	1.00	20.2	8.22	53,474	110	73
WS5-D	6.50	20.2	8.23	53,447	111	75

Physical parameters were noted to be relatively consistent throughout the profile i.e., alkaline, saline and in an oxidising state. These conditions are consistent with the significant flushing that occurs as a result of daily tidal movement of marine waters. RPS did note the following minor trends and guideline exceedances:

- Trends:
  - Redox marginally increased with depth at all locations except WS2.
  - Marginal increases of pH with depth were observed at all locations.
  - Dissolved oxygen increased with depth at two locations (WS1 and WS5) with decreases with depth observed at WS4.
- Guideline exceedances:
  - DO percentage saturation (%sat) did not comply with the MWG (90-110%sat) at all locations, ranging from 73%sat (WS5-S) to 81%sat (WS1-D, WS2, WS3 and WS4-S). DO percentage saturations at all locations except WS3-S and WS4-S marginally decreased when compared to the previous sampling event (Event #9, April 2021). DO percentage saturation was significantly higher at WS3-S than the previous event but was within the historical range with WS4-S consistent with the previous event.

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## Acid sulfate soil parameters

Acid sulfate soil (ASS) parameters observed during Event #10 can be summarised as follows:

- Total acidity was significantly below the relevant guideline in all samples. Total acidity concentrations were consistent with previous sampling events.
- Sulfide concentrations were below the limit of reporting (LoR) at all locations and therefore below the relevant guideline. The sulfide concentrations during this event were comparable with previous events.
- Sulfate concentrations exceeded the recreational water guideline (500 mg/L) in all samples with concentrations ranging from 2,400 mg/L (WS3-S and WS4-S) to 2,600 mg/L (WS1-D). These results are marginally lower than the previous sampling event (Event #9) and are typical of water quality results at the mouth of the Swan River.
- Total alkalinity results were relatively consistent across locations, ranging from 120 mg/L (WS1-D, WS2-D and WS5-D) to 130 mg/L (all other locations). All results were consistent with previous events.

## Solids

- TDS concentrations were relatively consistent over all locations and ranged from 36,000 mg/L (WS4-D) to 40,000 mg/L (WS1-D). Results were consistent with previous events.
- TSS ranged from <5 mg/L (WS1-D, WS2-D, WS3-S, WS4-S and WS5-S) to 10 mg/L (WS1-S, WS4-D and WS5-D). The TSS was lower at all locations except WS1-S and WS4-D, when compared to the previous event (Event #9). All results were within the historical range for each location.
- Turbidity results ranged from 0.4 (WS3-S and WS4-D) to 0.9 (WS5-D) NTU<sup>2</sup>. Turbidity was relatively consistent with previous events.

## Nutrients

Nutrient analytical results observed during Event #10 can be summarised as follows:

- Total phosphorous concentrations exceeded the MWG (0.03 mg/L) at WS4-S and WS4-D (both 0.04 mg/L) only. Concentrations at WS4-S and WS4-D were marginally higher than the previous event (Event #9). Total phosphorous concentrations were consistent with previous sampling events at all other locations.
- Reactive phosphorus (RP) concentrations were below the laboratory LoR at all locations. RP concentrations were marginally lower when compared to the previous event (Event #9) but were within historical ranges.
- All nitrogen species were below relevant MWG and RWG assessment criteria. Results were relatively consistent with previous sampling events, with minor decreases observed in all nitrogen species except for ammonia at WS1-S.

## Chlorophyll

All Chlorophyll "A" concentrations were below the MWG (0.003 mg/L) with a range of 0.0006 mg/L (WS2-D and WS5-D) to 0.0009 mg/L (WS4-S) observed. Results from this event were relatively consistent with

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<sup>2</sup> NTU: Nephelometric Turbidity unit, i.e., the unit used to measure the turbidity of a fluid or the presence of suspended particles in water.

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previous events with minor decreases from the previous event (Event#9) observed within the majority of samples.

Low concentrations of Phaeophytin "A" were detected within all samples, with concentrations ranging from 0.0005 mg/L (WS1-S, WS1-D and WS5-S) to 0.0007 mg/L (WS2-S and WS4-D). Results were relatively consistent with the previous event (Event #9).

## Metals and metalloids

Metal analytical results observed during Event #10 can be summarised as follows:

- Dissolved metals:
  - The concentrations of all dissolved metals were below the adopted criteria for all samples.
- Total metals:
  - Total aluminium concentrations were below the LoR at all locations except for WS1-D, WS2-S (both 0.02 mg/L) and WS4-D (0.04 mg/L) during this sampling event. Minor decreases were observed when compared to the previous sampling event.
  - Total iron concentrations were below the LoR at all locations except for WS1-S, WS2-D (both 0.02 mg/L) and WS2-S (0.03 mg/L). All sample concentrations were significantly below the MWG (1 mg/L).

## Hydrocarbons

All hydrocarbon results (BTEX, TRH and PAH) were below their relevant LoR.

## Pesticides

All organochlorine pesticides results were below their relevant LoR.

## PFAS

PFAS analytical results observed during Event #10 can be summarised as follows:

- Perfluorooctanesulfonate (PFOS) exceeded the 99% species protection MWG (0.00023 µg/L) in all samples, ranging from 0.0006 mg/L (WS1-D) to 0.0020 mg/L (WS4-S), with a mean of 0.0009 mg/L observed. The mean concentration during this event was lower than the previous event and significantly lower than the historical mean of 0.0023 mg/L.
- Minor detections of Perfluorohexanesulfonic acid (PFHxS) and/or Perfluorooctanoic acid (PFOA) were observed at all sampling locations. However, all concentrations were significantly below relevant guidelines.
- Total PFAS was relatively consistent between all locations and ranged from 0.001 µg/L (WS1-S, WS1-D and WS2-D) to 0.003 µg/L (WS4-S) with a mean of 0.0018 µg/L, which was significantly lower than the previous event (mean of 0.0031 µg/L) and lower than the historical mean of 0.0062 mg/L.

## Quality control and quality assurance

To maintain a high level of Quality Control and Quality Assurance (QAQC) sampling and analysis was undertaken with reference to relevant guidelines (DER, 2014, NEPC, 2013 and HEPA, 2020) and *Australian Standard 4482.1:1997* (Standards Australia, 2005). Strict hygiene procedures were applied throughout to

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assure a high level of sample integrity and quality was maintained, including the decontamination of all sampling equipment between sampling locations to prevent possible cross-contamination.

In accordance with HEPA (2020) guidance, one field duplicate was collected per 10 primary samples for PFAS analysis. In addition, one field blank, trip blank and field rinsate was collected per day of sampling. The results are presented in Tables F to N and summarised as follows:

- A total of 116 of the 120 (97%) analyte tests performed on the field duplicate sample had a Relative Percentage Difference (RPD) within 30% of the original samples indicating the sampling and analysis procedures applied by RPS and the laboratory were generally reproducible.
- One of the four total duplicate RPD failures were considered insignificant as both the primary and duplicate results were less than 5 x LOR. In such instances the elevated RPD merely indicates that analytical precision decreases as concentrations approach the LoR.
- The remaining RPD exceedances (zinc, PFOS and total positive PFHxS and PFOS) were considered significant as the concentration of either the primary or secondary sample was greater than 5 x LoR. The failures are likely due to minor differences in water quality when sampling. The duplicate sample concentration was higher for all three significant exceedances (zinc, PFOS and total positive PFHxS and PFOS) and as such were used for the data assessment. This exceedance was not considered to have affected the water quality assessment.
- The concentrations of turbidity, naphthalene and total positive PAHs were marginally above their respective LoRs within the field rinsate sample (WR1) and field blank (WB1). Minor exceedances of acceptance criteria (>LoR) are potentially a reflection of the quality of deionised water used for the blank collection.
- All trip blank samples were below their respective LoRs.
- All internal laboratory QAQC procedures (method blanks, matrix spikes, laboratory control standards, internal duplicates) except for the following were within acceptable limits:
  - A number of dissolved metal matrix spikes were outside of general acceptance criteria due to matrix interference and is reflective of the samples and not the methods usedAll other criteria were within acceptable laboratory limits.
- All samples were analysed within the recommended holding time for each analyte with the exception of Chlorophyll "A" and Phaeophytin "A" which were noted to exceed holding time criteria, however, this was due to extract or analysis dates not being provided. As such, the holding times could not be calculated.

The conclusion of the QAQC assessment indicates that sampling and analysis was generally reproducible and complied with accepted standards. As such, the data collected is considered representative of the site and suitable for the data assessment undertaken.

## Conclusions

Surface water monitoring Event #10 was completed on 5 May 2021. Samples were collected from all five of the sampling locations (Figure A). A shallow and deep sample were collected at each sampling point utilising the defined Niskin flask methodology, with the exception of WS3. Due to the shallow nature of WS3 (water column depth approximately ~1.1 m) a shallow sample was collected utilising a surface water sampling pole from a central point in the water column (~0.55 m).

A review of the analytical data collected indicates that the site waters were alkaline, saline and in an oxidising state. Minor exceedances of assessment criteria were noted (DO), however, these conditions are consistent with the marine environment present at the mouth of the Swan River.

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Minor exceedances of total phosphorus MWG (0.03 mg/L) was observed at WS4-S and WS4-D. All other nitrogen and phosphorous concentrations were below relevant criteria. Results were relatively consistent with previous sampling events with marginal decreases observed in all nitrogen species except for ammonia at WS1-S.

The concentrations of all metal and metalloids were below relevant guidelines at all locations. Results were relatively consistent with previous events.

All hydrocarbon and organochlorine pesticides results were below their relevant LoR and as such, adopted criteria in all samples analysed.

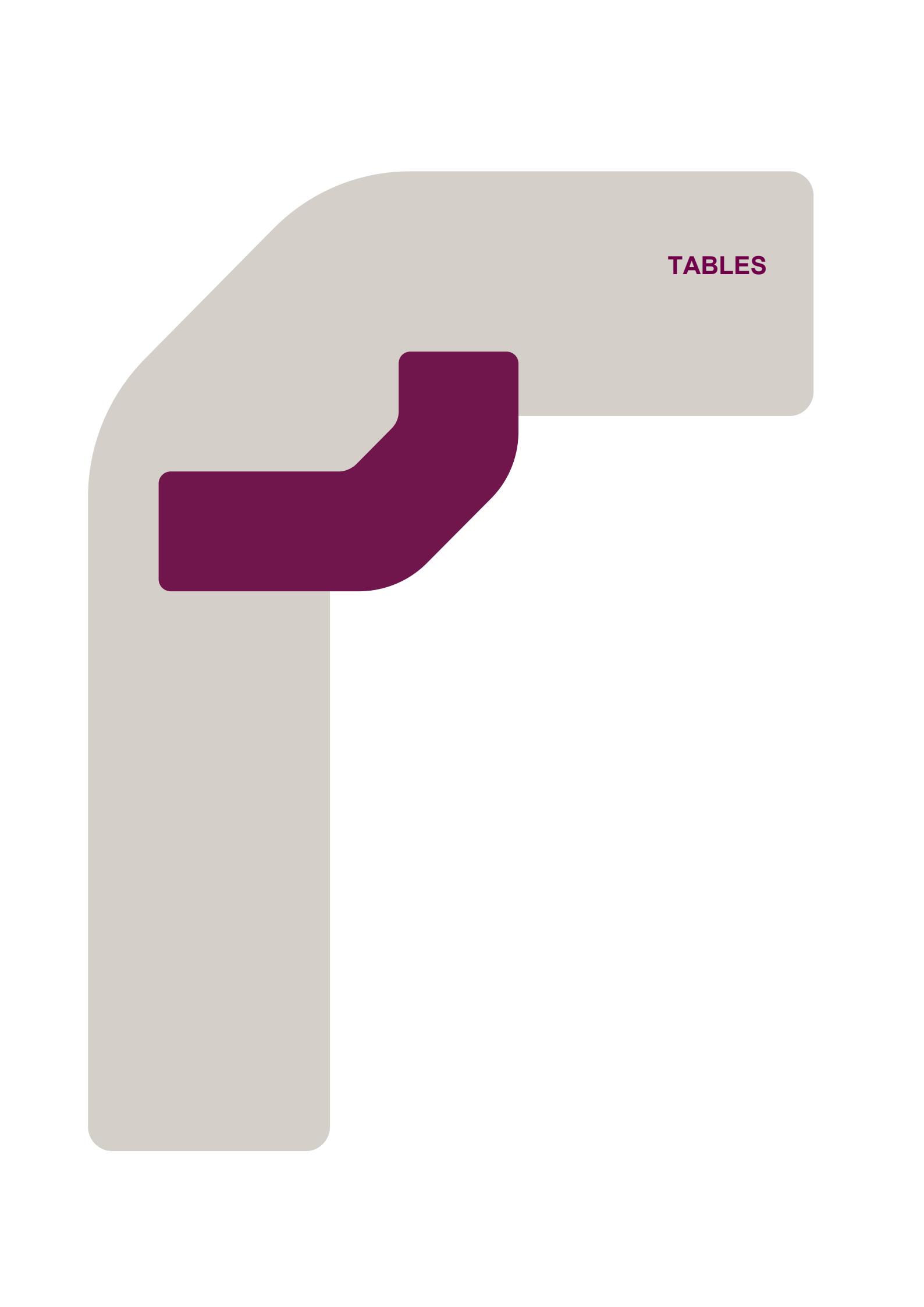
Minor detections of PFAS (PFHxS, PFOS and PFOA), were detected within all samples. The 99% species protection PFOS MWG (0.00023 mg/L) was exceeded in all samples, however, was significantly below the 95% species protection MWG (0.13 mg/L). No exceedances of any other relevant MWG or RWG were noted. Total PFAS concentrations were lower than historical data.

