

MEMO

Date: 4 March 2021
 To: Andrew Grime (Arup Senior Engineer)
 From: Alan Foley
 Pages: 9 inc. this page excluding attachments
 Regarding: Surface Water Quality – Event #7 summary

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Fremantle Swan River Crossing – Surface Water Quality Monitoring Event #7

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 is being completed to inform a future Construction Environment Management Plan (CEMP) monitoring program. This memo provides details on the surface water monitoring Event #7, completed in February 2021.

Sampling locations

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

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

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

Table 1: Surface water sampling locations summary

Sampling point	Swan River Bathymetry ^{1,2} (m)	Commentary
WS1	~4.0-6.0 ¹	- Central channel (northern side) - Sample collected from Fremantle Traffic Bridge northern access point
WS2	~4.0-6.0 ¹	- Central channel (southern side) - Sample collected from Fremantle Traffic Bridge southern access point
WS3	~2.0-4.0 ¹	Northern shoreline
WS4	~4.0-5.0 ¹	- Southern shoreline - Small craft pen jetty
WS5	~2.0-6.0 ²	- Southern shoreline - Public jetty - Background location

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

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/inline/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
Event 3	WS1-WS5	October 2020	7/10/2020	Completed
Event 4	WS1-WS5	November 2020	5/11/2020	Completed
Event 5	WS1-WS5	December 2020	3/12/2020	Completed
Event 6	WS1-WS5	January 2021	13/01/2021	Completed
Event 7	WS1-WS5	February 2021	11/02/2020	Completed – this round
Event 8	WS1-WS5	March 2021	-	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* (NEPC, 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.

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

- Where the water column was <2 m (WS3), the sample was collected in the middle of the water column, using a surface water pole sampler.

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

Analysis Program

All samples were analysed for the following analytical suite:

- Dissolved metals and metalloids: aluminium, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silicon, silver, and zinc.
- Total metals: aluminium and iron.
- Major anions: sulfate (SO_4^{2-}), chloride (Cl^-), fluoride (F^-), 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) and 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- and poly-fluoroalkyl substances (PFAS)
- Dissolved organic carbon (DOC)
- Chlorophyll-A and Phaeophytin-A.

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

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

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)

Site conditions

Site conditions noted during the monitoring Event #7 are summarised within Table 3.

Table 3: Site conditions

Items	Commentary
Weather conditions (during sampling event)	Sunny, with south-south-easterly winds in the morning, turning south-south-westerly in the afternoon 15-20 km/hr, maximum temperature of 25°C.
Rainfall (noted during the previous week)	A total of 37 mm of rain recorded at the Perth Station (Number: 9225) in the week prior to sampling.
Tide condition and direction	• Incoming tide. • Closest peak: – Low tide (6:06 am / 0.43 m) – High tide (9:19 pm / 1.12 m)
Fremantle Port and Swan River vessel activities	• WS1: Low general harbour / river traffic during sampling. • WS2: Low general harbour / river traffic during sampling. • WS3: Low general harbour / river traffic during sampling. • WS4: One tugboat located adjacent to sampling location on small craft jetty. Five ships being unloaded. Low general river traffic during sampling. • WS5: No boat traffic during sampling.

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

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

Monitoring Results Discussion

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

Field parameters

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

Table 4: Sampling location field parameters

Sample Location	Depth (m)	Temp (°C)	pH	EC (µS/cm)	Redox (mV)	DO (%sat)
WS1-S	1.00	22.3	8.27	54,769	101	97
WS1-D	3.00	22.3	8.28	54,765	99	100
WS2-S	1.00	22.1	8.19	54,438	87	85
WS2-D	4.00	22.1	8.21	54,527	91	73
WS3-S	0.15	22.5	8.28	54,792	106	67
WS4-S	1.00	22.1	7.99	54,440	100	131
WS4-D	3.00	22.1	8.08	54,460	102	133
WS5-S	1.00	22.2	8.25	54,644	104	98
WS5-D	6.50	22.2	8.27	54,677	101	93.5

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

- Trends:
 - Redox marginally decreased with depth at two locations: WS1 and WS5. Marginal increases of pH with depth were observed at all locations except WS3.
 - Dissolved oxygen decreased with depth at two locations: WS2 and WS5. Increases with depth were observed at all other locations except WS3.
- Guideline exceedances:
 - DO percentage saturation (%sat) did not comply with the MWG (90-110%sat) in five samples; WS2-S, WS2-D, WS3-S, WS4-S and WS4-D and the RWG (>80%sat) in two samples; WS2-D and WS3-S. DO percentage saturations at WS4 were significantly higher than previous sampling events. DO percentage saturations in two samples; WS2-D and WS3-S were significantly lower than the previous sampling event but were within historical ranges. DO percentage values ranged from 67%sat (WS3-S) to 133%sat (WS4-D).

Acid sulfate soil parameters

Acid sulfate soil (ASS) parameters observed during Event #7 can be summarised as follows:

- Total acidity was below the laboratory limit of reporting (LOR) (<5 mg/L) in all samples and therefore was below the relevant guideline. Overall, total acidity concentrations were marginally lower than previous events.

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

- Sulfide concentrations were below the laboratory LOR (<0.5 mg/L) in all samples and therefore were below the relevant guideline. Event #7 sulfide results were marginally lower than previous sampling events.
- Sulfate concentrations exceeded the recreational water guideline (500 mg/L) at all locations with a mean of 2,956 mg/L and a maximum of 3,000 mg/L observed at all locations except; WS1-S, WS2-S and WS2-D. These concentrations are consistent with previous events and is typical of water quality at the mouth of the Swan River.
- Total alkalinity results were consistent throughout all locations with a concentration of 130 mg/L observed at each location. All results were consistent with previous events.

Solids

- TDS concentrations were relatively consistent over all locations and ranged from 37,000 mg/L (WS1-S, WS2, WS4 and WS5-S) to 38,000 mg/L (WS1-D and WS5-D). All results were consistent with previous events.
- TSS ranged from <5 mg/L (WS1-D, WS2-D, WS4-S and WS5-S) to 70 mg/L (WS3-S). These results are higher than the previous event (Event #6) but within the historical range for each location. The increase in TSS during this event is potentially due to the fast incoming tide and the potential to mobilise sediment during sampling events and or inputs from the river catchment after rainfall.
- Turbidity results ranged from 0.4 (WS4-D) to 1.5 (WS3-S) NTU². Turbidity was relatively consistent with previous events with marginal increase observed at WS3-S.

