

MEMO

Date: 2 October 2020
 To: Andrew Grime (Arup Senior Engineer)
 From: Shae Miller-White
 Pages: 8 inc. this page (excluding attachments)
 Regarding: Surface water quality – Event 2 summary

Level 2, 27-31 Troode Street
 West Perth WA 6005
 T +61 8 9211 1111

Fremantle Swan River Crossing – Surface Water Quality Monitoring Event #2

Background

Arup on behalf of Main Roads Western Australia (MRWA), 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* (MRWA, 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 will be completed to inform a future Construction Environment Management Plan (CEMP) monitoring program. The sampling program is initially scoped to be undertaken monthly for five months.

This memo provides details on the surface water monitoring Event #2, completed in September 2020.

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 sampling Event #2, 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.

Table 1: Surface water sampling locations summary

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

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_swan_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 – this round
Event - 3	WS1-WS5	October 2020	-	TBC
Event - 4	WS1-WS5	November 2020	-	TBC
Event - 5	WS1-WS5	December 2020	-	TBC

Notes: To be completed (TBC)

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* (NEPM, 2013)
- *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, silver, and zinc.
- Total metals: aluminium and iron.

- Major anions: sulfate (SO_4^{2-}), chloride (Cl^-), alkalinity (hydroxide OH^- , carbonate CO_3^{2-} , bicarbonate 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 (S^{2-})
- Total dissolved solids (TDS)
- Total suspended solids (TSS)
- Turbidity
- Hydrocarbons: Total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAH)
- Organochlorine Pesticides (OCP)
- Per-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 level¹
 - 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)

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

Site conditions

Site conditions noted during the monitoring Event #1 are summarised within Table 3.

Table 3: Site conditions

Items	Commentary
Weather conditions (during sampling event)	Minor precipitation (2-3 mm), south-west winds 15-20 km/h, maximum temperature of 18°C.
Rainfall (noted during the previous week)	A total of 29 mm of rain was measured at the Perth Station (Number: 9225) in the week prior to sampling
Tide condition and direction	<ul style="list-style-type: none">Outgoing tide.Closest peak: Low tide (2.35 pm / 0.61 m)
Fremantle Port and Swan River vessel activities	<ul style="list-style-type: none">WS1: Low general boat traffic. Large cargo ship being birthed during sampling.WS2: Low general harbour / river traffic during sampling.WS3: Low general harbour / river traffic during sampling.WS4: Two tugboats located adjacent to sampling location on small craft jetty. Large cargo ships being escorted out of the port during sampling. Low general river traffic during sampling.

Monitoring Results Discussion

Results have been tabulated and are present in Tables A to E, with laboratory reporting presented in Appendix A. 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 B), with field parameters of sampling depths summarised in Table 4.

Table 4: Sampling location field parameters

Sample Location	Depth (m)	Temp (°C)	pH	EC (µS/cm)	Redox (mV)	DO (%sat)
WS1-S	1.0	17.6	8.18	50,919	80.4	104
WS1-D	3.0	17.6	8.20	50,935	90.9	108
WS2-S	1.0	17.4	8.11	50,645	60.0	110
WS2-D	4.0	17.4	8.19	50,453	78.6	110
WS3-S	0.15	17.8	8.25	50,920	108.7	128
WS4-S	1.0	17.3	7.93	50,651	41.9	109
WS4-D	3.5	17.3	8.05	50,680	56.0	112

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 result of daily tidal movement of marine waters. RPS did note the following minor trends and guideline exceedances:

- Trends:
 - pH and redox marginally increased with depth at all locations that were profiled.
- Guideline exceedances:
 - D.O. percentage saturation (%sat) exceeded the MWG (90-110 % sat) in two of the seven samples collected (WS3-S, 128 % sat and WS4-S, 112% sat).

Acid sulfate soil parameters

Acid sulfate soil (ASS) parameters observed during Event #2 can be summarised as follows:

- Total acidity was significantly below the ASS guideline (>40 mg/L) in all samples and ranged from 7 mg/L at WS2-D to 9 mg/L (remaining locations). Concentrations were relatively consistent with Event #1.
- Sulfide concentrations exceeded the ASS guideline (>0.5 mg/L) in one of the seven samples (WS4-S, 0.6 mg/L). All remaining results were below the limit of reporting (LOR) (0.5 mg/L) which was a noted decrease in concentration over the site when compared to Event #1.
- Sulfate was consistent in all locations with a concentration of 2,400 mg/L observed. As per Event #1, this is significantly above the recreational water guideline (500 mg/L) however, is considered consistent with marine water quality.
- Total alkalinity results were consistent throughout all locations with a concentration of 120 mg/L observed. All results were consistent with Event #1.

Solids

- TDS concentrations results ranged from 35,000 mg/L (WS2-D, WS3-S, WS4-S and WSD-D) to 36,000 mg/L (WS1-S, WS1-D and WS2-S). All results were consistent with Event #1.
- TSS ranged from LOR (<5 mg/L) (WS1-S, WS1-D, WS2-S and WS2-D) to 14 mg/L (WS3-S) with a mean of 6 mg/L observed over the seven samples which was a noted decrease when compared to Event #1.
- With exception of WS3-S, turbidity results were relatively consistent over the remaining three locations and ranged from 0.5 to 0.7 NTU². WS3-S turbidity concentration was significantly higher at 1.8 mg/L and increase potential due to sediment disturbance during sample collection. All results were consistent with Event #1.

Nutrients

Nutrients analytical results observed during Event #2 can be summarised as follows:

- Total phosphorus concentrations marginally exceeded the MWG (0.03 mg/L) in one of the seven samples collected during Event #2 (WS3-S, 0.04 mg/L). All other results were equal to MWG. All results were in line with Event #1 which were all below Event #1 LOR (0.05 mg/L)
- Reactive phosphorus marginally exceeded the MWG (0.005 mg/L) in one of the seven samples collected (WS1-S, 0.006 mg/L). The remaining samples were equal to (WS1-D and WS3-S) or below the LOR (0.005 mg/L). All results were consistent with Event #1.
- All other nitrogen and phosphorus species were below relevant MWG and RWG assessment criteria.

Chlorophyll

All Chlorophyll "A" sample results were significantly below the MWG (0.003 mg/L) with a concentration range of 0.0006 mg/L (WS3-S and WS4-D) to 0.0012 mg/L (WS1-S) observed.

Low concentrations of Phaeophytin "A" were detected within all surface water samples with concentrations ranging from 0.0004 mg/L (WS2-D) to 0.0008 mg/L (WS3-S).

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

All results were relatively consistent with Event #1.

Metals and metalloids

Metal analytical results observed during Event #2 can be summarised as follows:

- Dissolved metals:
 - No relevant dissolved metal guideline exceedances were noted.
 - With the exception of Arsenic, molybdenum, silver, zinc and to a lesser extent copper, all analysed dissolved metals were below their relevant LOR.
 - All results were relatively consistent with Event #1.
- Total metals:
 - Total aluminium was marginally above the LOR (0.01 mg/L) in all samples and ranged from 0.02 mg/L (WS1-S, WS2-S, WS2-D, WS4-S and WS4-D) to 0.05 mg/L (WS3-S).
 - Total iron concentrations ranged from 0.02 mg/L (WS1-S, WS2-S, WS2-D, WS4-S and WS4-D) to 0.08 mg/L (WS3-S) with a mean 0.03 mg/L observed.
 - All results were relatively consistent with Event #1.

Hydrocarbons

All hydrocarbon results (BTEX, TRH and PAH) were below their relevant LOR in all samples analysed.

Pesticides

All organochlorine pesticides results were below their relevant LOR in all samples analysed.