We trust that this is to your satisfaction, should you have any queries please contact the undersigned.



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Enc.           Tables  
Figure A - Water quality sampling locations  
Appendix A – DBCA approval  
Appendix B – Laboratory reports  
Appendix C – Surface water sampling logs



## TABLES

**Table A**  
**Surface Water Results: Field Parameters, ASS, Cations, Nutrients and Miscellaneous**

**Definitions:**

MWG (Marine Water Estuary Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines), ASS (Acid Sulfate Soils) Standing Advice from DWER on dewatering trigger values taken from ASS Guideline Series (2015).

- (No Guideline), --- not tested, LOR (Limit of Reporting), <sup>#</sup> duplicate value

**Notes:**

Guideline values have been adopted from the following guidance documentation:

- Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)

- Assessment and Management of Contaminated Sites (DER 2014)

- Freshwater and Marine Water Quality Guidelines Chapter 3 (ANZECC/ARMCANZ 2000)

All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts), turbidity (NTU) and EC ( $\mu$ S/cm)

a) Values for estuary environments - Table 3.3.6 ANZECC/ARMCANZ 2000 Freshwater and Marine WQ Guidelines Chapter 3

c) Values based on Australian Government, National Health and Medical Research Council, Guideline for Managing Risks in Recreational Water (NHMRC, 2008)

d) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

e) TKN concentration calculated (TKN = TN-NO<sub>x</sub>-N)

Denotes less than LOR

Sample ID	Date	Trigger	Field Parameters				Acid Sulfate Soil Parameters and Anions								ASS Ratios		Cations				Nutrients				Miscellaneous						
			pH	E.C.	Redox	DO	Total Acidity (CaCO <sub>3</sub> )	Total Alkalinity (CaCO <sub>3</sub> )	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN <sup>e</sup>	NH <sub>3</sub> -N	NO <sub>x</sub> -N	Dissolved Organic Carbon (DOC)	Chlorophyll "A"	Phaeophytin "A"	
			Units	pH units	$\mu$ S/cm	mV	%sat	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
			MWG	7.5-8.5	-	-	90-110	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03 <sup>a</sup>	0.005 <sup>a</sup>	0.75 <sup>a</sup>	-	0.62 <sup>b</sup>	0.045 <sup>a</sup>	-	0.003 <sup>a</sup>	-		
			RWG	6.5-8.5 <sup>c</sup>	-	-	>80 <sup>c</sup>	-	-	-	-	-	-	500 <sup>d</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			ASS	<6	-	-	-	>40	-	-	-	-	-	>0.5	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-	-		
			LOR	-	-	-	-	5	5	5	5	0.1	0.5	1	1	0.1	-	-	0.5	0.5	0.5	0.5	0.01	0.005	0.1	0.005	0.005	0.0002			
WS1 - S	10/09/2020			8.18	50,919	80	104	9	120	36,000	<5	0.5	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.006	0.2	0.2	0.009	<0.005	2	0.0012	0.0006
WS1 - S	7/10/2020			8.25	52,200	134	106	7	120	37,000	<5	0.4	0.6	2,300	17,000	<5	0.06	0.14	400	1300	380	10000	0.03	0.007	0.2	0.2	<0.005	<0.005	2	0.0009	0.0005
WS1 - S	5/11/2020			8.11	51,108	128	82	<5	120	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	10000	0.02	0.006	0.2	0.2	0.007	<0.005	3	0.0015	0.0006
WS1 - S	3/12/2020			8.08	49,503	178	86	---	120	37,000	<5	0.8	<0.5	2,700	19,000	<5	---	0.14	410	1300	390	12000	0.02	<0.005	0.6	0.6	<0.005	0.005	3	0.0014	0.0005
WS1 - S	13/01/2021			8.17	54,827	93	102	<5	130	37,000	<5	0.7	0.6	2,800	21,000	1	0.04	0.13	390	1200	390	11000	0.02	0.007	0.3	0.3	<0.005	<0.005	2	0.0017	0.0006
WS1 - S	11/02/2021			8.27	54,769	101	97	<5	130	37,000	20	0.8	<0.5	2,900	20,000	<5	0.04	0.15	400	1200	360	12000	0.02	<0.005	0.5	0.5	<0.005	<0.005	3	0.0025	0.0005
WS1 - S	4/03/2021			8.15	56,880	154	84	<5	120	37,000	<5	0.3	<0.5	3,100	21,000	<5	0.04	0.15	430	1400	410	12000	<0.01	<0.005	0.2	0.2	0.011	<0.005	<1	0.0008	0.0002
WS1 - S	20/04/2021			8.26	52,809	79	86	9	120	37,000	<5	0.6	<0.5	2,700	20,000	<5	0.08	0.14	410	1400	370	12000	0.03	0.006	0.2	0.2	0.01	<1	0.0009	0.0006	
WS1 - S	5/05/2021			8.22	53,594	113	80	8	130	38,000	10	0.8	<0.5	2,500	19,000	<5	0.06	0.13	430	1400	410	12000	0.03	<0.005	<0.5	<0.5	0.012	<0.005	1	0.0008	0.0005
WS1 - D	10/09/2020			8.20	50,935	91	107	9	120	36,000	<5	0.7	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.005	0.2	0.2	0.008	<0.005	2	0.0008	0.0006
WS1 - D	7/10/2020			8.29	53,399	131	104	7	120	37,000	<5	0.5	0.6	2,500	18,000	<5	0.06	0.14	420	1300	400	11000	0.04	0.005	0.1	0.1	0.006	0.007	2	0.0008	0.0004
WS1 - D	5/11/2020			8.12	51,230	125	80	<5	130	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	11000	0.02	0.006	0.2	0.2	0.009	<0.005	3	0.0012	0.0005
WS1 - D	3/12/2020			8.08	49,803	178	87	---	130	37,000	<5	0.8	0.6	2,800	20,000	<5	---	0.14	410	1300	390	12000	0.02	0.005	0.6	0.6	0.006	<0.005	2	0.0011	0.0004
WS1 - D	13/01/2021			8.16	54,836	92	97	<5	130	37,000	<5	0.8	0.7	2,900	21,000	1	0.04	0.14	380	1200	390	11000	0.02	0.006	0.2	0.2	<0.005	<0.005	2	0.0018	0.0006
WS1 - D	11/02/2021			8.27	54,761	100	98	<5	130	38,000	<5	0.6	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.006	0.4	0.4	<0.005	<0.005	3	0.0025	0.0005
WS1 - D	4/03/2021			8.16	56,866	152	86	<5	130	34,000	23	0.8	<0.5	3,000	21,000	<5	0.04	0.14	430	1400	410	12000	<0.01	0.006	0.2	0					

Sample ID	Date	Trigger	Field Parameters					Acid Sulfate Soil Parameters and Anions								ASS Ratios		Cations				Nutrients					Miscellaneous				
			pH	E.C.	Redox	DO	Total Acidity (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN <sup>e</sup>	NH4-N	NOx-N	Dissolved Organic Carbon (DOC)	Chlorophyll "A"	Phaeophytin "A"	
			Units	pH units	µS/cm	mV	%sat	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	0.03 <sup>a</sup>	0.005 <sup>a</sup>	0.75 <sup>a</sup>	-	0.62 <sup>b</sup>	0.045 <sup>a</sup>	-	0.003 <sup>a</sup>	-
			MWG	7.5-8.5	-	-	90-110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03 <sup>a</sup>	0.005 <sup>a</sup>	0.75 <sup>a</sup>	-	0.62 <sup>b</sup>	0.045 <sup>a</sup>	-	0.003 <sup>a</sup>	-	
			RWG	6.5-8.5 <sup>c</sup>	-	-	>80 <sup>c</sup>	-	-	-	-	-	500 <sup>d</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			ASS	<6	-	-	-	>40	-	-	-	>0.5	-	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LOR	-	-	-	-	5	5	5	0.1	0.5	1	1	0.1	-	-	0.5	0.5	0.5	0.5	0.01	0.005	0.1	0.005	0.005	0.005	1	0.0001	0.0002	
WS4-S	7/08/2020		8.27	50,809	106	106	6	130	40,000	16	0.6	0.7	3,100	21,000	---	0.05	0.15	400	1300	370	11000	<0.05	0.006	0.2	0.2	0.008	<0.005	1	0.0005	0.0005	
WS4-S	10/09/2020		7.93	50,651	42	109	9	120	35,000	11	0.5	0.6	2,400	18,000	---	0.08	0.13	390	1200	350	11000	0.03	<0.005	0.2	0.2	0.008	0.01	2	0.0007	0.0007	
WS4-S	7/10/2020		7.82	49,672	55	95	8	120	36,000	<5	0.3	0.8	2,300	17,000	45	0.07	0.14	390	1200	370	10000	0.03	<0.005	0.2	0.2	0.006	0.007	2	0.0016	0.0007	
WS4-S	5/11/2020		7.89	50,039	32	81	7	130	36,000	<5	0.6	<0.5	2,700	19,000	<5	0.05	0.14	340	1100	300	10000	0.02	0.006	0.2	0.2	0.009	0.008	2	0.0013	0.0005	
WS4-S	3/12/2020		7.94	48,677	105	85	---	130	37,000	<5	0.8	0.8	2,700	19,000	45	---	0.14	400	1200	380	12000	0.02	<0.005	0.6	0.6	<0.005	0.01	3	0.0016	0.0006	
WS4-S	13/01/2021		7.88	54,357	145	83	<5	130	38,000	<5	0.6	0.7	2,800	21,000	1	0.04	0.13	390	1200	390	11000	0.03	0.008	0.3	0.3	<0.005	0.01	2	0.0022	0.0007	
WS4-S	11/02/2021		7.99	54,440	100	131	<5	130	37,000	<5	0.8	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.009	0.5	0.5	<0.005	0.016	4	0.003	0.0009	
WS4-S	4/03/2021		8.07	56,909	150	82	<5	120	35,000	8	0.4	0.6	3,000	21,000	45	0.04	0.14	470	1500	440	13000	0.01	0.005	0.2	0.2	0.024	<0.005	<1	0.0006	0.0003	
WS4-S	20/04/2021		8.11	52,228	29	80	8	130	36,000	9	0.4	<0.5	2,700	20,000	<5	0.06	0.14	410	1300	370	11000	0.03	0.008	0.2	0.2	0.024	0.014	<1	0.0015	0.0007	
WS4-S	5/05/2021		8.18	53,220	92	81	10	130	37,000	<5	0.7	<0.5	2,400	18,000	<5	0.08	0.13	460	1500	420	13000	0.04	<0.005	<0.5	<0.5	0.015	<0.005	2	0.0009	0.0006	
WS4-D	7/08/2020		8.27	50,996	108	105	<5	130	40,000	21	0.5	0.7	2,800	20,000	---	0.04	0.14	420	1300	380	12000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0006	
WS4-D	10/09/2020		8.05	50,680	56	112	9	120	35,000	7	0.7	<0.5	2,400	18,000	---	0.08	0.13	370	1200	340	10000	0.03	<0.005	0.2	0.2	0.007	0.008	2	0.0008	0.0006	
WS4-D	7/10/2020		8.04	50,044	63	98	8	120	35,000	<5	0.4	<0.5	2,400	18,000	45	0.07	0.13	410	1300	390	10000	0.03	<0.005	0.1	0.1	0.006	0.01	2	0.0015	0.0006	
WS4-D	5/11/2020		7.97	50,024	40	81	5	120	36,000	6	0.7	<0.5	2,700	19,000	<5	0.04	0.14	350	1200	300	10000	0.02	0.006	0.2	0.2	0.008	0.008	2	0.0012	0.0007	
WS4-D	3/12/2020		7.98	48,630	115	83	---	130	37,000	7	1.1	3.8	2,600	19,000	<5	---	0.14	400	1200	380	12000	0.02	<0.005	0.7	0.7	<0.005	0.008	3	0.0016	0.0006	
WS4-D	13/01/2021		7.98	54,348	124	86	<5	130	37,000	<5	0.6	<0.5	2,800	21,000	1	0.04	0.13	390	1200	390	11000	0.03	0.008	0.2	0.2	<0.005	0.04	2	0.0021	0.0007	
WS4-D	11/02/2021		8.08	54,460	102	133	<5	130	37,000	12	0.4	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.009	0.5	0.5	<0.005	0.011	4	0.003	0.0007	
WS4-D	4/03/2021		8.10	56,910	143	81	<5	130	32,000	<5	0.4	0.6	3,000	21,000	45	0.04	0.14	460	1500	430	13000	0.01	0.005	0.2	0.2	0.023	<0.005	<1	0.0006	0.0004	
WS4-D	20/04/2021		8.26	52,908	25	87	9	120	39,000	5	0.5	<0.5	2,700	20,000	<5	0.08	0.14	410	1400	370	12000	0.03	0.007</								