Nutrients

Nutrient analytical results observed during Event #7 can be summarised as follows:

- Total phosphorous exceeded the MWG (0.03 mg/L) in one sample (WS5-D) with a concentration of 0.14 mg/L. This result is higher than previous events for this location. All other results were below the MWG, consistent with previous events.
- Reactive phosphorus (RP) marginally exceeded the MWG (0.005 mg/L) in all samples except WS1-S (<0.005 mg/L). Concentrations ranged from <0.005 mg/L (WS1-S) to 0.01 mg/L (WS2-S and WS2-D), with a mean of 0.007 mg/L, consistent with previous events.
- All nitrogen species were below relevant MWG and RWG assessment criteria. Results were relatively consistent with previous sampling events, with marginal increases in total nitrogen observed at all locations.

Chlorophyll

All Chlorophyll "A" sample results were below the MWG (0.003 mg/L) with a concentration range of 0.0023 mg/L (WS5-D) to 0.003 mg/L (WS4) observed. Results from this event were marginally higher than previous events.

Low concentrations of Phaeophytin "A" were detected within all surface water samples with concentrations ranging from 0.0005 mg/L (WS1 and WS2-S) to 0.0021 mg/L (WS3-S). The result in sample WS3-S was higher than previous sampling events with all other results consistent with previous events.

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.

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

Metals and metalloids

Metal analytical results observed during Event #7 can be summarised as follows:

- Dissolved metals:
 - The concentration of copper marginally exceeded the MWG (0.0013 mg/L) in one sample (WS5-S) with a concentration of 0.002 mg/L.
 - The concentration of all other dissolved metals were below the adopted criteria for all samples.
- Total metals:
 - Total aluminium concentrations were relatively consistent for all locations with a mean of 0.04 mg/L and a range of 0.03-0.14 mg/L observed.
 - All total iron concentrations were significantly below the MWG (1 mg/L) with a mean of 0.054 mg/L and a maximum of 0.24 mg/L (WS1-S) observed.
 - All results were consistent with previous events.

Hydrocarbons

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

Pesticides

All organochlorine pesticides results were below their relevant LOR.

PFAS

PFAS analytical results observed during Event #7 can be summarised as follows:

- Perfluorooctanesulfonate (PFOS) exceeded the 99% species protection MWG (0.00023 µg/L) in all samples, ranging from 0.0010 µg/L (WS5) to 0.0031 µg/L (WS2) with a mean of 0.0022 µg/L observed, which is lower than the previous event and historical average (0.0029 µg/L).
- Minor detections of Perfluorohexanesulfonic acid (PFHxS), Perfluorohexanoic acid, Perfluoroheptanoic acid and Perfluorooctanoic acid (PFOA) were observed marginally above their relevant LOR. However, all concentrations were significantly below all relevant guidelines or no guidelines are available.
- Total PFAS were relatively consistent between all locations and ranged from 0.0055 µg/L (WS5-S) to 0.0087 µg/L (WS2-D) with a mean of 0.0073 µg/L, which is consistent with previous events.

Quality Control and Quality Assurance

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

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

- A total of 115 of the 120 (97%) analyte tests performed on the field duplicate sample had a Relative Percentage Difference (RPD) within 30% of the original samples indicating the sampling and analysis procedures applied by RPS and the laboratory were generally reproducible.
- Two of the four total duplicate RPD failures were considered insignificant as both the primary and duplicate results were less than 5 x LOR. In such instances the elevated RPD merely indicates that analytical precision decreases as concentrations approach the LOR.
- The remaining RPD exceedances (TSS< Phaeophytin "a" and zinc) were considered significant as the concentration of either the primary or secondary sample was greater than 5 x LOR. The failures are likely due to minor differences in water quality when sampling. The duplicate sample concentration was higher for TSS and Phaeophytin "a" and as such was used for the data assessment. Neither exceedance was considered to have affected the water quality assessment.
- The concentrations of silicon, zinc and turbidity were marginally above their respective LORs within the field rinsate (WR1) and field blank samples (WB1). Additionally, iron concentrations marginally above LOR were detected in WR1. Minor exceedances of acceptance criteria (>LOR) are potentially a reflection of the quality of deionised water used for the blank collection.
- All trip blank samples were below their respective LORs.
- All internal laboratory QAQC procedures (method blanks, matrix spikes, laboratory control standards, internal duplicates) except for the following were within acceptable limits:
 - Dissolved zinc internal duplicate returned a result outside of acceptable RPD limits.
- All samples were analysed within the recommended holding time for each analyte with the exception of Chlorophyll "A" and Phaeophytin "A" which were noted to exceed holding time criteria, however, this was due to extract or analysis dates not being provided. As such, the holding times could not be calculated.

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

Conclusions

Surface water monitoring Event #7 was completed on 11 February 2021. Samples were collected from all five of the sampling locations (Figure A). A shallow and deep sample were collected at each sampling point utilising the defined Niskin flask methodology, with the exception of WS3. Due to the shallow nature of WS3 (water column depth approximately ~0.30 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 assessment criteria were noted (DO and sulfate), however, these conditions are consistent with the marine environment present at the mouth of the Swan River.

Total phosphorous marginally exceeded the MWG (0.03 mg/L) in one sample (WS5-D). Minor exceedances of reactive phosphorus MWG (0.005 mg/L) were observed in all samples except WS1-S (<0.005 mg/L). All other nitrogen and phosphorous concentrations were below relevant criteria. Results were relatively consistent with previous sampling events with marginal increases in total nitrogen observed at all locations.

The concentrations of all metal and metalloids were below relevant guidelines at all locations except for copper at WS5-S. All results were relatively consistent with previous events.