PFAS

PFAS analytical results observed during Event #2 can be summarised as follows:

- Perfluorooctanesulfonate (PFOS) exceeded the 99% species protection MWG (0.00023 µg/L) in all samples, ranging from 0.0022 µg/L (WS2-D) to 0.0044 µg/L (WS3-S) with a mean of 0.0028 µg/L. The mean in Event #2 was significantly higher than the Event #1 mean (0.0005 µg/L). However, all concentrations were still significantly below the 95% species protection guideline (0.13 µg/L).
- Minor detections of Perfluorohexanesulfonic acid (PFHxS) Perfluorohexanoic acid, Perfluorohexanoic acid and Perfluorooctanoic acid (PFOA) were observed marginally above their relevant LOR. However, all concentrations were significantly below all relevant guidelines.
- Total PFAS were relatively consistent between all locations and ranged from 0.0063 µg/L (WS2-S and WS2-D) to 0.0099 µg/L (WS3-S) with a mean of 0.007 µg/L observed, which is a significant increase when compared to the Event #1 mean (0.0009 µg/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, NEPM, 2013 and HEPA, 2020) and *Australian Standard 4482.1:1997* (Standards Australia, 2005). Strict hygiene procedures were applied throughout to 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. 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 118 (98%) 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. In both instances the exceedances are considered insignificant as concentrations of both the primary and duplicate sample are less than 5 \times LOR. In such instances the elevated RPD merely indicates that analytical precision decreases as concentrations approach the LOR.
- As a result of minor particulates being present following decontamination or deionised water quality, the following detections were noted within the field rinsate sample (WR1):
 - Turbidity concentrations (0.1 NTU) were equal to the LOR (0.1 NTU).
- Turbidity results within the field blank sample (0.1 NTU) were also equal to the LOR (0.1 NTU), indicating that this may be representative of the deionised water quality utilised for the QAQC sampling i.e. field blank and rinsate.
- All internal laboratory QAQC procedures (method blanks, matrix spikes, laboratory control standards, internal duplicates) were within acceptable limits.
- All samples were analysed within the recommended holding time for each analyte with the exception of Chlorophyll "A" and Phaeophytin "A" which states that no extract or analyse dates where 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 #2 was completed on 10 September 2020. Due to DBCA access approval not being received in time, samples were only collected from four of the five sampling locations, with the background location WS5 excluded. With the exception of WS3, a shallow and deep sample were collected at each sampling point utilising the defined Niskin flask methodology. Due to the shallow nature of WS3 (water column depth approximately ~0.35 m) a shallow sample was collected utilising a surface water sampling pole from a central point in the water column (~0.15 m).

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

No metal, hydrocarbon or OCP guideline exceedances were noted during Event #2, with concentrations predominantly below their relevant LORs.

A minor exceedance of the TP MWG (0.03 mg/L) and reactive phosphorus (RP) MWG (0.005 mg/L) were noted within one of the seven samples collected (TP: WS3-S, 0.04 mg/L and RP: WS1-S, 0.006 mg/L). All remaining TP results were equal to the MWG. All nitrogen species were below relevant guidelines. However, a general increase in nutrient concentrations were noted when compared to Event #1.

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 of RWG were noted. An increase in PFAS concentrations was noted from Event #1.

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



Shae Miller-White

Supervising Scientist - Contamination and Acid Sulfate Soils

shae.miller-white@rpsgroup.com.au

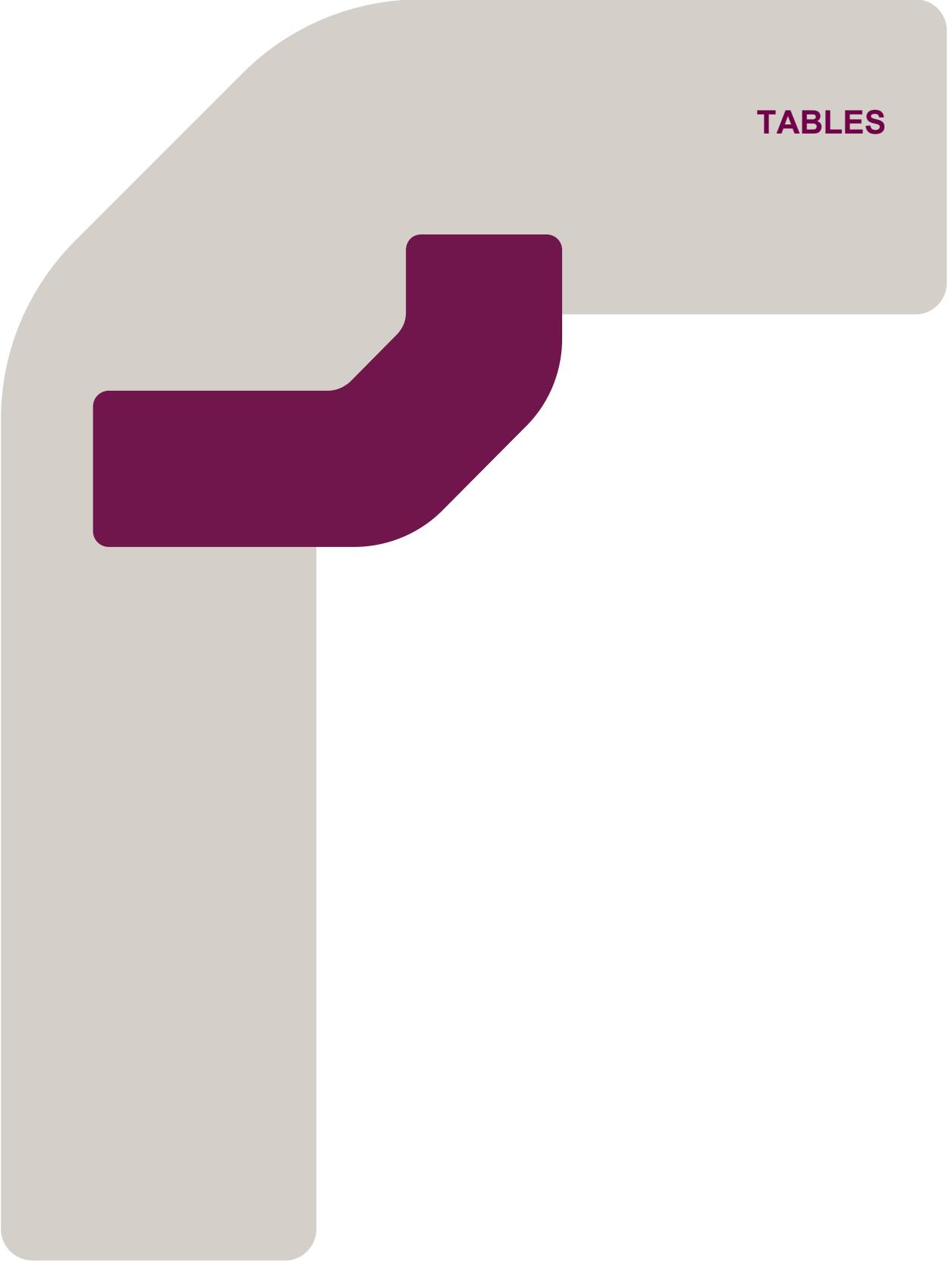
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Enc. Tables

Figure A - Water quality sampling locations

Appendix A – Laboratory reports

Appendix B – 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), * value for hexavalent chromium, # duplicate value used due to RPD (%) failure

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 (milli Volts), turbidity (NTU) and EC (μ S/cm)

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

b) Values based on the sample having a pH ~8.2 (ANZECC/ARMCANZ 2000)

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-NH₃-N)