## Table B

### Surface Water Results: Metals

#### Definitions:

MWG (Marine Water Estuary Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines), ASS (Acid Sulfate Soils) Standing Advice from DWER on dewatering trigger values taken from ASS Guideline Series (2015).  
 - (No Guideline), --- not tested, LOR (Limit of Reporting), \* value for hexavalent chromium, # duplicate value

#### Notes:

Guideline values have been adopted from the following guidance documentation:

- Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes (DER 2015b)
- Assessment and Management of Contaminated Sites (DER 2014)
- Freshwater and Marine Water Quality Guidelines Chapter 3 (ANZECC/ARMCANZ 2000)

All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts), turbidity (NTU) and EC (µS/cm)

a) Chemicals for which possible bioaccumulation and secondary poisoning should be considered

b) Recreational water guideline values based on drinking water guidelines NHMRC & ARMCANZ (2011) Australian Drinking Water Guidelines

Denotes less than LOR

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																Total Metals		
			Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0044	-	0.0001 <sup>a</sup>	-	-	-	-	0.0014	-	-
WS1 - S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	0.0006	0.002	0.02	0.02
WS1 - S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	<0.5	0.0005	0.003	<0.02	0.02
WS1 - S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03
WS1 - S	3/12/2020		0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.011	<0.0005	0.012	<0.002	<0.002	<1	0.0001	0.006	0.03	0.03
WS1 - S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	0.7	<0.0001	0.005	0.04	0.08
WS1 - S	11/02/2021		0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<0.5	<0.0001	0.011	0.03	0.04
WS1 - S	4/03/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.006	0.02	<0.02
WS1 - S	20/04/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.005	<0.02	<0.02
WS1 - S	5/05/2021		<0.02	<0.002	0.003	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<1	<0.0001	0.005	<0.02	0.02
WS1 - D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	0.0006	0.003	0.03	0.04
WS1 - D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	<0.5	<0.0005	0.002	0.02	<0.02
WS1 - D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.03
WS1 - D	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<1	<0.0001	0.004	0.02	0.02
WS1 - D	13/01/2021		0.07	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	0.7	0.0002	0.043	0.05	0.07
WS1 - D	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03
WS1 - D	4/03/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.006	<0.02	0.03
WS1 - D	20/04/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.004	<0.02	<0.02
WS1 - D	5/05/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<1	<0.0001	<0.002	0.02	<0.02
WS2-S	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02
WS2-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	<0.0005	0.003	0.02	0.02
WS2-S	7/10/2020		<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.002	<0.01	<0.001	<0.005	<0.0005	0.011	<0.001	<0.001	0.7	<0.0005	0.003	<0.02	<0.02
WS2-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04
WS2-S	3/12/2020		0.04	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<1	0.0002	0.0099	0.07	0.02
WS2-S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.015	<0.002	<0.002	<0.5	<0.0001	0.002	0.07	0.03
WS2																					

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																	Total Metals	
			Aluminum	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0044	-	0.0001 <sup>a</sup>	-	-	-	-	0.0014	-	-
WS2-S	20/04/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.005	<0.02	<0.02
WS2-S	5/05/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<1	<0.0001	0.005	0.02	0.03
WS2-D	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	---	<0.0001	0.007	0.03	0.02
WS2-D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	0.0006	0.003	0.02	0.02
WS2-D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	0.7	<0.0005	0.003	<0.02	<0.02
WS2-D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.04
WS2-D	3/12/2020		0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.005	0.03	0.04
WS2-D	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	0.9	0.0001	0.004	<0.02	0.03
WS2-D	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03
WS2-D	4/03/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.006	0.03	0.02
WS2-D	20/04/2021		<0.02	<0.002	<0.002	0.0003 <sup>#</sup>	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<0.5	<0.0001	0.005	<0.02	<0.02
WS2-D	5/05/2021		<0.02	<0.002	0.003	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.015	<0.002	<0.002	<1	<0.0001	0.009	<0.02	0.02
WS3-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	<0.0005	0.003	0.05	0.08
WS3-S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.013	<0.001	<0.001	<0.5	<0.0005	0.003	0.02	0.2
WS3-S	5/11/2020		0.07	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.034	0.06	0.05
WS3-S	3/12/2020		0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<1	<0.0001	0.008	0.05	0.09
WS3-S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<0.5	0.0001	0.005	0.02	0.03
WS3-S	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014	<0.002	<0.002	<0.5	<0.0001	0.026	0.14	0.24
WS3-S	4/03/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.004	<0.02	<0.02
WS3-S	20/04/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<0.5	<0.0001	0.003	<0.02	<0.02
WS3-S	5/05/2021		<0.02	<0.002	0.003	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.015	<0.002	<0.002	<1	<0.0001	0.006	<0.02	<0.02
WS4-S	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	---	0.0002	0.004	0.02	0.03
WS4-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	---	<0.0005	0.002	0.02	0.02
WS4-S	7/10/2020		<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.0005	0.012	<0.001	<0.001	0.6	<0.0005	0.003	<0.02	<0.02
WS4-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04
WS4-S	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.013	<0.002	<0.002	<1	<0.0001	0.004	0.03	0.03
WS4-S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.0005	0.014							

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																		Total Metals		
			Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron		
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0044	-	0.0001 <sup>a</sup>	-	-	-	-	0.0014	-	-	1 <sup>b</sup>	
WS5-S	7/10/2020		RWG	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.002	<0.01	<0.001	<0.005	<0.00005	0.024	<0.001	<0.001	0.8	<0.00005	0.004	<0.02	0.02	
WS5-S	5/11/2020		ASS	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.05 <sup>b</sup>	2 <sup>b</sup>	-	0.01 <sup>b</sup>	0.5 <sup>b</sup>	0.001 <sup>b</sup>	-	0.02 <sup>b</sup>	0.01 <sup>b</sup>	-	-	-	-	
WS5-S	3/12/2020		LOR	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
WS5-S	13/01/2021			0.01	0.002	0.001	0.0001	0.002	0.001	0.002	0.05	0.001	0.001	0.00005	0.001	0.001	0.01	0.1	0.00005	0.005	0.01	0.01	
WS5-S	11/02/2021			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.8	0.0001	0.004	0.02	0.02
WS5-S	4/03/2021			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	0.006	<0.002	0.04	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.03
WS5-S	20/04/2021			0.02	0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.008	<0.02	0.02
WS5-S	5/05/2021			<0.02	<0.002	0.003	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.017	<0.002	<0.002	<1	<0.0001	0.006	<0.02	<0.02
WS5-D	7/10/2020			<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	<0.5	<0.00005	0.002	<0.02	<0.02	
WS5-D	5/11/2020			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.04	
WS5-D	3/12/2020			0.04	<0.002	0.002	<0.0002	<0.002	0.005	<0.002	0.04	<0.002	<0.01	<0.00005	0.013	0.022	<0.002	<1	<0.0001	0.019	0.03	0.03	
WS5-D	13/01/2021			0.03	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.8	0.0001	0.01	0.02	0.02
WS5-D	11/02/2021			0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03
WS5-D	4/03/2021			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<1	<0.0001	0.006	0.04	0.02	
WS5-D	20/04/2021			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.005	<0.02	<0.02
WS5-D	5/05/2021			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.015	<0.002	<0.002	<1	<0.0001	0.003	<0.02	<0.02



**Table D**  
**Surface Water Results - OC/OP Pesticides**

## Definitions:

MWG (Marine Water Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines) denotes no guideline, - denotes not tested

- denotes no guideline. --- denotes not tested.

## Notes:

All values in mg/L unless specified otherwise  
All guideline values are adopted from:

All guideline values are adopted from:

<sup>- National Environment Protection (Assessment of Site Contamination) Measure 1999, Guideline on Investigation Levels for Soil and Groundwater (NEPC 2013) Assessment and Management of Contaminated Sites (DWER 2014)</sup>

a) Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered.

b) Chemicals for which possible bioaccumulation and secondary poisoning effects should be considered. Refer to section 8.3.3.4 and 8.3.5.7 of ANZCCER (2011) Australian Drinking Water Guidelines.

b) Recreational water guideline values based on drinking water guidelines NELMRC & Table uses colour coding for data interpretation, avoid black and white reproduction.

Table uses colour coding for data interpretation; avoid black and white reproduction.

denotes <EUR

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**Table E**  
**Surface Water Results: Per- and Poly-Fluoroalkyl Substances**

**Definitions:** LOR (Limits of Reporting), MWG (Marine Water Guideline) -99 (99% species protection level) -95 (95% species protection level), RWG (Recreational Water Guidelines)

- denotes no guideline. --- denotes not tested

## Notes

All values in  $\mu\text{g/L}$  unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction

All guideline values are adopted from the WHO

- PFAS National Report

Denotes <LOR

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10.000-15.000 €

For more information about the study, contact Dr. Michael J. Hwang at (319) 356-4530 or via e-mail at [mhwang@uiowa.edu](mailto:mhwang@uiowa.edu).

**Table E**  
**Surface Water Results: Per- and Poly-Fluoroalkyl Substances**

## Definitions:

LOR (Limits of Reporting), MWG (Marine Water Guideline) -99 (99% species protection level), RWG (Recreational Water Guidelines)

- denotes no guideline. --- denotes not tested.

## Notes

All values in  $\mu\text{g/L}$  unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

All guideline values are adop

- PFAS Nation

Denotes <LOR

---

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10.000-15.000 €

For more information about the study, contact Dr. Michael J. Hwang at (319) 356-4000 or via e-mail at [mhwang@uiowa.edu](mailto:mhwang@uiowa.edu).

For more information about the study, please contact Dr. Michael J. Koenig at (314) 747-2146 or via email at [koenig@dfci.harvard.edu](mailto:koenig@dfci.harvard.edu).

**Table F**  
**Surface Water QAQC Results (RPD Assessment): ASS, Cations, Nutrients and Miscellaneous**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

				denotes <LOR (primary laboratory)									
				denotes <5x LOR (primary laboratory)									
				denotes exceedance of acceptance criteria (30%) where samples <5x LOR									
				denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR									

Sample ID	Sample Type	Date	Trigger	Acid Sulfate Soil Parameters										Cations				Nutrients						Miscellaneous			
				Units	Total Acidity (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN	NH3-N	NOx-N	Dissolved Organic Carbon (DOC)	Chlorophyll "a"	Phaeophytin "a"	
					mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
				LOR	1	1	10	5	0.1	0.1	1	1	0.1	1	1	1	1	0.01	0.005	0.1	0.1	0.005	0.005	1	0.0001	0.0002	
WS2-S	Primary	7/08/2020			6	120	39,000	9	0.6	0.9	2800	20,000	--	420	1300	370	12000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0005	
WZ1	Duplicate				7	120	39,000	6	0.6	0.8	2800	20,000	--	420	1300	370	11000	<0.05	<0.005	0.1	0.1	0.009	<0.005	<1	0.0005	0.0003	
RPD %					15	0	0	40	0	12	0	0	#	0	0	0	9	0	0	0	2	25	0	0	22	50	
WS1-S	Primary	10/09/2020			9	120	36,000	<5	0.5	<0.5	2400	18,000	--	390	1200	360	11000	0.03	0.006	0.2	0.20	0.009	<0.005	2	0.0012	0.0006	
WZ1	Duplicate				9	120	36,000	6	0.7	<0.5	2300	18,000	--	400	1300	360	11000	0.03	<0.005	0.2	0.20	0.008	<0.005	2	0.0012	0.0005	
RPD %					0	0	0	18	33	0	4	0	#	3	8	0	0	0	18	0	0	12	0	0	0	18	
WS3-S	Primary	7/10/2020			7	120	37,000	8	1.6	0.8	2400	18,000	<5	420	1300	400	11000	0.05	0.006	0.2	0.20	0.018	0.043	1	0.0019	0.0009	
WZ1	Duplicate				7	130	37,000	33	0.9	0.7	2400	18,000	<5	410	1300	390	11000	0.05	0.005	0.1	0.10	<0.005	<0.005	1	0.0011	0.0008	
RPD %					0	8	0	122	56	13	0	0	0	2	0	3	0	0	18	67	67	113	158	0	53	12	
WS2-D	Primary	5/11/2020			6	130	36,000	<5	0.8	<0.5	2700	19,000	<5	330	1100	290	9700	0.02	0.006	0.2	0.2	0.006	0.01	3	0.0016	0.0007	
WZ1	Duplicate				7	130	36,000	<5	1	<0.5	2700	19,000	<5	360	1200	320	11000	0.02	0.006	0.2	0.2	0.006	0.01	2	0.0015	0.0006	
RPD %					15	0	0	0	22	0	0	0	0	9	9	10	13	0	0	0	0	0	0	40	6	15	
WS2-S	Primary	3/12/2020			---	130	36,000	<5	0.7	0.6	2700	19,000	<5	400	1300	380	12000	0.02	<0.005	0.8	0.8	<0.005	0.01	3	0.0022	0.0006	
WZ1	Duplicate				---	130	36,000	<5	0.9	0.7	2700	19,000	<5	400	1300	380	12000	0.02	<0.005	0.7	0.7	<0.005	0.011	3	0.0018	0.0006	
RPD %					---	0	0	0	25	15	0	0	0	0	0	0	0	0	0	13	13	0	10	0	20	0	
WS2-S	Primary	13/01/2021			<5	130	38,000	<5	0.5	0.5	2900	21,000	1.3	390	1200	400	11000	0.02	0.005	0.2	0.2	0.006	0.006	1	0.0012	0.0006	
WZ1	Duplicate				<5	130	39,000	<5	0.5	0.5	2800	21,000	1.3	390	1200	390	11000	0.03	0.006	0.2	0.2	0.007	<0.005	2	0.0011	0.0005	
RPD %					0	0	3	0	0	0	4	0	0	0	0	3	0	40	0	0	0	0	0	18	67	9	18
WS3-S	Primary	11/02/2021			<5	130	37,000	38	1.5	<0.5	3000	21,000	<5	370	1200	340	11000	0.03	0.006	0.5	0.5	<0.005	<0.005	3	0.0026	0.001	
WZ1	Duplicate				<5	130	37,000	79	2	<0.5	3000	21,000	<5	390	1200	350	12000	0.1	0.006	0.5	0.5	<0.005	<0.005	2	0.003	0.0021	
RPD %					0	0	0	29	0	0	0	0	5	0	3	9	108	0	0	0	0	0	0	40	14	71	
WS2-D	Primary	4/03/2021			<5	130	34,000	<5	0.7	<0.5	3000	21,000	<5	430	1400	400	12000	0.01	0.006	0.2	0.2	0.021	<0.005	<1	0.0008	0.0003	
WZ1	Duplicate				<5	130	38,000	22	0.5	0.9	3000	21,000	<5	470</td													