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

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

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

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



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

TABLES

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

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

Notes:
Guideline values have been adopted from the following guidance documentation:
- *Treatment and Management of Soil and Water in Acid Sulfate Soil Landscapes* (DER 2015b)
- *Assessment and Management of Contaminated Sites* (DER 2014)
- *Freshwater and Marine Water Quality Guidelines Chapter 3* (ANZECC/ARMCANZ 2000)
All results expressed as mg/L except for pH (pH units), ratios (unitless), Redox mV (mili Volts), turbidity (NTU) and EC (µS/cm)
a) Values for estuary environments - Table 3.3.6 ANZECC/ARMCANZ 2000 Freshwater and Marine WQ Guidelines Chapter 3
c) Values based on Austalina 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-NOx-N)

Denotes less than LOR

Sample ID	Date	Trigger	Field Parameters				Acid Sulfate Soil Parameters and Anions								ASS Ratios		Cations				Nutrients						Miscellaneous				
			Units	pH	E.C	Redox	DO	Total Acidity (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Flouride	Acidity: Alkalinity	Sulfate: Chloride	Calcium	Magnesium	Potassium	Sodium	Total P	Reactive P	Total N	TKN ^o	NH ₃ -N	NO _x -N	Dissolved Organic Carbon (DOC)	Chlorophyll "A"	Phaeophytin "A"
			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
RWG	6.5-8.5 ^c	-	-	>80 ^c	-	-	-	-	-	-	-	500 ^d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
ASS	<6	-	-	-	>40	-	-	-	-	-	>0.5	-	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LOR	-	-	-	-	5	5	5	5	0.1	0.5	1	1	0.1	-	-	0.5	0.5	0.5	0.5	0.01	0.005	0.1	0.005	0.005	0.005	1	0.0001	0.0002			
WS1 - S	10/09/2020		8.18	50,919	80	104	9	120	36,000	<5	0.5	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.006	0.2	0.2	0.009	<0.005	2	0.0012	0.0006	
WS1 - S	7/10/2020		8.25	52,200	134	106	7	120	37,000	<5	0.4	0.6	2,300	17,000	<5	0.06	0.14	400	1300	380	10000	0.03	0.007	0.2	0.2	<0.005	<0.005	2	0.0009	0.0005	
WS1 - S	5/11/2020		8.11	51,108	128	82	<5	120	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	10000	0.02	0.006	0.2	0.2	0.007	<0.005	3	0.0015	0.0006	
WS1 - S	3/12/2020		8.08	49,503	178	86	---	120	37,000	<5	0.8	<0.5	2,700	19,000	<5	---	0.14	410	1300	390	12000	0.02	<0.005	0.6	0.6	<0.005	0.005	3	0.0014	0.0005	
WS1 - S	13/01/2021		8.17	54,827	93	102	<5	130	37,000	<5	0.7	0.6	2,800	21,000	1.3	0.04	0.13	390	1200	390	11000	0.02	0.007	0.3	0.3	<0.005	<0.005	2	0.0017	0.0006	
WS1 - S	11/02/2021		8.27	54,769	101	97	<5	130	37,000	20	0.8	<0.5	2,900	20,000	<5	0.04	0.15	400	1200	360	12000	0.02	<0.005	0.5	0.5	<0.005	<0.005	3	0.0025	0.0005	
WS1 - D	10/09/2020		8.20	50,935	91	107	9	120	36,000	<5	0.7	<0.5	2,400	18,000	---	0.08	0.13	390	1200	360	11000	0.03	0.005	0.2	0.2	0.008	<0.005	2	0.0008	0.0006	
WS1 - D	7/10/2020		8.29	53,399	131	104	7	120	37,000	<5	0.5	0.6	2,500	18,000	<5	0.06	0.14	420	1300	400	11000	0.04	0.005	0.1	0.1	0.006	0.007	2	0.0008	0.0004	
WS1 - D	5/11/2020		8.12	51,230	125	80	<5	130	37,000	<5	0.7	<0.5	2,800	20,000	<5	0.04	0.14	350	1200	310	11000	0.02	0.006	0.2	0.2	0.009	<0.005	3	0.0012	0.0005	
WS1 - D	3/12/2020		8.08	49,803	178	87	---	130	37,000	<5	0.8	0.6	2,800	20,000	<5	---	0.14	410	1300	390	12000	0.02	0.005	0.6	0.6	0.006	<0.005	2	0.0011	0.0004	
WS1 - D	13/01/2021		8.16	54,836	92	97	<5	130	37,000	<5	0.8	0.7	2,900	21,000	1.3	0.04	0.14	380	1200	390	11000	0.02	0.006	0.2	0.2	<0.005	<0.005	2	0.0018	0.0006	
WS1 - D	11/02/2021		8.27	54,761	100	98	<5	130	38,000	<5	0.6	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.006	0.4	0.4	<0.005	<0.005	3	0.0025	0.0005	
WS2-S	7/08/2020		8.70	50,710	181	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	0.1	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	0.2	0.007	0.009	2	0.0010	0.0005	
WS2-S	7/10/2020		8.16	49,541	94	102	6	120	34,000	<5	0.6	0.7	2,300	17,000	<5	0.05	0.14	380	1200	360	9700	0.04	<0.005	0.2	0.2	<0.005	0.017	2	0.0019	0.0006	
WS2-S	5/11/2020		8.07	49,927	60	79	7	120	36,000	<5	0.6	<0.5	2,700	19,000	<5	0.06	0.14	330	1100	300	10000	0.02	0.007	0.2	0.2	0.007	0.01	3	0.0017	0.0006	
WS2-S	3/12/2020		8.06	48,338	145	78	---	130	36,000	<5	0.7	0.6	2,700	19,000	<5	---	0.14	400	1300	380	12000	0.02	<0.005	0.8	0.8	<0.005	0.01	3	0.0022	0.0006	
WS2-S	13/01/2021		8.10	54,365	93	87	<5	130	37,000	<5	0.5	0.8	2,800	21,000	1.2	0.04	0.13	390	1200	390	11000	0.03	0.009	0.3	0.3	0.008	0.01	2	0.0014	0.0007	
WS2-S	11/02/2021		8.19	54,438	87	85	<5	130	37,000	11	0.5	<0.5	2,800	19,000	<5	0.04	0.15	370	1200	340	11000	0.02	0.01	0.5	0.5	0.008	0.014	2	0.0025	0.0005	
WS2-D	7/08/2020		8.19	50,966	179	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	0.1	0.007	<0.005	<1	0.0005	0.0005	
WS2-D	10/09/2020		8.19	50,453	79	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	0.2	0.006	0.009	2	0.0011	0.0004	
WS2-D	7/10/2020		8.23	50,511	97	100	7	120	35,000	<5	0.5	0.6	2,400	17,000	<5	0.06	0.14	400	1200	380	10000	0.04	<0.005	0.3	0.3	<0.005	0.022	2	0.0017	0.0006	
WS2-D	5/11/2020		8.09	50,009	68	78	6	130	36,000	<5	0.8	<0.5	2,700	19,000	<5	0.05	0.14	330	1100	290	9700	0.02	0.006	0.2	0.2	0.006	0.01	3	0.0016	0.0007	
WS2-D	3/12/2020		8.06	48,410	155	74	---	130	35,000	<5	1	0.5	2,700	19,000	<5	---	0.14	400	1300	380	12000	0.03	<0.005	0.8	0.8	0.005	0.015	3	0.0017	0.0008	
WS2-D	13/01/2021		8.10	54,420	95	84	<5	130	38,000	<5	0.6	0.7	2,800	21,000	1.2	0.04	0.13	380	1200	380	11000	0.03	0.009	0.3	0.3	0.008	0.015	2	0.0014	0.0006	
WS2-D	11/02/2021		8.21	54,527	91	73	<5	130	37,000	<5	0.6	<0.5	2,900	20,000	<5	0.04	0.15	390	1200	350	11000	0.02	0.01	0.5	0.5	<0.005	<0.005	4	0.0026	0.0006	
WS3-S	10/09/2020		8.25	50,920	109	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	0.2	<0.005	<0.005	2	0.0006	0.0008	
WS3-S	7/10/2020		8.29	52,289	132	115	7	120	37,000	33 [#]	1.6	0.8	2,400	18,000	<5	0.06	0.13	420	1300	400	11000	0.05	0.006	0.2	0.2	0.018	0.043	1	0.0019	0.0009	
WS3-S	5/11/2020		8.15	51,444	126	55	6	120	37,000	7	1	<0.5	2,700	19,000	<5	0.05	0.14	350	1200	310	11000	0.02	0.006	0.2	0.2	0.01	<0.005	2	0.0017	0.0009	
WS3-S	3/12/2020		8.11	49,569	184	98	---	110	38,000	19	2.4	<0.5	2,700	19,000	<5	---	0.14	380	1200	370	12000	0.03	0.006	0.8	0.8	<0.005	<0.005	2	0.0013	0.0011	
WS3-S	13/01/2021		8.19	55,172	102	101	<5	130	38,000	<5	0.5	0.7	2,900	21,000	1.3	0.04	0.14	390	1200	400	11000	0.03 [#]	0.005	0.2	0.2	0.006	0.006	2 [#]	0.0012	0.0006	
WS3-S	11/02/2021																														