Denotes less than LOR

Sample ID	Date	Trigger	Field Parameters				Acid Sulfate Soil Parameters							ASS Ratios		Cations				Nutrients				Miscellaneous					
			pH	E.C.	Redox	DO	Total Acidity (CaCO ₃)	Total Alkalinity (CaCO ₃)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN ^e	NH ₃ -N	NO _x -N	Dissolved Organic Carbon (DOC)	Chlorophyll "A"	Phaeophytin "A"
			Units	pH units	μ S/cm	mV	%sat	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	7.5-8.5	-	-	90-110	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03 ^a	0.005 ^a	0.75 ^a	-	0.62 ^b	0.045 ^a	-	0.003 ^a	-
WS1 - S	10/09/2020		8.18	50.919	80.4	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	0.191	0.009	<0.005	2	0.0012	0.0006
WS1 - D	10/09/2020		8.20	50.935	90.9	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	0.192	0.008	<0.005	2	0.0008	0.0006
WS2-S	7/08/2020		8.70	50.710	181.4	105	6	120	39,000	9	0.6	0.9	2,800	20,000	0.05	0.14	420	1300	370	12000	<0.05	<0.005	0.1	0.093	0.007	<0.005	<1	0.0004	0.0005
WS2-S	10/09/2020		8.11	50.645	60	110	9	120	36,000	<5	0.6	<0.5	2,400	19,000	0.08	0.13	410	1300	360	11000	0.03	<0.005	0.2	0.193	0.007	2	0.0010	0.0005	
WS2-D	7/08/2020		8.19	50.966	179.4	105	7	120	39,000	5	0.5	0.8	2,800	20,000	0.06	0.14	410	1300	360	11000	<0.05	<0.005	0.1	0.093	0.007	<0.005	<1	0.0005	0.0005
WS2-D	10/09/2020		8.19	50.453	78.6	110	9	120	35,000	<5	0.6	<0.5	2,400	18,000	0.08	0.13	380	1200	350	11000	0.03	<0.005	0.2	0.194	0.006	0.009	2	0.0011	0.0004
WS3-S	10/09/2020		8.25	50.920	108.7	128	7	120	35,000	14	1.8	<0.5	2,400	19,000	0.06	0.13	390	1200	350	11000	0.04	0.005	0.2	0.195	<0.005	<0.005	2	0.0006	0.0008
WS4-S	7/08/2020		8.27	50.809	106.3	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	0.192	0.008	<0.005	1	0.0005	0.0005
WS4-S	10/09/2020		7.93	50.651	41.9	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	0.192	0.008	0.01	2	0.0007	0.0007
WS4-D	7/08/2020		8.27	50.996	108.4	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	0.093	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	0.193	0.007	0.008	2	0.0008	0.0006

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 used due to RPD (%) failure

Notes:

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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	Mercury	Manganese	Molybdenum	Nickel	Lead	Selenium	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	
			MWG	-	-	-	-	0.001	-	0.0013	-	0.0001 ^a	-	-	-	0.0044	-	0.0014	-	-	1 ^b
WS1 - S	10/09/2020	LOR	1	<0.01	<0.001	0.002	0.0001	0.002	0.001	0.002	0.05	0.00005	0.001	0.001	0.001	0.001	0.01	0.00005	0.005	0.01	0.01
WS1 - D	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	0.00006	0.002	0.02	0.02
WS2-S	7/08/2020	LOR	1	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.0001	0.003	<0.02	<0.02
WS2-S	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.00005	0.003	0.02	0.02
WS2-D	7/08/2020	LOR	1	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.0001	0.007	0.03	0.02
WS2-D	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.00006	0.003	0.02	0.02
WS3-S	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.00005	0.003	0.05	0.08
WS4-S	7/08/2020	LOR	1	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.0002	0.004	0.02	0.03
WS4-S	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.00005	0.002	0.02	0.02
WS4-D	7/08/2020	LOR	1	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.0001	0.003	<0.02	<0.02
WS4-D	10/09/2020	LOR	1	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.00005	<0.005	0.012	<0.001	<0.001	<0.001	<0.00005	0.002	0.02	0.02

Table C
Surface Water Results: MTBE, BTEX and TRH

Definitions:

MWG (Marine Water Guideline) for slightly - moderately disturbed systems, RWG (Recreational Water Guidelines)

LOR (Limits of Reporting), '-' denotes no guideline. --- denotes not tested. ^ denotes guideline for hexavalent chromium has been adopted, analysis results are for total chromium.

denotes aesthetic guideline has been applied in the absence of a health based guideline.

Notes:

All values in mg/L unless specified otherwise

All guideline values are adopted from:

- 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)

- Health screening for petroleum hydrocarbons in soil and groundwater Part 2: Application document (CRC Care 2011)

a) Value may not protect key test species from chronic toxicity, refer to chapter eight of ANZECC & ARMCANZ (2000)

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

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

Denotes <LOR

Sample ID	Date	Trigger	MTBE		BTEX					TRH					Polycyclic Aromatic Hydrocarbons														
			MTBE	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-xylene	F1: C6-C10 minus BTEX	F2: C>10-C16 minus N	F3: C>16-C44	F4: C>34-C40	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b,j)fluoranthene	Benzo(a)pyrene	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	mg/L		
			MWG	-	0.50 ^a	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
WS1 - S	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS1 - D	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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		
WS2 - S	7/08/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS2 - S	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS2 - D	7/08/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS2 - D	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS3 - S	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS4 - S	7/08/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS4 - S	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS4 - D	7/08/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	
WS4 - D	10/09/2020		<1	<1	<1	<1	<2	<1	<10	<50	<100	<100	<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	<0.0001	<0.0005	<0.0001	

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 guideline for hexavalent chromium has been adopted, analysis results are for total chromium.

denotes aesthetic guideline has been applied in the absence of a health based guideline.

Notes:

All values in mg/L unless specified otherwise

All guideline values are adopted from:

- 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)

a) 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 ANZECC & ARMCANZ (2000).

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

Where applicable, the following groundwater characteristics have been applied based on, groundwater depth 2 m to <4 mbog.

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

denotes <LOR

denotes EOR

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 µg/L unless specified otherwise

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

All guideline values are adopted from

- PFAS National
Report and Q&A

Denotes <LOR

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

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	Acid Sulfate Soil Parameters								Cations					Nutrients					Miscellaneous			
				Total Acidity (CaCO ₃)	Total Alkalinity (CaCO ₃)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN	NH ₃ -N	NO _x -N	Dissolved Organic Carbon (DOC)	Chlorophyll "a"	Phaeophytin "a"	
				Units	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	
				LOR	1	1	10	5	0.1	0.1	1	1	1	1	1	0.01	0.01	0.1	0.1	0.01	0.01	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	0.093	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	0.091	0.009	<0.005	<1	0.0005	0.0003
RPD %					15	0	0	40	0	12	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	0.191	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	0.192	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	1	12	0	0	0	18

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																			
				Aluminium		Antimony		Arsenic		Cadmium		Cobalt		Chromium		Copper		Iron		Mercury		Manganese		Molybdenum		Nickel		Lead		Selenium		Silver		Zinc		Total Aluminium		Total Iron	
				Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L	Units	mg/L						
				LOR	0.01	0.001	0.001	0.0001	0.002	0.001	0.001	0.02	0.05	0.00005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.01	0.01	0.02	0.02					
WS2-S	Primary	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.012	<0.002	<0.002	<0.002	<0.0001	0.003	<0.02	<0.02																	
WZ1	Duplicate			<0.02	<0.002	<0.002	<0.0002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.00005	<0.01	0.013	<0.002	<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	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	<0.00005	<0.005	0.012	<0.001	<0.001	<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	<0.00005	<0.005	0.013	<0.001	<0.001	<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	0	0	18	40	0	40															

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 <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

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

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

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

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 LOQ

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														
				Aluminum		Antimony		Arsenic		Cadmium		Cobalt		Chromium		Copper		Iron		Mercury		Manganese		Molybdenum		Nickel		Lead		Selenium		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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	NTU					
				LOR	0.01	0.001	0.001	0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00005	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.00005	0.001	0.001	0.01	0.01	0.1						
Rinsates																																				
WR1	Water	7/08/2020		<0.01	<0.001	<0.001	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.005	<0.001	<0.001	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.001	<0.01	<0.01	0.1								
Field Blank																																				
WB1	Water	7/08/2020		<0.01	<0.001	<0.001	<0.0001	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.005	<0.001	<0.001	<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	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.001	<0.01	<0.01	0.1								

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

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
			LOR	0.00001	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	0.00002
Rinsates																							
WR1	Water	07/0/2020		<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	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<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
Field Blank																							
WB1	Water	07/0/2020		<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	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	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	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002

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

All values in mg/L unless specified otherwise

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

denotes <LOR (primary label).

denotes exceedance of acceptance criteria

For more information about the study, please contact Dr. John Smith at (555) 123-4567 or via email at john.smith@researchinstitute.org.