**Table G**  
**Surface Water QAQC Results (RPD Assessment): Metals**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denoted not calculated.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

					denotes <LOR (primary laboratory)														
					denotes <5x LOR (primary laboratory)														
					denotes exceedance of acceptance criteria (30%) where samples <5x LOR														
					denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR														

Sample ID	Sample Type	Date	Trigger	Dissolved Metals & Metalloids																Total Metals				
				Units	Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Lead	Mercury	Manganese	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron	
					mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
				LOR	0.01	0.001	0.001	0.0001	0.002	0.001	0.02	0.05	0.001	0.00005	0.001	0.001	0.001	0.01	0.0002	0.00005	0.001	0.01	0.02	
WS2-S	Primary	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.012	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02	
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.013	<0.002	<0.002	---	<0.0001	0.004	0.03	0.02	
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	#	0	29	40	0	
WS1-S	Primary	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	<0.00005	<0.005	0.012	<0.001	<0.001	---	0.00006	0.002	0.02	0.02	
WZ1	Duplicate			<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	<0.00005	<0.005	0.013	<0.001	<0.001	---	<0.00005	0.003	0.02	0.03	
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	#	18	40	0	40	
WS3-S	Primary	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.001	<0.00005	<0.005	0.013	<0.001	<0.001	<5	<0.00005	0.003	0.02	0.04	
WZ1	Duplicate			<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.01	<0.001	<0.00005	<0.005	0.012	<0.001	<0.001	<5	<0.00005	0.004	<0.02	0.2	
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	29	0	133	
WS2-D	Primary	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.013	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.04	
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.013	<0.002	<0.002	<0.5	<0.0001	0.005	0.03	0.04	
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	
WS2-S	Primary	3/12/2020		0.04	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.012	<0.002	<0.002	<1	0.0002	0.0099	0.07	0.02	
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.013	<0.002	<0.002	<1	<0.0001	0.005	<0.02	0.02	
RPD %				67	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	66	111	0	
WS3-S	Primary	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.014	<0.002	<0.002	<0.5	0.0001	0.005	0.02	0.03	
WZ1	Duplicate			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.016	<0.002	<0.002	0.5	<0.0001	0.005	<0.02	0.02	
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	40	
WS3-S	Primary	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	0.014	<0.002	<0.002	<0.5	<0.0001	0.026	0.14	0.24		
WZ1	Duplicate			<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.008	0.19	0.29		
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	106	30	19
WS2-D	Primary	4/03/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.02	<0.002	<0.00005	<0.01	0.013	<0.002	<0.002	<1	<0.0001	0.			

**Table H**  
**Surface Water QAQC Results (RPD Assessment): MTBE, BTEX and TRP**

## Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

#### **Notes:-**

All values in mg/l unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <1 LOB (primary laboratory)

denotes <LOD (primary laboratory)

denotes <5x LOR (primary laboratory)  
denotes exceedance of acceptance criteria (30%) where samples <5x LOR  
denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR

**Table I**  
**Surface Water QAQC Results (RPD Assessment): OC/OP Pesticides**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denoted not calculated.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes <5x LOR (primary laboratory)

denotes exceedance of acceptance criteria (30%) where samples <5x LOR

denotes exceedance of acceptance criteria (30%) where sample(s) >5x LOR

Sample ID	Sample type	Date	Trigger	Organochlorine Pesticides																																							
				Aldrin		a-BHC		b-BHC		d-BHC		g-BHC (Lindane)		a-Chlordane		g-Chlordane		DDD		DDE		DDT		DDD + DDE + DDT		Dieldrin		a-Endosulfan		b-Endosulfan		Endosulfan sulphate		Endrin		Heptachlor		Heptachlor epoxide		Hexachlorobenzene		Methoxychlor	
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L										
				LOR	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00006	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002									
WS2-S	Primary	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001													
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001													
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS1-S	Primary	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS3-S	Primary	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS2-D	Primary	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001												
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
WS2-S	Primary	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001											
WZ1	Duplicate			<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.0																									

**Table J**  
**Surface Water QAQC Results (RPD Assessment): Per- and Poly-Fluoroalkyl Substances**

## Definitions:

LOR 1° (Limit of Reporting, Primary Laboratory). --- denotes not tested. # denotes not calculated.

Notes

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory

denotes <5x LOR (primary laboratory)

denotes exceedance of acceptance criteria (30%) where samples <5x LOQ

denotes exceedance of acceptance criteria (30%) where sample(s) >5x L

**Table K**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): Metals and Turbidity**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample Type	Date	Trigger	Dissolved Metals & Metalloids																Total Metals	Turbidity			
				Aluminium	Antimony	Arsenic	Cadmium	Cobalt	Chromium	Copper	Iron	Manganese	Mercury	Molybdenum	Nickel	Lead	Selenium	Silicon	Silver	Zinc				
				Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				
				LOR	0.01	0.001	0.001	0.0001	0.001	0.001	0.01	0.005	0.00005	0.001	0.001	0.001	0.001	0.1	0.00005	0.001	0.01	0.01		
<b>Rinsates</b>																								
WR1	Water	7/08/2020		<0.01	<0.001	<0.001	0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.2	
WR1	Water	10/09/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.1	
WR1	Water	7/10/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.02	<0.1	
WR1	Water	5/11/2020		<0.01	<0.001	<0.001	0.0002	<0.001	<0.001	0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	0.3	<0.00005	0.005	<0.01	<0.01	0.3	
WR1	Water	3/12/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	0.008	0.01	<0.005	<0.00005	<0.001	<0.001	0.021	<0.001	---	<0.00005	0.015	<0.01	0.02	0.5	
WR1	Water	13/01/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	0.2	<0.00005	<0.001	<0.01	<0.02	<0.1	
WR1	Water	11/02/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.01	<0.00005	<0.002	<0.002	<0.002	<0.002	0.2	<0.00001	0.006	<0.02	0.02	0.2	
WR1	Water	4/03/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	0.001	<0.01	<0.01	0.4	
WR1	Water	20/04/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	0.004	<0.01	<0.01	0.4	
WR1	Water	5/05/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	<0.001	<0.01	<0.01	0.4	
<b>Field Blank</b>																								
WB1	Water	7/08/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.2	
WB1	Water	10/09/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.01	0.1	
WB1	Water	7/10/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	---	<0.00005	<0.001	<0.01	<0.02	<0.1	
WB1	Water	5/11/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	0.3	<0.00005	<0.001	<0.01	<0.01	0.2	
WB1	Water	3/12/2020		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	<0.001	<0.01	<0.01	0.1	
WB1	Water	13/01/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	0.2	<0.00005	<0.001	<0.01	<0.02	<0.1	
WB1	Water	11/02/2021		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.01	<0.005	<0.00005	<0.002	<0.002	<0.002	<0.002	0.2	<0.00001	0.006	<0.02	<0.02	0.2
WB1	Water	4/03/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	0.2	<0.00005	<0.001	<0.01	<0.01	0.3	
WB1	Water	20/04/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	<0.001	<0.01	<0.01	0.4	
WB1	Water	5/05/2021		<0.01	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.005	<0.00005	<0.001	<0.001	<0.001	<0.001	<0.1	<0.00005	<0.001	<0.01	<0.01	0.2	

**Table L**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): MTBE, BTEX and TRH**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample type	Date	Trigger	MTBE		BTEX					TRH					Polycyclic Aromatic Hydrocarbons													
				MTBE	Benzene	Toluene	Ethylbenzene	m+p-xylylene	o-xylene	F1: C6-C10 minus	F2: C>10-C16 minus N	F3: C>16-C34	F4: C>34-C40	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j+k)fluoranthene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Total Carcinogenic PAHs	Total Positive PAHs
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L		
<b>Rinsates</b>																													
WR1	Water	7/08/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WR1	Water	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WR1	Water	7/10/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	3/12/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	13/01/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	11/02/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	4/03/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	<0.0001
WR1	Water	20/04/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	0.0022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	0.0022
WR1	Water	5/05/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	0.0013	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0005	0.0013
<b>Field Blank</b>																													
WB1	Water	7/08/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	
WB1	Water	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	
WB1	Water	7/10/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	
WB1	Water	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	
WB1	Water	3/12/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	
WB1	Water	13/01/2021		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	&																		

**Table M**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): OC/OP Pesticides**

**Definitions:**

LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

**Notes:**

All values in mg/L unless specified otherwise

Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample type	Date	Trigger	Organochlorine Pesticides																				
				Aldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)		a-Chlordane	g-Chlordane	DDD	DDE	DDT	DDD + DDE + DDT	Dieldrin	a-Endosulfan	b-Endosulfan	Endosulfan sulphate	Endrin	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
<b>Rinsates</b>																								
WR1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	13/01/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	11/02/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	4/03/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	20/04/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WR1	Water	5/05/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
<b>Field Blank</b>																								
WB1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	13/01/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	11/02/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	4/03/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00002	
WB1	Water	20/04/2021		&																				

**Table N**  
**Surface Water QAQC Results (Rinsate, Field Blank and Trip-Blank): Per- and Poly-Fluoroalkyl Substances**

**Definitions:**  
LOR 1° (Limit of Reporting, Primary Laboratory), --- denotes not tested.

Notes

**Notes:**  
All values in mg/L unless specified otherwise  
Table uses colour coding for data interpretation, avoid black and white reproduction.

denotes < LOR (primary laboratory)  
denotes exceedance of acceptance criteria > LOR

**FIGURE**





**Figure A**  
**Swan River crossing**  
**Water quality sampling locations**

Document Path: G:\Jobs\C\_Jobs\C20078 - MRWA SR Bridge\Figures C20078-004\C20078-004\_G\_001\_Fig A Proposed WQ Sampling\_200629.mxd

## **Appendix A**

### **DBCA Approval**

2020/1928  
PERMIT P12652

Pursuant to Part 4 (Regulation 29) of the Swan and Canning Rivers Management Regulations 2007, this is to certify that a permit is issued to the person(s) or organisation described hereunder as permit holder and that person(s) or organisation is permitted to carry out the authorised works, acts or activities for the duration specified, subject to the conditions listed below.

Permit holder: Main Roads Western Australia (John Braid)

Authorised works, acts or activities: Swan River Crossings Project – In-river scientific investigations – sampling suite includes contaminants, water quality, benthic habitat and sediment analysis

Location of works, acts or activities: Swan River between Fremantle Traffic Bridge and Stirling Bridge, Fremantle; and Lot 2010 on Plan 18598 and Lot 1941 on Plan 213981

Approval date: 2 October 2020

Expiry date: 31 December 2021

## CONDITIONS

1. The applicant shall notify the Department of Biodiversity, Conservation and Attractions in writing not less than three (3) days prior to the commencement of works (see **Advice Note 1**).
2. The applicant shall ensure that all contractors and personnel involved in the investigations approved by the Department of Biodiversity, Conservation and Attractions are familiar with the conditions and requirements of this approval at all times.
3. The works shall take place in accordance with the methodologies provided in the *Swan River Crossings Project-Environmental (in-river) Surveys September 2020 V6.0*, unless modified by a condition of this approval.
4. The results of the benthic habitat surveys, once collated, shall be provided to the Department of Biodiversity, Conservation and Attractions (see **Advice Note 1**).
5. Further to **Condition 4**, the applicant shall undertake any necessary additional sampling and/or modify the scientific investigation methodologies as required by the Department of Biodiversity, Conservation and Attractions on review of the results of the benthic habitat surveys and deduced potential impacts to known benthic habitat and communities.
6. The applicant shall ensure that all equipment is visually inspected for any traces of aquatic organisms and shall remove the organisms prior to the equipment entering the Swan Canning Development Control Area.
7. The applicant shall monitor all works and ensure that appropriate measures are implemented to contain turbidity and prevent sediment plumes spreading and shall have a silt curtain readily available to deploy in order to contain any turbidity and sediment plumes that are uncontrolled or move beyond the immediate area of works (see **Advice Note 2**).
8. Water-based activities shall cease if a dolphin comes within 50 metres of any water vessel involved in the approved activities and shall not recommence until any dolphin has moved away more than 200 metres or has not been observed for 20 minutes.
9. Any refuelling shall take place outside of the Swan Canning Development Control Area or at a licensed refuelling facility.