Sample ID	Date	Trigger	Field Parameters				Acid Sulfate Soil Parameters and Anions								ASS Ratios		Cations				Nutrients						Miscellaneous					
			Units	pH units	µS/cm	mV	%sat	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	-	-	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			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	-
			RWG	6.5-8.5 ^c	-	-	>80 ^c	-	-	-	-	-	-	-	500 ^d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			ASS	<6	-	-	-	>40	-	-	-	-	-	>0.5	-	-	-	>1	>0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
LOR	-	-	-	-	-	5	5	5	5	0.1	0.5	1	1	0.1	-	-	0.5	0.5	0.5	0.5	0.01	0.005	0.1	0.005	0.005	0.005	1	0.0001	0.0002			
WS4-D	7/08/2020		8.27	50,996	108	105	<5	130	40,000	21	0.5	0.7	2,800	20,000	---	0.04	0.14	420	1300	380	12000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0006		
WS4-D	10/09/2020		8.05	50,680	56	112	9	120	35,000	7	0.7	<0.5	2,400	18,000	---	0.08	0.13	370	1200	340	10000	0.03	<0.005	0.2	0.2	0.007	0.008	2	0.0008	0.0006		
WS4-D	7/10/2020		8.04	50,044	63	98	8	120	35,000	<5	0.4	<0.5	2,400	18,000	<5	0.07	0.13	410	1300	390	10000	0.03	<0.005	0.1	0.1	0.006	0.01	2	0.0015	0.0006		
WS4-D	5/11/2020		7.97	50,024	40	81	5	120	36,000	6	0.7	<0.5	2,700	19,000	<5	0.04	0.14	350	1200	300	10000	0.02	0.006	0.2	0.2	0.008	0.008	2	0.0012	0.0007		
WS4-D	3/12/2020		7.98	48,630	115	83	---	130	37,000	7	1.1	3.8	2,600	19,000	<5	---	0.14	400	1200	380	12000	0.02	<0.005	0.7	0.7	<0.005	0.008	3	0.0016	0.0006		
WS4-D	13/01/2021		7.98	54,348	124	86	<5	130	37,000	<5	0.6	<0.5	2,800	21,000	1.2	0.04	0.13	390	1200	390	11000	0.03	0.008	0.2	0.2	<0.005	0.04	2	0.0021	0.0007		
WS4-D	11/02/2021		8.08	54,460	102	133	<5	130	37,000	12	0.4	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.009	0.5	0.5	<0.005	0.011	4	0.003	0.0007		
WS5-S	7/10/2020		8.24	49,470	118	108	7	120	35,000	<5	0.3	<0.5	2,400	18,000	<5	0.06	0.13	410	1300	390	10000	0.04	<0.005	0.2	0.2	<0.005	0.015	2	0.0016	0.0005		
WS5-S	5/11/2020		8.10	49,829	81	79	8	130	36,000	<5	0.6	<0.5	2,700	19,000	<5	0.06	0.14	380	1200	330	10000	0.02	0.006	0.2	0.2	0.008	<0.005	2	0.0017	0.0007		
WS5-S	3/12/2020		8.10	49,008	166	109	---	130	36,000	7	1.1	0.6	2,700	19,000	<5	---	0.14	410	1300	390	12000	0.02	0.005	0.6	0.6	0.006	0.012	2	0.0017	0.0006		
WS5-S	13/01/2021		8.19	54,706	96	98	<5	130	37,000	<5	0.6	<0.5	2,900	21,000	1.2	0.04	0.14	390	1200	390	11000	0.03	0.006	0.2	0.2	<0.005	0.008	2	0.0024	0.0006		
WS5-S	11/02/2021		8.25	54,644	104	98	<5	130	37,000	<5	0.8	<0.5	3,000	21,000	<5	0.04	0.14	380	1200	350	11000	0.02	0.006	0.4	0.4	<0.005	0.006	3	0.0026	0.0006		
WS5-D	7/10/2020		8.30	52,146	117	109	7	120	36,000	<5	0.4	0.9	2,400	17,000	<5	0.06	0.14	420	1300	400	11000	0.03	0.006	0.1	0.1	0.006	<0.005	2	0.0011	0.0006		
WS5-D	5/11/2020		8.12	49,820	91	71	9	120	36,000	7	0.7	<0.5	2,700	19,000	<5	0.08	0.14	340	1200	310	11000	0.03	0.005	0.2	0.2	<0.005	<0.005	2	0.0022	0.0007		
WS5-D	3/12/2020		8.09	49,116	175	103	---	120	37,000	6	1.4	2	2,700	19,000	<5	---	0.14	410	1300	400	12000	0.02	0.006	0.7	0.7	<0.005	0.009	2	0.0013	0.0006		
WS5-D	13/01/2021		8.19	54,732	93	92	<5	130	38,000	<5	0.7	<0.5	2,800	21,000	1.2	0.04	0.13	390	1200	390	11000	0.03	0.006	0.2	0.2	<0.005	0.01	2	0.0021	0.0006		
WS5-D	11/02/2021		8.27	54,667	101	95	<5	130	38,000	18	0.9	<0.5	3,000	21,000	<5	0.04	0.14	400	1300	360	12000	0.14	0.006	0.4	0.4	<0.005	<0.005	2	0.0023	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