Sample ID	Sample type	Date	Trigger	Perfluoroalkyl Sulfonic Acids								Perfluoroalkyl Carboxylic Acids								Perfluoroalkyl Sulfonamides								(n:2) Fluorotelomer Sulfonic Acids				PFAS Sums			
				LOR	Perfluorobutanesulfonic acid µg/L	Perfluoropentanesulfonic acid µg/L	Perfluorohexanesulfonic acid µg/L	Perfluorohexanesulfonic acid µg/L	Perfluoroheptanesulfonic acid µg/L	Perfluoroheptanesulfonic acid µg/L	Perfluoroctanesulfonate PFOS µg/L	Perfluoroctanesulfonic acid µg/L	Perfluorodecanesulfonic acid µg/L	Perfluorobutanoic acid µg/L	Perfluoropentanoic acid µg/L	Perfluorohexanoic acid µg/L	Perfluorohexanoic acid µg/L	Perfluoroheptanoic acid PFOA µg/L	Perfluorononanoic acid µg/L	Perfluorodecanoic acid µg/L	Perfluoroundecanoic acid µg/L	Perfluorododecanoic acid µg/L	Perfluorotetradecanoic acid µg/L	Perfluorooctane sulfonamide µg/L	N-Methyl perfluorooctane sulfonamide µg/L	N-Ethyl perfluorooctane sulfonamide µg/L	MePerfluorooctanesulf- amid oacetic acid µg/L	EtPerfluorooctanesulf- amid oacetic acid µg/L	4:2 FTSA µg/L	6:2 FTSA µg/L	8:2 FTSA µg/L	10:2 FTSA µg/L	Total Positive PFHxS & PFOS µg/L	Total Positive PFAS & PFOA µg/L	
WR1	Water	7/08/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	0.0003	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	0.0003	0.0003
WR1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.005	<0.01	<0.005	<0.01	<0.002	<0.002	<0.0002	<0.0002	<0.0002	<0.0002			
Rinsates																																			
WB1	Water	7/08/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	
WB1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.005	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	
Field Blank																																			
WB1	Water	7/08/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	
WB1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.005	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	
Trip-Blank																																			
WTB1	Water	7/08/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	
WTB1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.005	<0.01	<0.005	<0.01	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	

FIGURE





Figure A
Swan River crossing
Water quality sampling locations

Document Path: G:\Jobs\C_Jobs\Jobs\C20078 - MRWA SR Bridge\Figures C20078-004\C20078-004_G_001_Fig A Proposed WQ Sampling_200629.mxd



Appendix A

Laboratory reports

CHAIN OF CUSTODY

Site:	Fremantle Traffic Bridge		Analytical suites												Page number:	1 of 1							
	Project reference:	EEC20078.004 <th rowspan="2">Monthly water suite</th> <th rowspan="2">metals, turbidity, TRH/BTEX, PAH, OCP, PFAS</th> <th rowspan="2">BTEX, TRH (C6-C9), PFAS only</th> <th colspan="10"></th>	Monthly water suite	metals, turbidity, TRH/BTEX, PAH, OCP, PFAS	BTEX, TRH (C6-C9), PFAS only																		
Scientist(s):	SMW & ZL											Turnaround time:	Standard										
Sample type(s):	Water											Quote number:	20P194v2										
Report to:	Alan Foley & Shae Miller-White											Remarks											
Invoice to:	west.accountspayable@rpsgroup.com																						
Sample I.D.	Date collected	Number of jars / bottles / bags																					
1	WS1-S	10/09/2020	As per quote	X																			
2	WS1-D	10/09/2020		X																			
3	WS2-S	10/09/2020		X																			
4	WS2-D	10/09/2020		X																			
5	WS3-S	10/09/2020		X																			
6	WS4-S	10/09/2020		X																			
7	WS4-D	10/09/2020		X																			
8	W21	10/09/2020		X																			
9	WR1	10/09/2020		X																			
10	WR1 W81	10/09/2020		X																			
11	WTB1	10/09/2020		X																			
Total number of bottles/bags/jars															Laboratory ID: 249938 Rec - 10-9 Time Rec - 1540 Rec By - MC TAT Req - SAME 1/2 STD Temp req - Ambient Cooling - Ice / Ice pack None Seal - Yes No								
Primary destination: MPL			Received by: MC			Secondary destination:			Received by:														
Relinquished by: Shae Miller-White			Organisation: MPL			Relinquished by:			Organisation:														
Organisation: RPS			Date: 10-9-20			Organisation:			Date:														
Date: 10-Sep			Time: 1540			Date:			Time:														
Time:																							

CERTIFICATE OF ANALYSIS 249938

Client Details

Client	RPS Australia West Pty Ltd
Attention	Shae Miller-White
Address	Level 2, 27-31 Troode St, WEST PERTH, WA, 6005

Sample Details

Your Reference	<u>EEC20078.004 - Fremantle Traffic Bridge</u>
Number of Samples	11 Water
Date samples received	10/09/2020
Date completed instructions received	10/09/2020

Analysis Details

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

Report Details

Date results requested by	24/09/2020
Date of Issue	24/09/2020
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Heram Halim, Operations Manager
 Huong Tran, Chemist
 Travis Carey, Organics - Team Leader

Authorised By



Michael Kubiak, Laboratory Manager

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		13/09/2020	13/09/2020	13/09/2020	13/09/2020	13/09/2020
TRH C ₆ - C ₉	µg/L	10	<10	<10	<10	<10	<10
TRH C ₆ - C ₁₀	µg/L	10	<10	<10	<10	<10	<10
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
MTBE	µg/L	1	<1	<1	<1	<1	<1
Benzene	µg/L	1	<1	<1	<1	<1	<1
Toluene	µg/L	1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	1	<1	<1	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1	<1	<1
Naphthalene	µg/L	1	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%		99	98	99	97	98
Surrogate toluene-d8	%		95	95	96	96	96
Surrogate 4-BFB	%		102	101	102	100	101

vTRH(C6-C10)/MBTEXN in water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		13/09/2020	13/09/2020	13/09/2020	13/09/2020	13/09/2020
TRH C ₆ - C ₉	µg/L	10	<10	<10	<10	<10	<10
TRH C ₆ - C ₁₀	µg/L	10	<10	<10	<10	<10	<10
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
MTBE	µg/L	1	<1	<1	<1	<1	<1
Benzene	µg/L	1	<1	<1	<1	<1	<1
Toluene	µg/L	1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	1	<1	<1	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1	<1	<1
Naphthalene	µg/L	1	<1	<1	<1	<1	<1
Surrogate Dibromofluoromethane	%		97	97	97	97	96
Surrogate toluene-d8	%		95	97	95	96	97
Surrogate 4-BFB	%		103	101	102	103	99

vTRH(C6-C10)/MBTEXN in water			
Our Reference	UNITS	PQL	249938-11
Your Reference			WTB1
Date Sampled			10/09/2020
Type of sample			Water
Date analysed	-		13/09/2020
TRH C ₆ - C ₉	µg/L	10	<10
TRH C ₆ - C ₁₀	µg/L	10	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	10	<10
MTBE	µg/L	1	<1
Benzene	µg/L	1	<1
Toluene	µg/L	1	<1
Ethylbenzene	µg/L	1	<1
m+p-xylene	µg/L	2	<2
o-xylene	µg/L	1	<1
Naphthalene	µg/L	1	<1
Surrogate Dibromofluoromethane	%		96
Surrogate toluene-d8	%		96
Surrogate 4-BFB	%		101

svTRH(C10-C40) in water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		16/09/2020	16/09/2020	16/09/2020	16/09/2020	16/09/2020
TRH C ₁₀ - C ₁₄	µg/L	50	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	100	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	100	<100	<100	<100	<100	<100
TRH >C ₁₀ - C ₁₆	µg/L	50	<50	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆ less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C ₁₆ - C ₃₄	µg/L	100	<100	<100	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		93	118	109	113	116

svTRH(C10-C40) in water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		16/09/2020	16/09/2020	16/09/2020	16/09/2020	16/09/2020
TRH C ₁₀ - C ₁₄	µg/L	50	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	100	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	100	<100	<100	<100	<100	<100
TRH >C ₁₀ - C ₁₆	µg/L	50	<50	<50	<50	<50	<50
TRH >C ₁₀ -C ₁₆ less N (F2)	µg/L	50	<50	<50	<50	<50	<50
TRH >C ₁₆ - C ₃₄	µg/L	100	<100	<100	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	100	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%		111	107	101	89	88

PAHs in Water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-		17/09/2020	17/09/2020	17/09/2020	17/09/2020	17/09/2020
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 ₁₄	%		85	89	88	87	88