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10. A spill kit shall be maintained on all vessels and shall be utilised to contain and clean up any spills that occur.
11. The applicant shall take all precautions to ensure no damage to the foreshore, riverbank or waterway (including infrastructure and vegetation) occurs as a result of the works. Should any inadvertent damage occur, the applicant is required to notify the Department of Biodiversity, Conservation and Attractions within 48 hours of that damage occurring (see **Advice Note 2**).
12. The applicant shall rectify at its expense any damage to the foreshore, riverbank or waterway (including infrastructure and vegetation) that occurs as a result of the works.
13. Within 24 hours of the completion of the activities, the applicant shall remove all waste materials, equipment and machinery.
14. An electronic copy of the report, addressing the findings of the scientific investigations approved under this permit shall be forwarded to the Department of Biodiversity, Conservation and Attractions prior to the expiration of this permit (see **Advice Note 1**).

**ADVICE TO APPLICANT**

1. Notifications and information can be emailed to [rivers.planning@dbca.wa.gov.au](mailto:rivers.planning@dbca.wa.gov.au).
2. In the event of spills, waste materials impacting the river or turbidity or sediment plumes, the Department of Biodiversity, Conservation and Attractions' Duty Officer (Riverpark) can be contacted on 9278 0981 (24 hrs) or Pollution Response Officer (Marine) on 9480 9924 (24 hrs).
3. The Department of Transport (DoT) Navigational Safety advises the applicant that:
  - Main Roads Western Australia (MRWA) and/or its contractors are to develop a communication plan with Commercial Ferry Operators and are to consult with commercial operators to gain comment and support for the Vessel Management Plan [Regarding 4.2 Legislative and Other Provisions (page 13 of the Vessel Management Plan): Should also include the '*Western Australian Marine Act 1982*' and the '*Marine Safety (Domestic Commercial Vessel) National Law Act 2012*'];
  - MRWA and/or its contractors are to monitor VHF Channel 16 during operating hours;
  - The works area and any hazards should be marked with yellow special marker buoys, approximately 1 metre in height equipped with flashing yellow lights;
  - All vessels taking part in the works must display shapes and lights in accordance with the Prevention of Collisions at Sea Regulations 1983 at all times;
  - Should diving operations be conducted between the Fremantle Rail Bridge and Fremantle Traffic Bridge, a closure of the respective navigation span will be required;
  - Navigational channels are to remain open wherever possible and only one navigation span is to be impeded at any one time;
  - Any anchor points which encroach the channel should be marked;
  - A Temporary Notice to Mariners (TNTM) must be issued by DoT outlining the scope of the works, the works area, navigational marking (lighting) and dates of the works, prior to commencement. MRWA and/or its contractors are to provide notification of the works to DoT a minimum of 21 days prior to the works commencing to enable a TNTM to be published, by email to: [navigational.safety@transport.wa.gov.au](mailto:navigational.safety@transport.wa.gov.au);
  - MRWA and/or its contractors are to provide sufficient notification of any ad hoc day closures of navigational channels so that a TNTM can be published to alert mariners; and



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- MRWA and/or its contractors are to seek approval from Fremantle Ports Authority for any works to the west of the Fremantle Traffic and Rail Bridges.
4. The applicant is advised that the proposed works are located in a high to moderate and moderate to low acid sulphate soils risk area. The Acid Sulfate Soils Guideline Series for guidance on the identification, assessment and management of acid sulphate soils in Western Australia is available from the Department of Water and Environmental Regulation website at [www.dwer.wa.gov.au](http://www.dwer.wa.gov.au). If any acid sulfate soils are exposed during the works the Department of Water and Environmental Regulation should be contacted for further advice.
5. The applicant is advised that this approval does not negate the need to obtain any other approval from relevant agencies, or from the Department of Biodiversity, Conservation and Attractions.

**PERMIT APPROVED**

Signed:  Date: 02/10/20

Jacey Mills  
Manager, Statutory Assessments  
As delegate of CEO  
Under Section 38 of the SCRM Act 2006

## **Appendix B**

### **Laboratory reports**

## CERTIFICATE OF ANALYSIS 261391

### **Client Details**

<b>Client</b>	RPS Australia West Pty Ltd
<b>Attention</b>	Zac Langtry
<b>Address</b>	Level 2, 27-31 Troode St, WEST PERTH, WA, 6005

### **Sample Details**

<b>Your Reference</b>	<b>EEL20092.001 Fremantle Port</b>
<b>Number of Samples</b>	13 Water
<b>Date samples received</b>	06/05/2021
<b>Date completed instructions received</b>	06/05/2021

### **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**

<b>Date results requested by</b>	20/05/2021
<b>Date of Issue</b>	20/05/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

### Results Approved By

Heram Halim, Operations Manager  
Travis Carey, Organics - Team Leader

### Authorised By



Michael Kubiak, Laboratory Manager

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Total Dissolved Solids (grav)	mg/L	5	38,000	40,000	38,000	39,000	39,000
Total Suspended Solids	mg/L	5	10	<5	5	<5	<5
Turbidity	NTU	0.1	0.8	0.5	0.6	0.5	0.4
Dissolved Organic Carbon	mg/L	1	1	1	2	1	1
Acidity as CaCO <sub>3</sub>	mg/L	5	8	7	8	7	8
Sulphide in water*	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Total Dissolved Solids (grav)	mg/L	5	37,000	36,000	37,000	38,000	37,000
Total Suspended Solids	mg/L	5	<5	10	<5	10	<5
Turbidity	NTU	0.1	0.7	0.4	0.5	0.9	0.6
Dissolved Organic Carbon	mg/L	1	2	1	<1	1	1
Acidity as CaCO <sub>3</sub>	mg/L	5	10	8	8	8	8
Sulphide in water*	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics				
Our Reference	UNITS	PQL	261391-11	261391-12
Your Reference			WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date prepared	-		07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021
Turbidity	NTU	0.1	0.2	0.4

Ionic Balance							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Calcium - Dissolved	mg/L	0.5	430	450	430	430	440
Potassium - Dissolved	mg/L	0.5	410	420	400	400	400
Magnesium - Dissolved	mg/L	0.5	1,400	1,400	1,400	1,300	1,400
Sodium - Dissolved	mg/L	0.5	12,000	13,000	12,000	12,000	13,000
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	130	120	130	120	130
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Hydroxide OH <sup>-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	130	120	130	120	130
Chloride	mg/L	1	19,000	19,000	19,000	19,000	18,000
Sulphate	mg/L	1	2,500	2,600	2,500	2,500	2,400
Ionic Balance	%		6.7	9.4	7.1	6.7	9.7
Hardness as CaCO <sub>3</sub>	mg/L	3	6,700	7,000	6,700	6,600	6,900

Ionic Balance							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Calcium - Dissolved	mg/L	0.5	460	430	440	440	460
Potassium - Dissolved	mg/L	0.5	420	400	400	410	420
Magnesium - Dissolved	mg/L	0.5	1,500	1,400	1,400	1,400	1,500
Sodium - Dissolved	mg/L	0.5	13,000	12,000	12,000	13,000	13,000
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	130	130	130	120	120
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Hydroxide OH <sup>-</sup> as CaCO <sub>3</sub>	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	130	130	130	120	120
Chloride	mg/L	1	18,000	19,000	19,000	19,000	19,000
Sulphate	mg/L	1	2,400	2,500	2,500	2,500	2,500
Ionic Balance	%		12	7.9	7.6	10	10
Hardness as CaCO <sub>3</sub>	mg/L	3	7,200	6,700	6,800	6,900	7,200

<b>Nutrients in Water</b>							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	06/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	06/05/2021	07/05/2021
Total Nitrogen	mg/L	0.1	<0.5	<0.5	<0.5	<0.5	<0.5
NOx as N	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia as N	mg/L	0.005	0.012	0.014	0.012	0.011	0.013
Total Phosphorus	mg/L	0.01	0.03	0.03	0.03	0.03	0.03
Phosphate as P	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005

<b>Nutrients in Water</b>							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Total Nitrogen	mg/L	0.1	<0.5	<0.5	<0.5	<0.5	<0.5
NOx as N	mg/L	0.005	<0.005	<0.005	<0.005	0.010	<0.005
Ammonia as N	mg/L	0.005	0.015	0.016	0.014	0.012	0.015
Total Phosphorus	mg/L	0.01	0.04	0.04	0.03	0.03	0.03
Phosphate as P	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Dissolved Metals in Water							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Arsenic-Dissolved	mg/L	0.001	0.003	0.002	0.002	0.003	0.003
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.014	0.014	0.014	0.015	0.015
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.005	<0.002	0.005	0.009	0.006
Silicon - Dissolved	mg/L	0.1	<1	<1	<1	<1	<1

Dissolved Metals in Water							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Arsenic-Dissolved	mg/L	0.001	0.002	0.002	0.003	0.002	0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.015	0.014	0.017	0.015	0.013
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.003	0.004	0.006	0.003	0.006
Silicon - Dissolved	mg/L	0.1	<1	<1	<1	<1	<1

<b>Dissolved Metals in Water</b>				
Our Reference	UNITS	PQL	261391-11	261391-12
Your Reference			WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date prepared	-		11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.00005	<0.00005
Aluminium-Dissolved	mg/L	0.01	<0.01	<0.01
Arsenic-Dissolved	mg/L	0.001	<0.001	<0.001
Cadmium-Dissolved	mg/L	0.0001	<0.0001	<0.0001
Cobalt-Dissolved	mg/L	0.001	<0.001	<0.001
Chromium-Dissolved	mg/L	0.001	<0.001	<0.001
Copper-Dissolved	mg/L	0.001	<0.001	<0.001
Iron-Dissolved	mg/L	0.01	<0.01	<0.01
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.005	<0.005
Molybdenum-Dissolved	mg/L	0.001	<0.001	<0.001
Nickel-Dissolved	mg/L	0.001	<0.001	<0.001
Lead-Dissolved	mg/L	0.001	<0.001	<0.001
Antimony-Dissolved	mg/L	0.001	<0.001	<0.001
Selenium-Dissolved	mg/L	0.001	<0.001	<0.001
Zinc-Dissolved	mg/L	0.001	<0.001	<0.001
Silicon - Dissolved	mg/L	0.1	<0.1	<0.1

<b>Total Metals in water</b>							
Our Reference			261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date digested	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Aluminium-Total	mg/L	0.01	<0.02	0.02	0.02	<0.02	<0.02
Iron-Total	mg/L	0.01	0.02	<0.02	0.03	0.02	<0.02

<b>Total Metals in water</b>							
Our Reference			261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date digested	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021	11/05/2021	11/05/2021	11/05/2021
Aluminium-Total	mg/L	0.01	<0.02	0.04	<0.02	<0.02	<0.02
Iron-Total	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02

<b>Total Metals in water</b>				
Our Reference			261391-11	261391-12
Your Reference	UNITS	PQL	WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date digested	-		11/05/2021	11/05/2021
Date analysed	-		11/05/2021	11/05/2021
Aluminium-Total	mg/L	0.01	<0.01	<0.01
Iron-Total	mg/L	0.01	<0.01	<0.01

**Chlorophyll a & Phaeophytin a**

Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	0.8	0.7	0.8	0.6	0.7
Phaeophytin a	µg/L	0.2	0.5	0.5	0.7	0.6	0.6

**Chlorophyll a & Phaeophytin a**

Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	0.9	0.8	0.7	0.6	1.2
Phaeophytin a	µg/L	0.2	0.6	0.7	0.5	0.6	0.7

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<50	<100	<100	<100	<50
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<50	<100	<100	<100	<50
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<50	<100	<100	<100	<50
MTBE	µg/L	1	<3	<5	<5	<5	<3
Benzene	µg/L	1	<3	<5	<5	<5	<3
Toluene	µg/L	1	<3	<5	<5	<5	<3
Ethylbenzene	µg/L	1	<3	<5	<5	<5	<3
m+p-xylene	µg/L	2	<6	<10	<10	<10	<6
o-xylene	µg/L	1	<3	<5	<5	<5	<3
Naphthalene	µg/L	1	<3	<5	<5	<5	<3
Surrogate Dibromofluoromethane	%		99	99	101	100	101
Surrogate toluene-d8	%		100	100	101	100	100
Surrogate 4-BFB	%		97	97	101	100	100