Notes:

Guideline values have been adopted from the following guidance documentation:

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

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

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

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

Denotes less than LOR

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																	Total Metals		
			Aluminium	Antimony	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron	
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	-	-	-	-	-	0.001	0.0013	-	0.0044	-	0.0001 ^a	-	-	-	-	0.0014	-	-	1 ^b
			RWG	-	0.003 ^b	0.007 ^b	0.002 ^b	0.05 ^b	-	2 ^b	-	0.01 ^b	0.5 ^b	0.001 ^b	-	0.02 ^b	0.01 ^b	-	-	-	-	-
			ASS	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LOR	0.01	0.002	0.001	0.0001	0.001	0.002	0.002	0.05	0.001	0.001	0.00005	0.001	0.001	0.01	0.1	0.00005	0.005	0.01	0.01
WS1 - S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	0.00006	0.002	0.02	0.02	
WS1 - S	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	<0.5	0.00005	0.003	<0.02	0.02	
WS1 - S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03	
WS1 - S	3/12/2020		0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	0.011	<0.00005	0.012	<0.002	<0.002	<1	0.0001	0.006	0.03	0.03	
WS1 - S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.7	<0.0001	0.005	0.04	0.08	
WS1 - S	11/02/2021		0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.011	0.03	0.04	
WS1 - D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	0.00006	0.003	0.03	0.04	
WS1 - D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	<0.5	<0.00005	0.002	0.02	<0.02	
WS1 - D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.03	
WS1 - D	3/12/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<1	<0.0001	0.004	0.02	0.02	
WS1 - D	13/01/2021		0.07	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.7	0.0002	0.043	0.05	0.07	
WS1 - D	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03	
WS2-S	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02	
WS2-S	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	<0.00005	0.003	0.02	0.02	
WS2-S	7/10/2020		<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.002	<0.01	<0.001	<0.005	<0.00005	0.011	<0.001	<0.001	0.7	<0.00005	0.003	<0.02	<0.02	
WS2-S	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04	
WS2-S	3/12/2020		0.04	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<1	0.0002	0.0099	0.07	0.02	
WS2-S	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.015	<0.002	<0.002	0.9	0.0002	0.007	0.09	0.03	
WS2-S	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03	
WS2-D	7/08/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	---	<0.0001	0.007	0.03	0.02	
WS2-D	10/09/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	0.00006	0.003	0.02	0.02	
WS2-D	7/10/2020		<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	0.7	<0.00005	0.003	<0.02	<0.02	
WS2-D	5/11/2020		<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.04	
WS2-D	3/12/2020		0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<1	<0.0001	0.005	0.03	0.04	
WS2-D	13/01/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.9	0.0001	0.004	<0.02	0.03	
WS2-D	11/02/2021		<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03	