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

PAHs in Water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-		17/09/2020	17/09/2020	17/09/2020	17/09/2020	17/09/2020
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 ₁₄	%		91	90	86	88	70

Low Level OCP in water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-		17/09/2020	17/09/2020	17/09/2020	17/09/2020	17/09/2020
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	%		88	92	93	91	90

Low Level OCP in water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		14/09/2020	14/09/2020	14/09/2020	14/09/2020	14/09/2020
Date analysed	-		17/09/2020	17/09/2020	17/09/2020	17/09/2020	17/09/2020
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	%		95	96	92	89	82

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Total Dissolved Solids (grav)	mg/L	5	36,000	36,000	36,000	35,000	35,000
Total Suspended Solids	mg/L	5	<5	<5	<5	<5	14
Turbidity	NTU	0.1	0.5	0.7	0.6	0.6	1.8
Dissolved Organic Carbon	mg/L	1	2	2	2	2	2
Acidity as CaCO ₃	mg/L	5	9	9	9	9	7
Sulphide in water*	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Miscellaneous Inorganics							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Total Dissolved Solids (grav)	mg/L	5	35,000	35,000	36,000	[NA]	[NA]
Total Suspended Solids	mg/L	5	11	7	6	[NA]	[NA]
Turbidity	NTU	0.1	0.5	0.7	0.7	0.1	0.1
Dissolved Organic Carbon	mg/L	1	2	2	2	[NA]	[NA]
Acidity as CaCO ₃	mg/L	5	9	9	9	[NA]	[NA]
Sulphide in water*	mg/L	0.5	0.6	<0.5	<0.5	[NA]	[NA]

Ionic Balance							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Calcium - Dissolved	mg/L	0.5	390	390	410	380	390
Potassium - Dissolved	mg/L	0.5	360	360	360	350	350
Magnesium - Dissolved	mg/L	0.5	1,200	1,200	1,300	1,200	1,200
Sodium - Dissolved	mg/L	0.5	11,000	11,000	11,000	11,000	11,000
Bicarbonate HCO ₃ as CaCO ₃	mg/L	5	120	120	120	120	120
Carbonate CO ₃ ²⁻ as CaCO ₃	mg/L	5	<5	<5	<5	<5	<5
Hydroxide OH ⁻ as CaCO ₃	mg/L	5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	5	120	120	120	120	120
Chloride	mg/L	1	18,000	18,000	19,000	18,000	19,000
Sulphate	mg/L	1	2,400	2,400	2,400	2,400	2,400
Ionic Balance	%		3.1	2.2	4.1	2.6	1.6
Hardness as CaCO ₃	mg/L	3	6,100	6,100	6,400	5,900	6,000

Ionic Balance					
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8
Your Reference			WS4-S	WS4-D	WZ1
Date Sampled			10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020
Calcium - Dissolved	mg/L	0.5	390	370	400
Potassium - Dissolved	mg/L	0.5	350	340	360
Magnesium - Dissolved	mg/L	0.5	1,200	1,200	1,300
Sodium - Dissolved	mg/L	0.5	11,000	10,000	11,000
Bicarbonate HCO ₃ as CaCO ₃	mg/L	5	120	120	120
Carbonate CO ₃ ²⁻ as CaCO ₃	mg/L	5	<5	<5	<5
Hydroxide OH ⁻ as CaCO ₃	mg/L	5	<5	<5	<5
Total Alkalinity as CaCO ₃	mg/L	5	120	120	120
Chloride	mg/L	1	18,000	18,000	18,000
Sulphate	mg/L	1	2,400	2,400	2,300
Ionic Balance	%		3.0	1.2	4.7
Hardness as CaCO ₃	mg/L	3	6,100	5,800	6,200

Nutrients in Water							
Our Reference			249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020
Total Nitrogen	mg/L	0.1	0.2	0.2	0.2	0.2	0.2
NOx as N	mg/L	0.005	<0.005	<0.005	0.009	0.009	<0.005
Ammonia as N	mg/L	0.005	0.009	0.008	0.007	0.006	<0.005
Total Phosphorus	mg/L	0.01	0.03	0.03	0.03	0.03	0.04
Phosphate as P	mg/L	0.005	0.006	0.005	<0.005	<0.005	0.005

Nutrients in Water					
Our Reference			249938-6	249938-7	249938-8
Your Reference	UNITS	PQL	WS4-S	WS4-D	WZ1
Date Sampled			10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water
Date prepared	-		11/09/2020	11/09/2020	11/09/2020
Date analysed	-		11/09/2020	11/09/2020	11/09/2020
Total Nitrogen	mg/L	0.1	0.2	0.2	0.2
NOx as N	mg/L	0.005	0.01	0.008	<0.005
Ammonia as N	mg/L	0.005	0.008	0.007	0.008
Total Phosphorus	mg/L	0.01	0.03	0.03	0.03
Phosphate as P	mg/L	0.005	<0.005	<0.005	<0.005

Dissolved Metals in Water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	0.00006	0.00006	<0.00005	0.00006	<0.00005
Aluminium-Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic-Dissolved	mg/L	0.001	0.002	0.002	0.002	0.002	0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001
Iron-Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Molybdenum-Dissolved	mg/L	0.001	0.012	0.012	0.012	0.012	0.012
Nickel-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc-Dissolved	mg/L	0.001	0.002	0.003	0.003	0.003	0.003

Dissolved Metals in Water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Aluminium-Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic-Dissolved	mg/L	0.001	0.002	0.002	0.002	<0.001	<0.001
Cadmium-Dissolved	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron-Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Molybdenum-Dissolved	mg/L	0.001	0.012	0.012	0.013	<0.001	<0.001
Nickel-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium-Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc-Dissolved	mg/L	0.001	0.002	0.002	0.003	<0.001	<0.001

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

Total Metals in water							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date digested	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Aluminium-Total	mg/L	0.01	0.02	0.03	0.02	0.02	0.05
Iron-Total	mg/L	0.01	0.02	0.04	0.02	0.02	0.08

Total Metals in water							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date digested	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Date analysed	-		15/09/2020	15/09/2020	15/09/2020	15/09/2020	15/09/2020
Aluminium-Total	mg/L	0.01	0.02	0.02	0.02	<0.01	<0.01
Iron-Total	mg/L	0.01	0.02	0.02	0.03	<0.01	<0.01

Chlorophyll a & Phaeophytin a							
Our Reference			249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	1.2	0.8	1.0	1.1	0.6
Phaeophytin a	µg/L	0.2	0.6	0.6	0.5	0.4	0.8

Chlorophyll a & Phaeophytin a					
Our Reference			249938-6	249938-7	249938-8
Your Reference	UNITS	PQL	WS4-S	WS4-D	WZ1
Date Sampled			10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water
Chlorophyll a	µg/L	0.1	0.7	0.8	1.2
Phaeophytin a	µg/L	0.2	0.7	0.6	0.5

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		18/09/2020	18/09/2020	18/09/2020	18/09/2020	18/09/2020
Date analysed	-		18/09/2020	18/09/2020	18/09/2020	18/09/2020	18/09/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	0.0004	<0.0004	<0.0004	<0.0004	0.0005
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexamersulfonic acid	µg/L	0.0002	0.0020	0.0020	0.0020	0.0020	0.0030
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0030	0.0026	0.0024	0.0022	0.0044
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	0.001	0.001	0.001	0.001	0.001
Perfluoroheptanoic acid	µg/L	0.0004	0.0004	0.0004	0.0004	0.0005	0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0006	0.0006	0.0005	0.0006	0.0006
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 ¹³ C ₈ PFOS	%		103	104	99	92	97
Surrogate ¹³ C ₂ PFOA	%		94	95	98	93	99
Extracted ISTD ¹³ C ₃ PFBS	%		92	91	90	87	90
Extracted ISTD ¹⁸ O ₂ PFHxS	%		89	82	87	85	85
Extracted ISTD ¹³ C ₄ PFOS	%		66	61	62	62	60
Extracted ISTD ¹³ C ₄ PFBA	%		64	64	68	64	68