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<50	<50	<50	<100	<50
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<50	<50	<50	<100	<50
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<50	<50	<50	<100	<50
MTBE	µg/L	1	<3	<3	<3	<5	<3
Benzene	µg/L	1	<3	<3	<3	<5	<3
Toluene	µg/L	1	<3	<3	<3	<5	<3
Ethylbenzene	µg/L	1	<3	<3	<3	<5	<3
m+p-xylene	µg/L	2	<6	<6	<6	<10	<6
o-xylene	µg/L	1	<3	<3	<3	<5	<3
Naphthalene	µg/L	1	<3	<3	<3	<5	<3
Surrogate Dibromofluoromethane	%		103	102	100	102	102
Surrogate toluene-d8	%		100	99	100	100	101
Surrogate 4-BFB	%		100	99	100	99	101

vTRH(C6-C10)/MBTEXN in water					
Our Reference	UNITS	PQL	261391-11	261391-12	261391-13
Your Reference			WB1	WR1	WTB1
Date Sampled			05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water
Date analysed	-		07/05/2021	07/05/2021	07/05/2021
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	<10	<10	<10
TRH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	µg/L	10	<10	<10	<10
MTBE	µg/L	1	<1	<1	<1
Benzene	µg/L	1	<1	<1	<1
Toluene	µg/L	1	<1	<1	<1
Ethylbenzene	µg/L	1	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1
Naphthalene	µg/L	1	1	1	1
Surrogate Dibromofluoromethane	%		91	95	94
Surrogate toluene-d8	%		102	99	101
Surrogate 4-BFB	%		97	97	97

svTRH(C10-C40) in water							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Date analysed	-		13/05/2021	13/05/2021	13/05/2021	13/05/2021	13/05/2021
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		79	89	85	85	92

svTRH(C10-C40) in water							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Date analysed	-		13/05/2021	13/05/2021	13/05/2021	13/05/2021	13/05/2021
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		85	83	81	82	79

svTRH(C10-C40) in water				
Our Reference	UNITS	PQL	261391-11	261391-12
Your Reference			WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date extracted	-		10/05/2021	10/05/2021
Date analysed	-		13/05/2021	13/05/2021
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	<100	<100
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less N (F2)	µg/L	50	<50	<50
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	<100	<100
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	<100	<100
Surrogate o-Terphenyl	%		88	82

PAHs in Water							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D <sub>14</sub>	%		95	94	111	92	97

PAHs in Water							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D <sub>14</sub>	%		97	95	102	101	94

PAHs in Water				
Our Reference	UNITS	PQL	261391-11	261391-12
Your Reference			WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date extracted	-		07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021
Naphthalene	µg/L	0.1	1.3	1.4
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1
Dibeno(a,h)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	1.3	1.4
Surrogate p-Terphenyl-D <sub>14</sub>	%		99	92

Low Level OCP in water							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		103	98	113	98	100

Low Level OCP in water							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		07/05/2021	07/05/2021	07/05/2021	07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021	10/05/2021	10/05/2021	10/05/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		101	99	101	102	100

Low Level OCP in water				
Our Reference	UNITS	PQL	261391-11	261391-12
Your Reference			WB1	WR1
Date Sampled			05/05/2021	05/05/2021
Type of sample			Water	Water
Date extracted	-		07/05/2021	07/05/2021
Date analysed	-		10/05/2021	10/05/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		98	89

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021
Date analysed	-		12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexamersulfonic acid	µg/L	0.0002	0.0005	0.0004	0.0004	0.0003	0.0004
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0007	0.0006	0.001	0.0007	0.0008
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	<0.0002	0.0002	0.0003	0.0003	0.0003
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		97	90	107	107	97
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		90	92	88	89	86
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		90	87	81	83	76
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		91	79	84	87	86
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		81	87	76	78	83
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		68	65	65	65	58

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	261391-1	261391-2	261391-3	261391-4	261391-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		85	84	81	82	76
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		104	102	102	101	97
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		92	91	91	88	85
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		119	113	115	115	111
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		98	91	94	93	90
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		129	126	122	120	119
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		110	110	110	111	106
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		122	131	128	134	121
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		71	79	75	80	72
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		113	106	109	114	109
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		92	85	84	94	82
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		98	68	87	90	83
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		70	58	62	61	61
Extracted ISTD d <sub>3</sub> N MeFOSA	%		45	24	33	36	37
Extracted ISTD d <sub>5</sub> N EtFOSA	%		42	25	33	35	38
Extracted ISTD d <sub>7</sub> N MeFOSE	%		85	68	74	76	86
Extracted ISTD d <sub>9</sub> N EtFOSE	%		84	72	79	77	84
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		150	130	150	146	138
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		128	118	115	111	112
Total Positive PFHxS & PFOS	µg/L	0.0002	0.001	0.001	0.001	0.001	0.001
Total Positive PFOS & PFOA	µg/L	0.0002	0.0007	0.0008	0.001	0.001	0.001
Total Positive PFAS	µg/L	0.0002	0.001	0.001	0.002	0.001	0.002

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021
Date analysed	-		12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	0.0009	0.0007	0.0006	0.0006	0.0009
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.001	0.001	0.0008	0.0009	0.0020
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	0.0006	0.0005	<0.0004	<0.0004	0.0006
Perfluoroheptanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0005	0.0004	0.0003	0.0003	0.0005
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		97	111	93	107	116
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		88	90	89	86	85
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		81	94	77	87	89
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		87	92	81	96	92
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		88	84	90	84	77
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		56	63	62	63	58

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	261391-6	261391-7	261391-8	261391-9	261391-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			05/05/2021	05/05/2021	05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		78	85	82	85	79
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		99	109	104	105	101
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		88	95	91	94	93
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		119	130	117	125	122
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		97	109	94	102	99
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		130	150	130	140	133
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		113	127	119	125	123
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		134	141	136	136	143
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		71	84	77	69	82
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		120	138	115	121	117
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		99	105	88	99	97
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		101	117	90	100	92
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		69	74	60	72	65
Extracted ISTD d <sub>3</sub> N MeFOSA	%		44	43	23	49	34
Extracted ISTD d <sub>5</sub> N EtFOSA	%		42	41	22	47	35
Extracted ISTD d <sub>7</sub> N MeFOSE	%		94	100	74	97	88
Extracted ISTD d <sub>9</sub> N EtFOSE	%		97	99	74	93	87
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		159	184	144	153	162
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		121	148	118	129	134
Total Positive PFHxS & PFOS	µg/L	0.0002	0.002	0.002	0.001	0.002	0.0029
Total Positive PFOS & PFOA	µg/L	0.0002	0.002	0.001	0.001	0.001	0.0025
Total Positive PFAS	µg/L	0.0002	0.0030	0.0026	0.002	0.002	0.0040

PFAS in water TRACE Extended					
Our Reference	UNITS	PQL	261391-11	261391-12	261391-13
Your Reference			WB1	WR1	WTB1
Date Sampled			05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water
Date prepared	-		12/05/2021	12/05/2021	12/05/2021
Date analysed	-		12/05/2021	12/05/2021	12/05/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		102	111	98
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		87	84	92
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		92	84	96
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		86	87	92
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		77	81	89
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		101	102	102

PFAS in water TRACE Extended					
Our Reference	UNITS	PQL	261391-11	261391-12	261391-13
Your Reference			WB1	WR1	WTB1
Date Sampled			05/05/2021	05/05/2021	05/05/2021
Type of sample			Water	Water	Water
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		99	97	99
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		110	112	116
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		95	101	98
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		121	124	120
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		101	102	105
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		131	140	131
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		115	121	126
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		120	144	148
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		56	71	67
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		145	142	149
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		108	106	113
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		104	101	107
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		74	72	75
Extracted ISTD d <sub>3</sub> N MeFOSA	%		43	41	37
Extracted ISTD d <sub>5</sub> N EtFOSA	%		43	42	40
Extracted ISTD d <sub>7</sub> N MeFOSE	%		91	85	89
Extracted ISTD d <sub>9</sub> N EtFOSE	%		86	89	86
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		149	149	163
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		129	138	156
Total Positive PFHxS & PFOS	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Total Positive PFOS & PFOA	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Total Positive PFAS	µg/L	0.0002	<0.0002	<0.0002	<0.0002

Method ID	Methodology Summary
Ext-058	Analysed by The Marine and Freshwater Research Laboratory, accreditation number 10603
INORG-005	Acidity - determined by titration based on APHA latest edition, Method 2310 B. Soils reported from a 1:5 water extract unless otherwise specified.
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition, Method 2320-B. Soils reported from a 1:5 water extract unless otherwise specified.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C
INORG-019	Suspended Solids - determined gravimetrically by filtration of the sample. The solids are dried at 104±5°C
INORG-022	Turbidity - measured nephelometrically using a turbidimeter, in accordance with APHA latest edition, 2130 B.
INORG-040	Ion Balance Calculation: Cations in water by ICP-OES; Anions in water by IC; Alkalinity in water by Titration using APHA methods.
INORG-051	Determination of sulphide by titration and/or colourimetric determination. Note, the Sulphide is termed as Total Sulphide given any Sulphide contained in any sediment present may also included in the determination.
INORG-055	NOx - determined colourimetrically. Soils are analysed from a water extract.
INORG-057	Ammonia by colourimetric analysis based on APHA latest edition 4500-NH3 F.
INORG-060	Phosphate- determined colourimetrically. Soils are analysed from a water extract.
INORG-060	Total Phosphorus by colourimetric analysis based on APHA latest edition 4500-P J.
INORG-081	Anions - a range of anions are determined by Ion Chromatography based on APHA latest edition Method 4110-B. Soils and other sample types reported from a water extract unless otherwise specified (standard soil extract ratio 1:5).
INORG-110	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Dissolved/Total Carbon and Dissolved/Total Organic and Inorganic Carbon by high temperature catalytic combustion with NDIR
METALS-008	Hardness calculated from Calcium and Magnesium as per APHA latest edition 2340B.
METALS-020	Determination of various metals by ICP-AES.
METALS-021	Determination of Mercury by Cold Vapour AAS.  For urine samples total Mercury is determined, however, mercury in urine is almost entirely in the inorganic form (CDC).
METALS-022	Determination of various metals by ICP-MS.
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-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM draft B1 Guideline on Investigation Levels for Soil and Groundwater.
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-029	<p>Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3.</p> <p>Analysis is undertaken with LC-MS/MS.</p> <p>PFAS results include the sum of branched and linear isomers where applicable.</p> <p>Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.3 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components.</p> <p>Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.</p>

**Client Reference: EEL20092.001 Fremantle Port**

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-2	
Date prepared	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Date analysed	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Total Dissolved Solids (grav)	mg/L	5	INORG-018	<5	1	38000	[NT]		98	[NT]	
Total Suspended Solids	mg/L	5	INORG-019	<5	1	10	[NT]		82	[NT]	
Turbidity	NTU	0.1	INORG-022	<0.1	1	0.8	0.8	0	87	[NT]	
Dissolved Organic Carbon	mg/L	1	INORG-110	<1	1	1	1	0	101	102	
Acidity as CaCO <sub>3</sub>	mg/L	5	INORG-005	<5	1	8	7	13	97	[NT]	
Sulphide in water*	mg/L	0.5	INORG-051	<0.5	1	<0.5	[NT]		81	[NT]	
Fluoride	mg/L	0.1	INORG-081	<0.1	1	<5	[NT]		84	[NT]	

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date prepared	-			[NT]	7	07/05/2021	07/05/2021		[NT]	[NT]	
Date analysed	-			[NT]	7	07/05/2021	07/05/2021		[NT]	[NT]	
Total Dissolved Solids (grav)	mg/L	5	INORG-018	[NT]	7	36000	38000	5	[NT]	[NT]	
Total Suspended Solids	mg/L	5	INORG-019	[NT]	7	10	11	10	[NT]	[NT]	
Turbidity	NTU	0.1	INORG-022	[NT]	7	0.4	[NT]		[NT]	[NT]	
Dissolved Organic Carbon	mg/L	1	INORG-110	[NT]	7	1	[NT]		[NT]	[NT]	
Acidity as CaCO <sub>3</sub>	mg/L	5	INORG-005	[NT]	7	8	[NT]		[NT]	[NT]	
Sulphide in water*	mg/L	0.5	INORG-051	[NT]	7	<0.5	[NT]		[NT]	[NT]	
Fluoride	mg/L	0.1	INORG-081	[NT]	7	<5	[NT]		[NT]	[NT]	

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date prepared	-			[NT]	11	07/05/2021	07/05/2021		[NT]	[NT]	
Date analysed	-			[NT]	11	07/05/2021	07/05/2021		[NT]	[NT]	
Turbidity	NTU	0.1	INORG-022	[NT]	11	0.2	0.2	0	[NT]	[NT]	