Sample ID	Date	Trigger	Dissolved Metals & Metalloids																		Total Metals	
			Aluminium	Antimony	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silicon	Silver	Zinc	Total Aluminium	Total Iron	
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	-	-	-	-	-	0.001	0.0013	-	0.0044	-	0.0001 ^a	-	-	-	-	0.0014	-	-	1 ^b
			RWG	-	0.003 ^b	0.007 ^b	0.002 ^b	0.05 ^b	-	2 ^b	-	0.01 ^b	0.5 ^b	0.001 ^b	-	0.02 ^b	0.01 ^b	-	-	-	-	-
			ASS	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			LOR	0.01	0.002	0.001	0.0001	0.001	0.002	0.002	0.05	0.001	0.001	0.00005	0.001	0.001	0.01	0.1	0.00005	0.005	0.01	0.01
WS3-S	10/09/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	<0.00005	0.003	0.05	0.08	
WS3-S	7/10/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.013	<0.001	<0.001	<0.5	<0.00005	0.003	0.02	0.2	
WS3-S	5/11/2020	🔍	0.07	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.034	0.06	0.05	
WS3-S	3/12/2020	🔍	0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	<1	<0.0001	0.008	0.05	0.09	
WS3-S	13/01/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	<0.5	0.0001	0.005	0.02	0.03	
WS3-S	11/02/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	<0.5	<0.0001	0.026	0.14	0.24	
WS4-S	7/08/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	---	0.0002	0.004	0.02	0.03	
WS4-S	10/09/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	<0.00005	0.002	0.02	0.02	
WS4-S	7/10/2020	🔍	<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	0.6	<0.00005	0.003	<0.02	<0.02	
WS4-S	5/11/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.004	0.03	0.04	
WS4-S	3/12/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<1	<0.0001	0.004	0.03	0.03	
WS4-S	13/01/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	0.9	0.0002	0.003	0.03	0.04	
WS4-S	11/02/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	<0.5	<0.0001	0.006	0.04	0.03	
WS4-D	7/08/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	---	<0.0001	0.003	<0.02	<0.02	
WS4-D	10/09/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	---	<0.00005	0.002	0.02	0.02	
WS4-D	7/10/2020	🔍	<0.01	<0.001	0.001	<0.0001	<0.001	<0.001	0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	0.6	<0.00005	0.003	<0.02	<0.02	
WS4-D	5/11/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.015	<0.002	<0.002	<0.5	<0.0001	0.004	0.04	0.04	
WS4-D	3/12/2020	🔍	0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<1	<0.0001	0.003	0.03	0.03	
WS4-D	13/01/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.014	<0.002	<0.002	0.9	0.0001	0.006	0.03	0.03	
WS4-D	11/02/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.011	0.04	0.03	
WS5-S	7/10/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	0.002	<0.01	<0.001	<0.005	<0.00005	0.024	<0.001	<0.001	0.8	<0.00005	0.004	<0.02	0.02	
WS5-S	5/11/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.005	0.04	0.04	
WS5-S	3/12/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<1	<0.0001	0.004	0.03	0.03	
WS5-S	13/01/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.8	0.0001	0.004	0.02	0.02	
WS5-S	11/02/2021	🔍	<0.02	<0.002	0.002	<0.0002	<0.002	<0.002	0.002	<0.02	<0.002	<0.01	<0.00005	0.013	0.002	<0.002	<0.5	<0.0001	0.007	0.03	0.03	
WS5-D	7/10/2020	🔍	<0.01	<0.001	0.002	<0.0001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.005	<0.00005	0.012	<0.001	<0.001	<0.5	<0.00005	0.002	<0.02	<0.02	
WS5-D	5/11/2020	🔍	<0.02	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.012	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.04	
WS5-D	3/12/2020	🔍	0.04	<0.002	0.002	<0.0002	0.005	<0.002	<0.002	0.04	<0.002	<0.01	<0.00005	0.013	0.022	<0.002	<1	<0.0001	0.019	0.03	0.03	
WS5-D	13/01/2021	🔍	0.03	<0.002	0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	0.8	0.0001	0.01	0.02	0.02	
WS5-D	11/02/2021	🔍	0.03	<0.002	<0.002	<0.0002	<0.002	<0.002	<0.002	<0.02	<0.002	<0.01	<0.00005	0.013	<0.002	<0.002	<0.5	<0.0001	0.006	0.03	0.03	

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.

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																			
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			MWG	0.50 ^a	-	-	-	-	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			RWG	-	0.001 ^b	0.8 ^b	0.3 ^b	0.6 ^b	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00001 ^b	-	-	-	-	-
LOR	0.001	0.001	0.001	0.001	0.002	0.001	0.01	0.05	0.1	0.1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0005	0.0001		
WS1 - S	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	13/01/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - S	11/02/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	13/01/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS1 - D	11/02/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	7/08/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	13/01/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-S	11/02/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	7/08/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	13/01/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS2-D	11/02/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	10/09/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	7/10/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	5/11/2020		<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	3/12/2020		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	13/01/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS3-S	11/02/2021		<0.003	<0.003	<0.003	<0.003	<0.006	<0.003	<0.01	<0.05	<0.1	<0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001		
WS4-S	7/08/2020		<0.001	<0.001																										

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.

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

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

denotes $\angle LOR$

Sample ID	Date	Trigger	Organochlorine Pesticides																						
			Aldrin	Aldrin + Dieldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	a-Chlordane	g-Chlordane	DDD	DDE	DDT	DDD + DDE + DDT	Dieldrin	a-Endosulfan	b-Endosulfan	Endosulfan sulphate	Endrin	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor		
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
			MWG	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000005 ^a	-	0.000004 ^a	-	-	-	-	-	
			RWG	-	-	-	-	-	0.01 ^b	0.002 ^b	-	-	0.009 ^b	-	-	-	0.02 ^b	-	-	-	-	0.0003 ^b	-	-	
LOR	0.00001	0.00002	0.00005	0.00005	0.00005	0.00005	0.00001	0.00001	0.00001	0.00001	0.00006	0.00003	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002			
WS1 - S	10/09/2020		<0.00001	<0.00002	<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		
WS1 - S	7/10/2020		<0.00001	<0.00002	<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		
WS1 - S	5/11/2020		<0.00001	<0.00002	<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		
WS1 - S	3/12/2020		<0.00001	<0.00002	<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		
WS1 - S	13/01/2021		<0.00001	<0.00002	<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		
WS1 - S	11/02/2021		<0.00001	<0.00002	<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		
WS1 - D	10/09/2020		<0.00001	<0.00002	<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		
WS1 - D	7/10/2020		<0.00001	<0.00002	<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		
WS1 - D	5/11/2020		<0.00001	<0.00002	<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		
WS1 - D	3/12/2020		<0.00001	<0.00002	<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		
WS1 - D	13/01/2021		<0.00001	<0.00002	<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		
WS1 - D	11/02/2021		<0.00001	<0.00002	<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		
WS2-S	7/08/2020		<0.00001	<0.00002	<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		
WS2-S	10/09/2020		<0.00001	<0.00002	<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		
WS2-S	7/10/2020		<0.00001	<0.00002	<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		
WS2-S	5/11/2020		<0.00001	<0.00002	<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		
WS2-S	3/12/2020		<0.00001	<0.00002	<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		
WS2-S	13/01/2021		<0.00001	<0.00002	<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		
WS2-S	11/02/2021		<0.00001	<0.00002	<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		
WS2-D	7/08/2020		<0.00001	<0.00002	<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		
WS2-D	10/09/2020		<0.00001	<0.00002	<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		
WS2-D	7/10/2020		<0.00001	<0.00002	<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		
WS2-D	5/11/2020		<0.00001	<0.00002	<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		
WS2-D	3/12/2020		<0.00001	<0.00002	<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		
WS2-D	13/01/2021		<0.00001	<0.00002	<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		
WS2-D	11/02/2021		<0.00001	<0.00002	<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		
WS3-S	10/09/2020		<0.00001	<0.00002	<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		
WS3-S	7/10/2020		<0.00001	<0.00002	<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		
WS3-S	5/11/2020		<0.00001	<0.00002	<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		
WS3-S	3/12/2020		<0.00001	<0.00002	<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		
WS3-S	13/01/2021		<0.00001	<0.00002	<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		
WS3-S	11/02/2021		<0.00001	<0.00002	<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		
WS4-S	7/08/2020		<0.00001	<0.00002	<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		
WS4-S	10/09/2020		<0.00001	<0.00002	<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		
WS4-S	7/10/2020		<0.00001	<0.00002	<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		
WS4-S	5/11/2020		<0.00001																						