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	249938-1	249938-2	249938-3	249938-4	249938-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD ¹³ C ₃ PFPeA	%		71	69	71	70	71
Extracted ISTD ¹³ C ₂ PFHxA	%		84	76	79	76	76
Extracted ISTD ¹³ C ₄ PFHpA	%		110	101	106	101	100
Extracted ISTD ¹³ C ₄ PFOA	%		122	112	115	111	108
Extracted ISTD ¹³ C ₅ PFNA	%		97	89	93	92	87
Extracted ISTD ¹³ C ₂ PFDA	%		81	73	73	71	67
Extracted ISTD ¹³ C ₂ PFUnDA	%		72	56	53	54	51
Extracted ISTD ¹³ C ₂ PFDoDA	%		75	57	49	52	50
Extracted ISTD ¹³ C ₂ PFTeDA	%		49	48	54	47	49
Extracted ISTD ¹³ C ₂ 4:2FTS	%		155	120	128	125	124
Extracted ISTD ¹³ C ₂ 6:2FTS	%		133	107	104	111	109
Extracted ISTD ¹³ C ₂ 8:2FTS	%		77	70	71	69	56
Extracted ISTD ¹³ C ₈ FOSA	%		45	42	42	42	39
Extracted ISTD d ₃ N MeFOSA	%		47	33	31	37	32
Extracted ISTD d ₅ N EtFOSA	%		47	33	32	38	34
Extracted ISTD d ₇ N MeFOSE	%		49	43	42	43	41
Extracted ISTD d ₉ N EtFOSE	%		51	41	40	43	41
Extracted ISTD d ₃ N MeFOSAA	%		57	42	40	41	36
Extracted ISTD d ₅ N EtFOSAA	%		61	45	44	42	38
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0050	0.0046	0.0044	0.0042	0.0074
Total Positive PFOS & PFOA	µg/L	0.0002	0.0036	0.0032	0.0029	0.0028	0.0050
Total Positive PFAS	µg/L	0.0002	0.0074	0.0066	0.0063	0.0063	0.0099

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		18/09/2020	18/09/2020	18/09/2020	18/09/2020	18/09/2020
Date analysed	-		18/09/2020	18/09/2020	18/09/2020	18/09/2020	18/09/2020
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	0.0020	0.0020	0.0020	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0025	0.0025	0.0026	<0.0002	<0.0002
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	0.001	0.001	0.001	<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	0.0006	0.0006	0.0005	<0.0002	<0.0002
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 ¹³ C ₈ PFOS	%		101	100	101	102	99
Surrogate ¹³ C ₂ PFOA	%		98	100	100	95	98
Extracted ISTD ¹³ C ₃ PFBS	%		88	87	89	86	88
Extracted ISTD ¹⁸ O ₂ PFHxS	%		86	84	89	87	84
Extracted ISTD ¹³ C ₄ PFOS	%		61	60	64	69	63
Extracted ISTD ¹³ C ₄ PFBA	%		60	62	67	92	95

PFAS in water TRACE Extended							
Our Reference	UNITS	PQL	249938-6	249938-7	249938-8	249938-9	249938-10
Your Reference			WS4-S	WS4-D	WZ1	WR1	WB1
Date Sampled			10/09/2020	10/09/2020	10/09/2020	10/09/2020	10/09/2020
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD ¹³ C ₃ PFPeA	%		67	65	69	90	92
Extracted ISTD ¹³ C ₂ PFHxA	%		74	74	77	81	83
Extracted ISTD ¹³ C ₄ PFHpA	%		99	96	105	109	107
Extracted ISTD ¹³ C ₄ PFOA	%		109	103	113	123	121
Extracted ISTD ¹³ C ₅ PFNA	%		87	87	93	89	89
Extracted ISTD ¹³ C ₂ PFDA	%		74	67	76	80	71
Extracted ISTD ¹³ C ₂ PFUnDA	%		65	58	59	75	63
Extracted ISTD ¹³ C ₂ PFDoDA	%		65	56	56	73	58
Extracted ISTD ¹³ C ₂ PFTeDA	%		45	51	56	70	79
Extracted ISTD ¹³ C ₂ 4:2FTS	%		116	117	117	81	87
Extracted ISTD ¹³ C ₂ 6:2FTS	%		108	109	112	98	102
Extracted ISTD ¹³ C ₂ 8:2FTS	%		64	66	71	69	79
Extracted ISTD ¹³ C ₈ FOSA	%		43	39	43	23	49
Extracted ISTD d ₃ N MeFOSA	%		33	35	36	20	40
Extracted ISTD d ₅ N EtFOSA	%		34	34	38	21	39
Extracted ISTD d ₇ N MeFOSE	%		42	43	44	21	45
Extracted ISTD d ₉ N EtFOSE	%		44	41	43	22	46
Extracted ISTD d ₃ N MeFOSAA	%		45	41	45	57	45
Extracted ISTD d ₅ N EtFOSAA	%		50	45	48	59	52
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0045	0.0045	0.0046	<0.0002	<0.0002
Total Positive PFOS & PFOA	µg/L	0.0002	0.0031	0.0031	0.0031	<0.0002	<0.0002
Total Positive PFAS	µg/L	0.0002	0.0065	0.0065	0.0061	<0.0002	<0.0002

PFAS in water TRACE Extended			
Our Reference	UNITS	PQL	249938-11
Your Reference			WTB1
Date Sampled			10/09/2020
Type of sample			Water
Date prepared	-		18/09/2020
Date analysed	-		18/09/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	<0.0002
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	<0.0002
Perfluorononanoic acid	µg/L	0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002
Surrogate ¹³ C ₈ PFOS	%		102
Surrogate ¹³ C ₂ PFOA	%		95
Extracted ISTD ¹³ C ₃ PFBS	%		90
Extracted ISTD ¹⁸ O ₂ PFHxS	%		84
Extracted ISTD ¹³ C ₄ PFOS	%		59
Extracted ISTD ¹³ C ₄ PFBA	%		98

PFAS in water TRACE Extended			
Our Reference	UNITS	PQL	249938-11
Your Reference			WTB1
Date Sampled			10/09/2020
Type of sample			Water
<i>Extracted ISTD ¹³C₃ PFPeA</i>	%		94
<i>Extracted ISTD ¹³C₂ PFHxA</i>	%		84
<i>Extracted ISTD ¹³C₄ PFHpA</i>	%		115
<i>Extracted ISTD ¹³C₄ PFOA</i>	%		124
<i>Extracted ISTD ¹³C₅ PFNA</i>	%		94
<i>Extracted ISTD ¹³C₂ PFDA</i>	%		70
<i>Extracted ISTD ¹³C₂ PFUnDA</i>	%		56
<i>Extracted ISTD ¹³C₂ PFDoDA</i>	%		50
<i>Extracted ISTD ¹³C₂ PFTeDA</i>	%		87
<i>Extracted ISTD ¹³C₂ 4:2FTS</i>	%		83
<i>Extracted ISTD ¹³C₂ 6:2FTS</i>	%		109
<i>Extracted ISTD ¹³C₂ 8:2FTS</i>	%		67
<i>Extracted ISTD ¹³C₈ FOSA</i>	%		49
<i>Extracted ISTD d₃ N MeFOSA</i>	%		35
<i>Extracted ISTD d₅ N EtFOSA</i>	%		34
<i>Extracted ISTD d₇ N MeFOSE</i>	%		44
<i>Extracted ISTD d₉ N EtFOSE</i>	%		43
<i>Extracted ISTD d₃ N MeFOSAA</i>	%		42
<i>Extracted ISTD d₅ N EtFOSAA</i>	%		50
Total Positive PFHxS & PFOS	µg/L	0.0002	<0.0002
Total Positive PFOS & PFOA	µg/L	0.0002	<0.0002
Total Positive PFAS	µg/L	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 after SPE. 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: EEC20078.004 - Fremantle Traffic Bridge

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	-			13/09/2020	[NT]	[NT]	[NT]	[NT]	13/09/2020	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	99	[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]	98	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	102	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	96	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	99	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	99	[NT]
Surrogate toluene-d8	%		Org-023	97	[NT]	[NT]	[NT]	[NT]	98	[NT]
Surrogate 4-BFB	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	98	[NT]