QUALITY CONTROL: Ionic Balance					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-2	
Date prepared	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Date analysed	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Calcium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	430	420	2	94	#	
Potassium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	410	400	2	98	#	
Magnesium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	1400	1300	7	95	#	
Sodium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	12000	12000	0	95	#	
Bicarbonate HCO <sub>3</sub> as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	130	120	8	103	[NT]	
Carbonate CO <sub>3</sub> <sup>2-</sup> as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	<5	<5	0	103	[NT]	
Total Alkalinity as CaCO <sub>3</sub>	mg/L	5	INORG-006	<5	1	130	120	8	103	[NT]	
Chloride	mg/L	1	INORG-081	<1	1	19000	[NT]		93	[NT]	
Sulphate	mg/L	1	INORG-081	<1	1	2500	[NT]		88	[NT]	
Hardness as CaCO <sub>3</sub>	mg/L	3	METALS-008	<3	1	6700	6600	2	[NT]	[NT]	

QUALITY CONTROL: Nutrients in Water					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-2	
Date prepared	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Date analysed	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Total Nitrogen	mg/L	0.1	INORG-110	100	1	<0.5	<0.5	0	104	[NT]	
NOx as N	mg/L	0.005	INORG-055	<0.005	1	<0.005	<0.005	0	100	99	
Ammonia as N	mg/L	0.005	INORG-057	<0.005	1	0.012	0.012	0	98	120	
Total Phosphorus	mg/L	0.01	INORG-060	<0.01	1	0.03	0.03	0	113	108	
Phosphate as P	mg/L	0.005	INORG-060	<0.005	1	<0.005	<0.005	0	104	96	

**Client Reference: EEL20092.001 Fremantle Port**

QUALITY CONTROL: Dissolved Metals in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-2
Date prepared	-			11/05/2021	1	11/05/2021	11/05/2021		11/05/2021	13/05/2021
Date analysed	-			11/05/2021	1	11/05/2021	11/05/2021		11/05/2021	13/05/2021
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	<0.00005	1	<0.0001	<0.0001	0	104	98
Aluminium-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.02	<0.02	0	107	125
Arsenic-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.003	0.002	40	108	113
Cadmium-Dissolved	mg/L	0.0001	METALS-022	<0.0001	1	<0.0002	<0.0002	0	107	105
Cobalt-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	107	100
Chromium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	103	103
Copper-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	104	94
Iron-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.02	<0.02	0	109	120
Mercury-Dissolved	mg/L	0.00005	METALS-021	<0.00005	1	<0.00005	<0.00005	0	108	89
Manganese-Dissolved	mg/L	0.005	METALS-022	<0.005	1	<0.01	<0.01	0	105	109
Molybdenum-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.014	0.015	7	101	109
Nickel-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	105	97
Lead-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	110	95
Antimony-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	106	85
Selenium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	106	102
Zinc-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.005	0.005	0	107	102
Silicon - Dissolved	mg/L	0.1	METALS-020	<0.1	1	<1	<1	0	98	127

**Client Reference: EEL20092.001 Fremantle Port**

QUALITY CONTROL: Dissolved Metals in Water							Duplicate	Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	11/05/2021	11/05/2021		[NT]	[NT]
Date analysed	-			[NT]	11	11/05/2021	11/05/2021		[NT]	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	[NT]	11	<0.00005	<0.00005	0	[NT]	[NT]
Aluminium-Dissolved	mg/L	0.01	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Arsenic-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Cadmium-Dissolved	mg/L	0.0001	METALS-022	[NT]	11	<0.0001	<0.0001	0	[NT]	[NT]
Cobalt-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Chromium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Copper-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Iron-Dissolved	mg/L	0.01	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Mercury-Dissolved	mg/L	0.00005	METALS-021	[NT]	11	<0.00005	<0.00005	0	[NT]	[NT]
Manganese-Dissolved	mg/L	0.005	METALS-022	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
Molybdenum-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Nickel-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Lead-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Antimony-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Selenium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Zinc-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Silicon - Dissolved	mg/L	0.1	METALS-020	[NT]	11	<0.1	<0.1	0	[NT]	[NT]

QUALITY CONTROL: Total Metals in water						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-2	
Date digested	-			11/05/2021	1	11/05/2021	11/05/2021		11/05/2021	13/05/2021	
Date analysed	-			11/05/2021	1	11/05/2021	11/05/2021		11/05/2021	13/05/2021	
Aluminium-Total	mg/L	0.01	METALS-022	<0.01	1	<0.02	<0.02	0	93	96	
Iron-Total	mg/L	0.01	METALS-022	<0.01	1	0.02	0.03	40	109	125	

QUALITY CONTROL: Total Metals in water						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date digested	-			[NT]	11	11/05/2021	11/05/2021		[NT]	[NT]	
Date analysed	-			[NT]	11	11/05/2021	11/05/2021		[NT]	[NT]	
Aluminium-Total	mg/L	0.01	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]	
Iron-Total	mg/L	0.01	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]	

QUALITY CONTROL: Chlorophyll a & Phaeophytin a							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Chlorophyll a	µg/L	0.1	Ext-058	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Phaeophytin a	µg/L	0.2	Ext-058	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

**Client Reference: EEL20092.001 Fremantle Port**

QUALITY CONTROL: vTRH(C6-C10)/MBTEXN in water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date analysed	-			07/05/2021	[NT]	[NT]	[NT]	[NT]	07/05/2021	[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	95	[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	95	[NT]
MTBE	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	95	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	101	[NT]
Surrogate toluene-d8	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate 4-BFB	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: svTRH(C10-C40) in water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			10/05/2021	[NT]	[NT]	[NT]	[NT]	10/05/2021	[NT]
Date analysed	-			12/05/2021	[NT]	[NT]	[NT]	[NT]	12/05/2021	[NT]
TRH C <sub>10</sub> - C <sub>14</sub>	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH C <sub>15</sub> - C <sub>28</sub>	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH C <sub>29</sub> - C <sub>36</sub>	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	70	[NT]
TRH >C <sub>10</sub> - C <sub>16</sub>	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	84	[NT]
TRH >C <sub>16</sub> - C <sub>34</sub>	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C <sub>34</sub> - C <sub>40</sub>	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	84	[NT]
Surrogate o-Terphenyl	%		Org-020	83	[NT]	[NT]	[NT]	[NT]	72	[NT]

**Client Reference: EEL20092.001 Fremantle Port**

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-5	
Date extracted	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021	
Date analysed	-			10/05/2021	1	10/05/2021	10/05/2021		10/05/2021	10/05/2021	
Naphthalene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	107	
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Fluorene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	113	
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	105	
Anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	118	
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	120	
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Chrysene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	114	
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]	
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	115	
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Surrogate p-Terphenyl-D <sub>14</sub>	%		Org-022/025	84	1	95	93	2	95	95	

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date extracted	-			[NT]	4	07/05/2021	07/05/2021		[NT]	[NT]	
Date analysed	-			[NT]	4	10/05/2021	10/05/2021		[NT]	[NT]	
Naphthalene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Acenaphthylene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Acenaphthene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Fluorene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Phenanthrene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Anthracene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Fluoranthene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Pyrene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Benzo(a)anthracene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Chrysene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	[NT]	4	<0.2	<0.2	0	[NT]	[NT]	
Benzo(a)pyrene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	[NT]	4	<0.1	<0.1	0	[NT]	[NT]	
Surrogate p-Terphenyl-D <sub>14</sub>	%		Org-022/025	[NT]	4	92	97	5	[NT]	[NT]	

QUALITY CONTROL: Low Level OCP in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	261391-5
Date extracted	-			07/05/2021	1	07/05/2021	07/05/2021		07/05/2021	07/05/2021
Date analysed	-			10/05/2021	1	10/05/2021	10/05/2021		10/05/2021	10/05/2021
Hexachlorobenzene (HCB)	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
a-BHC	µg/L	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	85	98
Lindane (g-BHC)	µg/L	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	[NT]	[NT]
b-BHC	µg/L	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	123	113
Heptachlor	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	113	128
d-BHC	µg/L	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	[NT]	[NT]
Aldrin	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	92	86
Heptachlor Epoxide	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	115	110
g-Chlordane	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
a-Chlordane	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
a-Endosulfan	µg/L	0.02	Org-022/025	<0.02	1	<0.02	<0.02	0	[NT]	[NT]
pp-DDE	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	106	100
Dieldrin	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	98	124
Endrin	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	[NT]	[NT]
pp-DDD	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	106	121
b-Endosulfan	µg/L	0.02	Org-022/025	<0.02	1	<0.02	<0.02	0	[NT]	[NT]
pp-DDT	µg/L	0.006	Org-022/025	<0.006	1	<0.006	<0.006	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.02	Org-022/025	<0.02	1	<0.02	<0.02	0	113	99
Methoxychlor	µg/L	0.02	Org-022/025	<0.02	1	<0.02	<0.02	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022/025	83	1	103	99	4	91	104

QUALITY CONTROL: Low Level OCP in water						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	4	07/05/2021	07/05/2021		[NT]	[NT]
Date analysed	-			[NT]	4	10/05/2021	10/05/2021		[NT]	[NT]
Hexachlorobenzene (HCB)	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
a-BHC	µg/L	0.05	Org-022/025	[NT]	4	<0.05	<0.05	0	[NT]	[NT]
Lindane (g-BHC)	µg/L	0.05	Org-022/025	[NT]	4	<0.05	<0.05	0	[NT]	[NT]
b-BHC	µg/L	0.05	Org-022/025	[NT]	4	<0.05	<0.05	0	[NT]	[NT]
Heptachlor	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
d-BHC	µg/L	0.05	Org-022/025	[NT]	4	<0.05	<0.05	0	[NT]	[NT]
Aldrin	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
Heptachlor Epoxide	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
g-Chlordane	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
a-Chlordane	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
a-Endosulfan	µg/L	0.02	Org-022/025	[NT]	4	<0.02	<0.02	0	[NT]	[NT]
pp-DDE	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
Dieldrin	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
Endrin	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
pp-DDD	µg/L	0.01	Org-022/025	[NT]	4	<0.01	<0.01	0	[NT]	[NT]
b-Endosulfan	µg/L	0.02	Org-022/025	[NT]	4	<0.02	<0.02	0	[NT]	[NT]
pp-DDT	µg/L	0.006	Org-022/025	[NT]	4	<0.006	<0.006	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.02	Org-022/025	[NT]	4	<0.02	<0.02	0	[NT]	[NT]
Methoxychlor	µg/L	0.02	Org-022/025	[NT]	4	<0.02	<0.02	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022/025	[NT]	4	98	102	4	[NT]	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			12/05/2021	[NT]	[NT]	[NT]	[NT]	12/05/2021	[NT]
Date analysed	-			12/05/2021	[NT]	[NT]	[NT]	[NT]	12/05/2021	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	107	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	93	[NT]
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	100	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	99	[NT]
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	106	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	105	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	113	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	102	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	114	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	[NT]	[NT]	[NT]	[NT]	101	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	97	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	109	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	95	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	103	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	72	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	120	[NT]
4:2 FTS	µg/L	0.001	Org-029	<0.001	[NT]	[NT]	[NT]	[NT]	111	[NT]
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	109	[NT]
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	[NT]	[NT]	[NT]	[NT]	110	[NT]
10:2 FTS	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	122	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	111	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	101	[NT]
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	<0.01	[NT]	[NT]	[NT]	[NT]	102	[NT]
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	<0.005	[NT]	[NT]	[NT]	[NT]	108	[NT]
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	<0.05	[NT]	[NT]	[NT]	[NT]	103	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	104	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	[NT]	[NT]	[NT]	[NT]	111	[NT]
Surrogate <sup>13</sup> C <sub>8</sub> PFOS	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	105	[NT]
Surrogate <sup>13</sup> C <sub>2</sub> PFOA	%		Org-029	98	[NT]	[NT]	[NT]	[NT]	93	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFBS	%		Org-029	86	[NT]	[NT]	[NT]	[NT]	84	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Extracted ISTD <sup>18</sup> O <sub>2</sub> PFHxS	%		Org-029	90	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOS	%		Org-029	77	[NT]	[NT]	[NT]	[NT]	78	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFBA	%		Org-029	106	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD <sup>13</sup> C <sub>3</sub> PFPeA	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	88	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFHxA	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	96	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFHpA	%		Org-029	94	[NT]	[NT]	[NT]	[NT]	90	[NT]
Extracted ISTD <sup>13</sup> C <sub>4</sub> PFOA	%		Org-029	112	[NT]	[NT]	[NT]	[NT]	111	[NT]
Extracted ISTD <sup>13</sup> C <sub>5</sub> PFNA	%		Org-029	95	[NT]	[NT]	[NT]	[NT]	95	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDA	%		Org-029	129	[NT]	[NT]	[NT]	[NT]	133	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFUnDA	%		Org-029	110	[NT]	[NT]	[NT]	[NT]	113	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFDoDA	%		Org-029	128	[NT]	[NT]	[NT]	[NT]	124	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> PFTeDA	%		Org-029	52	[NT]	[NT]	[NT]	[NT]	48	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 4:2FTS	%		Org-029	132	[NT]	[NT]	[NT]	[NT]	124	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 6:2FTS	%		Org-029	103	[NT]	[NT]	[NT]	[NT]	97	[NT]
Extracted ISTD <sup>13</sup> C <sub>2</sub> 8:2FTS	%		Org-029	100	[NT]	[NT]	[NT]	[NT]	100	[NT]
Extracted ISTD <sup>13</sup> C <sub>8</sub> FOSA	%		Org-029	76	[NT]	[NT]	[NT]	[NT]	72	[NT]
Extracted ISTD d <sub>3</sub> N MeFOSA	%		Org-029	49	[NT]	[NT]	[NT]	[NT]	43	[NT]
Extracted ISTD d <sub>5</sub> N EtFOSA	%		Org-029	47	[NT]	[NT]	[NT]	[NT]	41	[NT]
Extracted ISTD d <sub>7</sub> N MeFOSE	%		Org-029	87	[NT]	[NT]	[NT]	[NT]	80	[NT]
Extracted ISTD d <sub>9</sub> N EtFOSE	%		Org-029	85	[NT]	[NT]	[NT]	[NT]	79	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Extracted ISTD d <sub>3</sub> N MeFOSAA	%		Org-029	150	[NT]	[NT]	[NT]	[NT]	150	[NT]
Extracted ISTD d <sub>5</sub> N EtFOSAA	%		Org-029	138	[NT]	[NT]	[NT]	[NT]	128	[NT]

## Result Definitions

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

## Quality Control Definitions

<b>Blank</b>	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.
<b>Duplicate</b>	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.
<b>Matrix Spike</b>	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.
<b>LCS (Laboratory Control Sample)</b>	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.
<b>Surrogate Spike</b>	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 AIOP 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.