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 Environmental Managment Plan Version 2.0 (HEPA 2020)
Denotes <LOR

Sample ID	Date	Trigger	Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carboxylic Acids										(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkyl Sulfonamides								PFAS Sums			
			Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonate PFOS	Perfluorodecanesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohecanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTSA	6:2 FTSA	8:2 FTSA	10:2 FTSA	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfon-amide	N-Me perfluorooctanesulfonamid- oethanol	N-Et perfluorooctanesulfonamid- oethanol	MePerfluorooctanesulf- amid oacetic acid	EtPerfluorooctanesulf- amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS	
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
			MWG-99	-	-	-	-	0.00023	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			MWG-95	-	-	-	-	0.13	-	-	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			RWG	-	-	2	-	2	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
			LOR	0.0004	0.001	0.0002	0.001	0.0002	0.002	0.002	0.002	0.0004	0.0004	0.0002	0.001	0.002	0.002	0.005	0.01	0.05	0.001	0.0004	0.0004	0.002	0.01	0.005	0.01	0.005	0.05	0.002	0.002	0.0002	0.0002	0.0002
WS1 - S	10/09/2020			0.0004	<0.001	0.0020	<0.001	0.0030	<0.002	<0.002	<0.002	0.001	0.0004	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.005	0.0036	0.0074
WS1 - S	7/10/2020			<0.0004	<0.001	0.0020	<0.001	0.0021	<0.002	<0.002	<0.002	0.0008	<0.0004	0.0005	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0041	0.0026	0.0054
WS1 - S	5/11/2020			0.0004	<0.001	0.0020	<0.001	0.0025	<0.002	<0.002	<0.002	0.001	0.0005	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0045	0.0032	0.0071
WS1 - S	3/12/2020			<0.0004	<0.001	0.0020	<0.001	0.0024	<0.002	<0.002	<0.002	0.0009	0.002	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0044	0.003	0.0079
WS1 - S	13/01/2021			<0.0004	<0.001	0.0010	<0.001	0.0020	<0.002	<0.002	<0.002	0.0008	0.0004	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.003	0.0026	0.0048
WS1 - S	11/02/2021			0.0007	<0.001	0.0020	<0.001	0.0023	<0.002	<0.002	<0.002	0.0009	0.0006	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0043	0.003	0.0072
WS1 - D	10/09/2020			<0.0004	<0.001	0.0020	<0.001	0.0026	<0.002	<0.002	<0.002	0.001	0.0004	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0046	0.0032	0.0066
WS1 - D	7/10/2020			<0.0004	<0.001	0.0010	<0.001	0.0020	<0.002	<0.002	<0.002	0.0007	<0.0004	0.0004	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.003	0.0024	0.0041
WS1 - D	5/11/2020			<0.0004	<0.001	0.0020	<0.001	0.0028	<0.002	<0.002	<0.002	0.001	0.0005	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0048	0.0035	0.007
WS1 - D	3/12/2020			0.0004	<0.001	0.0020	<0.001	0.0026	<0.002	<0.002	<0.002	0.0009	0.002	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0046	0.0032	0.0085
WS1 - D	13/01/2021			<0.0004	<0.001	0.0010	<0.001	0.0010	<0.002	<0.002	<0.002	0.001	0.0007	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.002	0.002	0.0045
WS1 - D	11/02/2021			0.0005	<0.001	0.0020	<0.001	0.0023	<0.002	<0.002	<0.002	0.0009	0.0006	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0043	0.003	0.007
WS2-S	7/08/2020			<0.0004	<0.001	0.0004	<0.001	0.0006	<0.002	<0.002	<0.002	<0.0004	<0.0004	0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.001	0.0008	0.001
WS2-S	10/09/2020			<0.0004	<0.001	0.0020	<0.001	0.0024	<0.002	<0.002	<0.002	0.001	0.0004	0.0005	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0044	0.0029	0.0063
WS2-S	7/10/2020			0.0006	<0.001	0.0027	<0.001	0.0038	<0.002	<0.002	<0.002	0.001	0.0006	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0065	0.0046	0.0095
WS2-S	5/11/2020			0.0006	<0.001	0.0022	<0.001	0.0039	<0.002	<0.002	<0.002	0.002	0.0007	0.0009	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0061	0.0048	0.01
WS2-S	3/12/2020			0.0005	<0.001	0.0021	<0.001	0.0045	<0.002	<0.002	<0.002	0.001	0.002	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0066	0.0053	0.011
WS2-S	13/01/2021			<0.0004	<0.001	0.0020	<0.001	0.0027	<0.002	<0.002	<0.002	0.001	0.0006	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0047	0.0035	0.0071
WS2-S	11/02/2021			0.0007	<0.001	0.0023	<0.001	0.0031	<0.002	<0.002	<0.002	0.001	0.0007	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0054	0.0039	0.0086
WS2-D	7/08/2020			<0.0004	<0.001	0.0005	<0.001	0.0005	<0.002	<0.002	<0.002	<0.0004	<0.0004	0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.001	0.0007	0.001
WS2-D	10/09/202																																	