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: svTRH(C10-C40) in water						Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2	
Date extracted	-			15/09/2020	[NT]	[NT]	[NT]	[NT]	15/09/2020	15/09/2020	
Date analysed	-			16/09/2020	[NT]	[NT]	[NT]	[NT]	16/09/2020	16/09/2020	
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	106	101	
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	93	
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	89	
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	100	94	
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	100	94	
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	89	
Surrogate o-Terphenyl	%		Org-020	106	[NT]	[NT]	[NT]	[NT]	93	107	

QUALITY CONTROL: PAHs in Water					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-10	
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020	
Date analysed	-			17/09/2020	1	17/09/2020	17/09/2020		17/09/2020	17/09/2020	
Naphthalene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	132	
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	94	84	
Phenanthrenene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	66	70	
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	95	83	
Pyrene	µg/L	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	84	
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	93	93	
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	106	87	
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 ₁₄	%		Org-022/025	87	1	85	82	4	100	92	

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: Low Level OCP in water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-10
Date extracted	-			14/09/2020	1	14/09/2020	14/09/2020		14/09/2020	14/09/2020
Date analysed	-			17/09/2020	1	17/09/2020	17/09/2020		17/09/2020	17/09/2020
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	101	85
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	99	82
Heptachlor	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	102	92
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	102	89
Heptachlor Epoxide	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	104	92
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	100	89
Dieldrin	µg/L	0.01	Org-022/025	<0.01	1	<0.01	<0.01	0	102	84
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	102	91
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	103	91
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	88	1	88	85	3	98	93

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	[NT]
Date analysed	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	[NT]
Total Dissolved Solids (grav)	mg/L	5	INORG-018	<5	1	36000	36000	0	105	[NT]
Total Suspended Solids	mg/L	5	INORG-019	<5	1	<5	<5	0	96	[NT]
Turbidity	NTU	0.1	INORG-022	<0.1	1	0.5	0.5	0	110	[NT]
Dissolved Organic Carbon	mg/L	1	INORG-110	<1	1	2	[NT]		102	[NT]
Acidity as CaCO ₃	mg/L	5	INORG-005	<5	1	9	9	0	102	[NT]
Sulphide in water*	mg/L	0.5	INORG-051	<0.5	1	<0.5	[NT]		82	[NT]

QUALITY CONTROL: Ionic Balance					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2	
Date prepared	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	11/09/2020	
Date analysed	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	11/09/2020	
Calcium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	390	390	0	102	[NT]	
Potassium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	360	360	0	102	[NT]	
Magnesium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	1200	1300	8	102	[NT]	
Sodium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	11000	11000	0	102	[NT]	
Bicarbonate HCO ₃ as CaCO ₃	mg/L	5	INORG-006	<5	1	120	120	0	103	[NT]	
Carbonate CO ₃ ²⁻ as CaCO ₃	mg/L	5	INORG-006	<5	1	<5	<5	0	103	[NT]	
Total Alkalinity as CaCO ₃	mg/L	5	INORG-006	<5	1	120	120	0	103	[NT]	
Chloride	mg/L	1	INORG-081	<1	1	18000	18000	0	91	104	
Sulphate	mg/L	1	INORG-081	<1	1	2400	2400	0	87	103	
Hardness as CaCO ₃	mg/L	3	METALS-008	<3	1	6100	6100	0	[NT]	[NT]	

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: Nutrients in Water					Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2	
Date prepared	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	11/09/2020	
Date analysed	-			11/09/2020	1	11/09/2020	11/09/2020		11/09/2020	11/09/2020	
Total Nitrogen	mg/L	0.1	INORG-110	<0.1	1	0.2	0.2	0	112	[NT]	
NOx as N	mg/L	0.005	INORG-055	<0.005	1	<0.005	<0.005	0	100	104	
Ammonia as N	mg/L	0.005	INORG-057	<0.005	1	0.009	0.009	0	88	99	
Total Phosphorus	mg/L	0.01	INORG-060	<0.01	1	0.03	0.03	0	106	115	
Phosphate as P	mg/L	0.005	INORG-060	<0.005	1	0.006	0.006	0	108	111	

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QUALITY CONTROL: Dissolved Metals in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	[NT]
Date analysed	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	<0.00005	1	0.00006	0.00005	18	102	[NT]
Aluminium-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.01	<0.01	0	99	[NT]
Arsenic-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.002	0.002	0	97	[NT]
Cadmium-Dissolved	mg/L	0.0001	METALS-022	<0.0001	1	<0.0001	<0.0001	0	100	[NT]
Cobalt-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	89	[NT]
Chromium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	94	[NT]
Copper-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	89	[NT]
Iron-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.01	<0.01	0	107	[NT]
Mercury-Dissolved	mg/L	0.00005	METALS-021	<0.00005	1	<0.00005	<0.00005	0	102	[NT]
Manganese-Dissolved	mg/L	0.005	METALS-022	<0.005	1	<0.005	<0.005	0	94	[NT]
Molybdenum-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.012	0.012	0	103	[NT]
Nickel-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	89	[NT]
Lead-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	91	[NT]
Antimony-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	106	[NT]
Selenium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.001	<0.001	0	100	[NT]
Zinc-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.002	0.003	40	93	[NT]

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: Total Metals in water							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2
Date digested	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Date analysed	-			15/09/2020	1	15/09/2020	15/09/2020		15/09/2020	15/09/2020
Aluminium-Total	mg/L	0.01	METALS-022	<0.01	1	0.02	0.02	0	106	101
Iron-Total	mg/L	0.01	METALS-022	<0.01	1	0.02	0.02	0	102	88

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

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: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2
Date prepared	-			18/09/2020	1	18/09/2020	18/09/2020		18/09/2020	18/09/2020
Date analysed	-			18/09/2020	1	18/09/2020	18/09/2020		18/09/2020	18/09/2020
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0004	<0.0004	0	102	106
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	98	111
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	<0.0002	1	0.0020	0.0020	0	103	111
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	102	106
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	<0.0002	1	0.0030	0.0030	0	106	110
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	77	80
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	99	106
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	103	115
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.001	0.001	0	103	103
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0004	0.0004	0	100	106
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	1	0.0006	0.0006	0	104	104
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	101	104
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	113	102
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	101	101
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	110	127
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	90	87
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	105	97
4:2 FTS	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	102	107
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	107	111
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	96	93
10:2 FTS	µg/L	0.002	Org-029	<0.001	1	<0.002	<0.002	0	99	117
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	107	121
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	137	133
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	137	131
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	112	128
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	119	140
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	114	113
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	109	125
Surrogate ¹³ C ₈ PFOS	%		Org-029	103	1	103	98	5	99	99
Surrogate ¹³ C ₂ PFOA	%		Org-029	98	1	94	97	3	101	96
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	90	1	92	91	1	93	92

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	86	1	89	85	5	94	86
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	63	1	66	60	10	70	62
Extracted ISTD ¹³ C ₄ PFBA	%		Org-029	97	1	64	69	8	97	68
Extracted ISTD ¹³ C ₃ PFPeA	%		Org-029	96	1	71	71	0	92	68
Extracted ISTD ¹³ C ₂ PFHxA	%		Org-029	93	1	84	80	5	92	78
Extracted ISTD ¹³ C ₄ PFHpA	%		Org-029	119	1	110	103	7	115	102
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	127	1	122	113	8	127	110
Extracted ISTD ¹³ C ₅ PFNA	%		Org-029	83	1	97	87	11	91	88
Extracted ISTD ¹³ C ₂ PFDA	%		Org-029	65	1	81	70	15	69	73
Extracted ISTD ¹³ C ₂ PFUnDA	%		Org-029	63	1	72	54	29	65	59
Extracted ISTD ¹³ C ₂ PFDoDA	%		Org-029	57	1	75	51	38	56	55
Extracted ISTD ¹³ C ₂ PFTeDA	%		Org-029	90	1	49	51	4	99	73
Extracted ISTD ¹³ C ₂ 4:2FTS	%		Org-029	124	1	155	120	25	119	130
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	107	1	133	109	20	93	117
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	78	1	77	66	15	81	81
Extracted ISTD ¹³ C ₈ FOSA	%		Org-029	61	1	45	44	2	60	42
Extracted ISTD d ₃ N MeFOSA	%		Org-029	41	1	47	35	29	35	35
Extracted ISTD d ₅ N EtFOSA	%		Org-029	41	1	47	32	38	33	37
Extracted ISTD d ₇ N MeFOSE	%		Org-029	58	1	49	43	13	56	43
Extracted ISTD d ₉ N EtFOSE	%		Org-029	57	1	51	41	22	52	42