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**

PFAS conducted by Envirolab Services Pty Ltd, NSW, report reference 268494.

Chlorophyll 'a' and Phaeophytin 'a' subcontracted to Murdoch University, report reference MPL21-16.

#1-10 - vTRH(C6-C10)/MBTEXN in water - PQL has been raised as the sample/s were foamy and required dilution.

Matrix spike recovery was outside recommended acceptance criteria, however an acceptable recovery was achieved for the LCS. This indicates a sample matrix interference.

Note: Some results have raised pqls. In these cases the sample's high TDS required the sample to be diluted prior to analysis.

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Site:		Fremantle Port		Analytical suites												Remarks												
Project reference:		EEL20092.001		Monthly water suite Metals, turbidity, TRH/MBETXN, PAH, OCP, PFAS	BTTEX, TRH (C6-9), PFAS	Si	F																					
Scientist(s)		ZL + ME																										
Sample type(s):		Water																										
Report to:		Zak L and Alan Foley																										
Invoice to:		west.accountspayable@rpsgroup.com																										
Sample I.D.		Date collected	Number of jars / bottles / bags																									
1	WS1-S	5/5/21	13	X		X	X																					
2	WS1-D	5/5/21	13	X		X	X																					
3	WS2-S	5/5/21	13	X		X	X																					
4	WS2-D	5/5/21	13	X		X	X																					
5	WS3-S	5/5/21	13	X		X	X																					
6	WS4-S	5/5/21	13	X		X	X																					
7	WS4-D	5/5/21	13	X		X	X																					
8	WS5-S	5/5/21	13	X		X	X																					
9	WS5-D	5/5/21	13	X		X	X																					
10	WZ1	5/5/21	13	X		X	X																					
11	WB1	5/5/21	9	X		X																						
12	WR1	5/5/21	9	X		X																						
13	WTB1	5/5/21	5		X																							
Total number of bottles/bags/jars		153																										
Primary destination:		MPL		Received by: CM		Secondary destination:		Received by:																				
Relinquished by:		ZAK L		Organisation: MPL		Relinquished by:		Organisation:																				
Organisation:		RPS		Date: 5/5/21		Organisation:		Date:																				
Date:		2 5/5/21		Time: 14:40		Date:		Time:																				
Time:		14:30																										

Please report WSS-S  
as WS5-D and  
WS5-D as WSS-S

MPL	ENVIROURB
Laboratories	environurb.com
Job No.- 261391	
Date Rec - 5/5/21	
Time Rec - 14:40	
Rec By - CM	
TAT Rec - SAME 1/2/3/5/10	
Temp - cool / ambient	
Cooling - ice / ice pack / None	
Security Seal - Yes / No	



## DATA QUALITY ASSESSMENT SUMMARY

### Report Details

Envirolab Report Reference	<u>261391</u>
Client ID	RPS Australia West Pty Ltd
Project Reference	EEL20092.001 Fremantle Port
Date Issued	20/05/2021

### QC DATA

All laboratory QC data was within the Envirolab Group's specifications except:

### QC Specification Exceptions

QC Type	Reference	Analysis	Comments
Spike Recovery %	261391-2	Calcium - Dissolved	Fails internal acceptance criteria
Spike Recovery %	261391-2	Magnesium - Dissolved	Fails internal acceptance criteria
Spike Recovery %	261391-2	Potassium - Dissolved	Fails internal acceptance criteria
Spike Recovery %	261391-2	Sodium - Dissolved	Fails internal acceptance criteria

See Report 261391-[R00] for QA/QC details



## **HOLDING TIME COMPLIANCE EVALUATION**

All preservation / holding times (based on AS/ASPH/ISO/NEPM/USEPA reference documents and standards) are compliant except:

### **Holding Time Exceedances**

Analysis	Sample No	Date Sampled	Date Extracted	Date Analysed	Accepted
<b>Chlorophyll a &amp; Phaeophytin a</b>					
Chlorophyll a	261391-1	05/05/2021			##
Phaeophytin a	261391-1	05/05/2021			##
Chlorophyll a	261391-2	05/05/2021			##
Phaeophytin a	261391-2	05/05/2021			##
Chlorophyll a	261391-3	05/05/2021			##
Phaeophytin a	261391-3	05/05/2021			##
Chlorophyll a	261391-4	05/05/2021			##
Phaeophytin a	261391-4	05/05/2021			##
Chlorophyll a	261391-5	05/05/2021			##
Phaeophytin a	261391-5	05/05/2021			##
Chlorophyll a	261391-6	05/05/2021			##
Phaeophytin a	261391-6	05/05/2021			##
Chlorophyll a	261391-7	05/05/2021			##
Phaeophytin a	261391-7	05/05/2021			##
Chlorophyll a	261391-8	05/05/2021			##
Phaeophytin a	261391-8	05/05/2021			##
Chlorophyll a	261391-9	05/05/2021			##
Phaeophytin a	261391-9	05/05/2021			##
Chlorophyll a	261391-10	05/05/2021			##
Phaeophytin a	261391-10	05/05/2021			##

### **Holding Table Comments**

## No Extract or Analysed Dates were provided. Holding Times cannot be calculated.

Certain analyses have had their recommended technical holding times elongated by filtering and/or freezing on receipt at the laboratory (e.g. BOD, chlorophyll/Pheophytin, nutrients and acid sulphate soil tests).



### **COMPLIANCE TO QC FREQUENCY (NEPM)**

Internal laboratory QC rate complies with NEPM requirements (LCS/MB/MS 1 in 20, Duplicates 1 in 10 samples). Note, samples are batched together with other sample consignments in order to assign QC sample frequency.

#### **QC Evaluation**

Duplicate(s) was performed as per NEPM frequency	✓
Laboratory Control Sample(s) were analysed with the samples received	✓
A Method Blank was performed with the samples received	✓
Matrix spike(s) was performed as per NEPM frequency (Not Applicable for Air samples)	✓

*Refer to Certificate of Analysis for all Quality Control data.*

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	RPS Australia West Pty Ltd
<b>Attention</b>	Zac Langtry

### Sample Login Details

<b>Your reference</b>	EEL20092.001 Fremantle Port
<b>MPL Reference</b>	261391
<b>Date Sample Received</b>	06/05/2021
<b>Date Instructions Received</b>	06/05/2021
<b>Date Results Expected to be Reported</b>	14/05/2021

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	13 Water
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	15
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	Yes

### Comments

Nil

Please direct any queries to:

<b>Heram Halim</b>	<b>Meredith Conroy</b>
<b>Phone:</b> 08 9317 2505	<b>Phone:</b> 08 9317 2505
<b>Fax:</b> 08 9317 4163	<b>Fax:</b> 08 9317 4163
<b>Email:</b> hhalim@mpl.com.au	<b>Email:</b> mconroy@mpl.com.au

*Analysis Underway, details on the following page:*

Sample ID	Total Dissolved Solids (grav)	Total Suspended Solids	Turbidity	Dissolved Organic Carbon	Acidity as CaCO <sub>3</sub>	Sulphide in water*	Fluoride	Ionic Balance	Nutrients in Water	Dissolved Metals in Water	Total Metals in water	Chlorophyll a & Phaeophytin a	VTRH(C6-C10)/MBTEXN in water	svTRH(C10-C40) in water	PAHs in Water	Low Level OCP in water	PFAs in water TRACE Extended
WS1-S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS1-D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS2-S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS2-D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS3-S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS4-S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS4-D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS5-S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WS5-D	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WZ1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
WB1		✓								✓	✓		✓	✓	✓	✓	✓
WR1	✓									✓	✓		✓	✓	✓	✓	✓
WTB1											✓					✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

### Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

## **Appendix C**

### **Surface water sampling logs**

## MULTI-PARAMETER METER CALIBRATION RECORD



Project number: EEC20092.001

**Site location:** Swan River Crossing - Fremantle

Multi-parameter meter details		Solution	Batch / lot	Expiry date	Zobell B solution, for Ag/AgCl saturated KCl electrode				Calibration notes:
Manufacturer:	YSI	pH 4 buffer	355385	Aug-21	T °C	mV	T °C	mV	
Model number:		pH 7 buffer	365751	Aug-21	5	273	20	240	
Serial number:		EC buffer	357733	Dec-21	10	262	25	229	
		Zobell B	20/410	---	15	251	30	218	

## **SURFACE WATER SAMPLING LOG**



<b>Project number:</b> EEC20092.002	<b>Sampling method:</b>	Niskin Flask
<b>Site name:</b> Swan River Crossing - Fremantle	<b>0.45 micron filter used (Y/N)</b>	Yes
<b>Sampling area:</b> Fremantle Railway Bridge	<b>Sample preservation (ice/esky):</b>	Yes
<b>Sampling location:</b> WS1	<b>QAQC samples:</b>	No
<b>Scientist:</b> Zak Langtry	<b>Tide (High/Low):</b>	High
<b>Date:</b> 05/05/2021	<b>Tide Height (m):</b>	1.05
<b>Weather:</b> Fine	<b>Water Column (m):</b>	4.35

#### **Additional details / comments**

**Other:** Low general boat traffic / large cargo ship being birthed / incoming tide

## **SURFACE WATER SAMPLING LOG**



<b>Project number:</b> EEC20092.002	<b>Sampling method:</b>	Niskin Flask
<b>Site name:</b> Swan River Crossing - Fremantle	<b>0.45 micron filter used (Y/N)</b>	Yes
<b>Sampling area:</b> Fremantle Railway Bridge	<b>Sample preservation (ice/esky):</b>	Yes
<b>Sampling location:</b> WS2	<b>QAQC samples:</b>	No
<b>Scientist:</b> Zak Langtry	<b>Tide (High/Low):</b>	High
<b>Date:</b> 05/05/2021	<b>Tide Height (m):</b>	1.05
<b>Weather:</b> Showers	<b>Water Column (m):</b>	5.46

**Additional details / comments:**

**Other:** Low general boat traffic / geotechnical barge doing workks east of bridge / incoming tide

## **SURFACE WATER SAMPLING LOG**



## **SURFACE WATER SAMPLING LOG**



<b>Project number:</b> EEC20092.002	<b>Sampling method:</b>	Niskin Flask
<b>Site name:</b> Swan River Crossing - Fremantle	<b>0.45 micron filter used (Y/N)</b>	Yes
<b>Sampling area:</b> Fremantle Railway Bridge	<b>Sample preservation (ice/esky):</b>	Yes
<b>Sampling location:</b> WS4	<b>QAQC samples:</b>	WZ1 at WS4-S
<b>Scientist:</b> Zak Langtry	<b>Tide (High/Low):</b>	High
<b>Date:</b> 05/05/2021	<b>Tide Height (m):</b>	1.05
<b>Weather:</b> Rain	<b>Water Column (m):</b>	4.87

**Additional details / comments:**

**Other:** Three ships being loaded / Low general boat traffic / Incoming tide.

## **SURFACE WATER SAMPLING LOG**



<b>Project number:</b> EEC20092.002	<b>Sampling method:</b>	Niskin Flask
<b>Site name:</b> Swan River Crossing - Fremantle	<b>0.45 micron filter used (Y/N)</b>	Yes
<b>Sampling area:</b> Fremantle Railway Bridge	<b>Sample preservation (ice/esky):</b>	Yes
<b>Sampling location:</b> WS5	<b>QAQC samples:</b>	No
<b>Scientist:</b> Zak Langtry	<b>Tide (High/Low):</b>	High
<b>Date:</b> 05/05/2021	<b>Tide Height (m):</b>	1.05
<b>Weather:</b> Fine	<b>Water Column (m):</b>	7.6

**Additional details / comments:**

**Other:** Low general boat traffic / Incoming tide.