Client Reference: EEC20078.004 - Fremantle Traffic Bridge

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	249938-2
Extracted ISTD d ₃ N MeFOSAA	%		Org-029	53	1	57	40	35	49	45
Extracted ISTD d ₅ N EtFOSAA	%		Org-029	60	1	61	42	37	54	44

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	18/09/2020	18/09/2020		[NT]	[NT]
Date analysed	-			[NT]	11	18/09/2020	18/09/2020		[NT]	[NT]
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	[NT]	11	<0.0002	<0.0002	0	[NT]	[NT]
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	[NT]	11	<0.0002	<0.0002	0	[NT]	[NT]
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorobutanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluoropentanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorohexanoic acid	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	[NT]	11	<0.0002	<0.0002	0	[NT]	[NT]
Perfluorononanoic acid	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
Perfluorodecanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluoroundecanoic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorododecanoic acid	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
Perfluorotridecanoic acid	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
4:2 FTS	µg/L	0.001	Org-029	[NT]	11	<0.001	<0.001	0	[NT]	[NT]
6:2 FTS	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
8:2 FTS	µg/L	0.0004	Org-029	[NT]	11	<0.0004	<0.0004	0	[NT]	[NT]
10:2 FTS	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	[NT]	11	<0.005	<0.005	0	[NT]	[NT]
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Surrogate ¹³ C ₈ PFOS	%		Org-029	[NT]	11	102	99	3	[NT]	[NT]
Surrogate ¹³ C ₂ PFOA	%		Org-029	[NT]	11	95	96	1	[NT]	[NT]
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	[NT]	11	90	77	16	[NT]	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	[NT]	11	84	77	9	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	[NT]	11	59	56	5	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFBA	%		Org-029	[NT]	11	98	89	10	[NT]	[NT]
Extracted ISTD ¹³ C ₃ PFPeA	%		Org-029	[NT]	11	94	81	15	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFHxA	%		Org-029	[NT]	11	84	82	2	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFHpA	%		Org-029	[NT]	11	115	88	27	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	[NT]	11	124	105	17	[NT]	[NT]
Extracted ISTD ¹³ C ₅ PFNA	%		Org-029	[NT]	11	94	91	3	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFDA	%		Org-029	[NT]	11	70	69	1	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFUnDA	%		Org-029	[NT]	11	56	53	6	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFDoDA	%		Org-029	[NT]	11	50	56	11	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFTeDA	%		Org-029	[NT]	11	87	96	10	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 4:2FTS	%		Org-029	[NT]	11	83	86	4	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	[NT]	11	109	103	6	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	[NT]	11	67	94	34	[NT]	[NT]
Extracted ISTD ¹³ C ₈ FOSA	%		Org-029	[NT]	11	49	48	2	[NT]	[NT]
Extracted ISTD d ₃ N MeFOSA	%		Org-029	[NT]	11	35	36	3	[NT]	[NT]
Extracted ISTD d ₅ N EtFOSA	%		Org-029	[NT]	11	34	34	0	[NT]	[NT]
Extracted ISTD d ₇ N MeFOSE	%		Org-029	[NT]	11	44	42	5	[NT]	[NT]
Extracted ISTD d ₉ N EtFOSE	%		Org-029	[NT]	11	43	42	2	[NT]	[NT]

QUALITY CONTROL: PFAS in water TRACE Extended							Duplicate		Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Extracted ISTD d ₃ N MeFOSAA	%		Org-029	[NT]	11	42	47	11	[NT]	[NT]
Extracted ISTD d ₅ N EtFOSAA	%		Org-029	[NT]	11	50	50	0	[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

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

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

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

Chlorophyll a and Phaeophytin a analysis conducted by Marine and Freshwater Research Laboratory. Report MPL20-18.

PFAS analysis conducted by Envirolab Services. Report 251245.

For PFAS Extracted Internal Standards denoted with # or outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).

MeFOSA, EtFOSA and MeFOSAA Extracted Internal Standards are outside of global acceptance criteria (50-150%) for MB and/or LCS but within analyte specific acceptance criteria.



DATA QUALITY ASSESSMENT SUMMARY

Report Details

Envirolab Report Reference	<u>249938</u>
Client ID	RPS Australia West Pty Ltd
Project Reference	EEC20078.004 - Fremantle Traffic Bridge
Date Issued	24/09/2020

QC DATA

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

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
Chlorophyll a & Phaeophytin a					
Chlorophyll a	249938-1	10/09/2020			##
Phaeophytin a	249938-1	10/09/2020			##
Chlorophyll a	249938-2	10/09/2020			##
Phaeophytin a	249938-2	10/09/2020			##
Chlorophyll a	249938-3	10/09/2020			##
Phaeophytin a	249938-3	10/09/2020			##
Chlorophyll a	249938-4	10/09/2020			##
Phaeophytin a	249938-4	10/09/2020			##
Chlorophyll a	249938-5	10/09/2020			##
Phaeophytin a	249938-5	10/09/2020			##
Chlorophyll a	249938-6	10/09/2020			##
Phaeophytin a	249938-6	10/09/2020			##
Chlorophyll a	249938-7	10/09/2020			##
Phaeophytin a	249938-7	10/09/2020			##
Chlorophyll a	249938-8	10/09/2020			##
Phaeophytin a	249938-8	10/09/2020			##

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.

MEMO

Appendix B

Surface water sampling logs

MULTI-PARAMETER METER CALIBRATION RECORD



Project number: EEC20078.004

Site location: Fremantle Ports

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	345197	Nov-20	T °C	mV	T °C	mV	
Model number:		pH 7 buffer	342069	Aug-20	5	273	20	240	
Serial number:		EC buffer	341437	Aug-20	10	262	25	229	
		Zobell B	---	---	15	251	30	218	

SURFACE WATER SAMPLING LOG



Project number: EEC20078.004	Sampling method: Niskin Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky): Yes
Sampling location: WS1	QAQC samples: Duplicate WZ1 sampled at WS1-S
Scientist: Shae Miller-White, Zak Langtry	Tide (High/Low): Low
Date: 10/09/2020	Tide Height (m): 0.61 m (2.35pm)
Weather: Fine / Overcast	Water Column (m): 4.0

Additional details / comments:

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

SURFACE WATER SAMPLING LOG

Project number: EEC20078.004	Sampling method: Niskin Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky): Yes
Sampling location: WS2	QAQC samples: -
Scientist: Shae Miller-White, Zak Langtry	Tide (High/Low): Low
Date: 10/09/2020	Tide Height (m): 0.61 m (2.35pm)
Weather: Fine / Overcast	Water Coloumn (m): 4.0

Additional details / comments:

Other: Low general boat traffic / outgoing tide

SURFACE WATER SAMPLING LOG



Project number: EEC20078.004	Sampling method: Niskin Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky): Yes
Sampling location: WS3	QAQC samples: -
Scientist: Shae Miller-White, Zak Langtry	Tide (High/Low): Low
Date: 10/09/2020	Tide Height (m): 0.61 m (2.35pm)
Weather: Fine / Overcast	Water Column (m): 0.35

Additional details / comments:

Other: Low general boat traffic / outgoing tide

SURFACE WATER SAMPLING LOG



Project number: EEC20078.004	Sampling method: Niskin Flask
Site name: Fremantle Ports - Surface Water	0.45 micron filter used (Y/N): Lab filter
Sampling area: Fremantle Port - Jetty	Sample preservation (ice/esky): Yes
Sampling location: WS4	QAQC samples: -
Scientist: Shae Miller-White, Zak Langtry	Tide (High/Low): Low
Date: 10/09/2020	Tide Height (m): 0.61 m (2.35pm)
Weather: Fine / Overcast	Water Column (m): 4.4

Additional details / comments:

Other: Two tug boats one on each side of the jetty / Large cargo ships being escorted out of the port / Low harbour traffic / Sampling methodology resulting in structure paint flaking