Sample ID	Date	Trigger	Perfluoroalkyl Sulfonic Acids						Perfluoroalkyl Carboxylic Acids										(n:2) Fluorotelomer Sulfonic Acids				Perfluoroalkyl Sulfonamides								PFAS Sums							
			Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonate PFOS	Perfluorodecenesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4:2 FTSA	6:2 FTSA	8:2 FTSA	10:2 FTSA	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfonamide	N-Me perfluorooctanesulfonamid-ethanol	N-Et perfluorooctanesulfonamid-ethanol	MePerfluorooctanesulf- amid oacetic acid	EtPerfluorooctanesulf- amid oacetic acid	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS					
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L					
			MWG-99	-	-	-	-	0.00023	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
			MWG-95	-	-	-	-	0.13	-	-	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
			RWG	-	-	2	-	2	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-				
			LOR	0.0004	0.001	0.0002	0.001	0.0002	0.002	0.002	0.002	0.0004	0.0004	0.0002	0.001	0.002	0.002	0.005	0.01	0.05	0.001	0.0004	0.0004	0.002	0.01	0.005	0.01	0.005	0.05	0.002	0.002	0.0002	0.0002	0.0002				
WS4-D	7/08/2020					<0.0004	<0.001	0.0003	<0.001	0.0003	<0.002	<0.002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0006	0.0003	0.0006
WS4-D	10/09/2020					<0.0004	<0.001	0.0020	<0.001	0.0025	<0.002	<0.002	<0.002	0.001	0.0004	0.0006	<0.001	<0.002	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0045	0.0031	0.0065	
WS4-D	7/10/2020					0.0004	<0.001	0.0026	<0.001	0.0034	<0.002	<0.002	<0.002	0.001	0.0005	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.006	0.0042	0.0087		
WS4-D	5/11/2020					0.0005	<0.001	0.0022	<0.001	0.0033	<0.002	<0.002	<0.002	0.002	0.0006	0.0009	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0055	0.0042	0.0095		
WS4-D	3/12/2020					0.0005	<0.001	0.0022	<0.001	0.0038	<0.002	<0.002	<0.002	0.001	0.002	0.0009	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.006	0.0047	0.01		
WS4-D	13/01/2021					0.0004	<0.001	0.0020	<0.001	0.0026	<0.002	<0.002	<0.002	0.001	0.0006	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0046	0.0033	0.0073		
WS4-D	11/02/2021					0.0007	<0.001	0.0021	<0.001	0.0025	<0.002	<0.002	<0.002	0.001	0.0007	0.0009	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0046	0.0034	0.0079		
WS5-S	7/10/2020					0.0004	<0.001	0.0025	<0.001	0.0035	<0.002	<0.002	<0.002	0.001	0.0005	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.006	0.0042	0.0086		
WS5-S	5/11/2020					0.0006	<0.001	0.0021	<0.001	0.0029	<0.002	<0.002	<0.002	0.002	0.0007	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.005	0.0037	0.0091		
WS5-S	3/12/2020					0.0005	<0.001	0.0021	<0.001	0.0034	<0.002	<0.002	<0.002	0.001	0.002	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0055	0.0041	0.0097		
WS5-S	13/01/2021					<0.0004	<0.001	0.0010	<0.001	0.0021	<0.002	<0.002	<0.002	<0.002	0.0005	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0031	0.0027	0.0051		
WS5-S	11/02/2021					0.0005	<0.001	0.0020	<0.001	0.0010	<0.002	<0.002	<0.002	0.0009	0.0005	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.003	0.002	0.0055		
WS5-D	7/10/2020					<0.0004	<0.001	0.0020	<0.001	0.0022	<0.002	<0.002	<0.002	0.0008	<0.0004	0.0005	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0042	0.0027	0.0055		
WS5-D	5/11/2020					0.0006	<0.001	0.0023	<0.001	0.0033	<0.002	<0.002	<0.002	0.002	0.0007	0.0009	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0056	0.0042	0.0098		
WS5-D	3/12/2020					0.0005	<0.001	0.0020	<0.001	0.0047	<0.002	<0.002	<0.002	0.001	0.003	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0067	0.0054	0.012		
WS5-D	13/01/2021					<0.0004	<0.001	0.0020	<0.001	0.0022	<0.002	<0.002	<0.002	0.001	0.0005	0.0006	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.0042	0.0028	0.0063		
WS5-D	11/02/2021					0.0007	<0.001	0.0020	<0.001	0.0010	<0.002	<0.002	<0.002	0.0009	0.0006	0.0007	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	0.003	0.002	0.0059		

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 (CaCO3)	Total Alkalinity (CaCO3)	TDS	TSS	Turbidity	Sulfide	Sulfate	Chloride	Fluoride	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	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	1	1	10	5	0.1	0.1	1	1	0.1	1	1	1	1	0.05	0.005	0.1	0.1	0.005	0.005	1	0.0001	0.0002
WS2-S	Primary	7/08/2020	⚡	6	120	39,000	9	0.6	0.9	2,800	20,000	---	420	1300	370	12,000	<0.05	<0.005	0.1	0.1	0.007	<0.005	<1	0.0004	0.0005	
WZ1	Duplicate		⚡	7	120	39,000	6	0.6	0.8	2,800	20,000	---	420	1300	370	11,000	<0.05	<0.005	0.1	0.1	0.009	<0.005	<1	0.0005	0.0003	
RPD %			⚡	15	0	0	40	0	12	0	0	#	0	0	0	9	0	0	0	2	25	0	0	22	50	
WS1-S	Primary	10/09/2020	⚡	9	120	36,000	<5	0.5	<0.5	2,400	18,000	---	390	1200	360	11,000	0.03	0.006	0.2	0.19	0.009	<0.005	2	0.0012	0.0006	
WZ1	Duplicate		⚡	9	120	36,000	6	0.7	<0.5	2,300	18,000	---	400	1300	360	11,000	0.03	<0.005	0.2	0.19	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	
WS3-S	Primary	7/10/2020	⚡	7	120	37,000	8	1.6	0.8	2,400	18,000	<5	420	1300	400	11,000	0.05	0.006	0.2	0.18	0.018	0.043	1	0.0019	0.0009	
WZ1	Duplicate		⚡	7	130	37,000	33	0.9	0.7	2,400	18,000	<5	410	1300	390	11,000	0.05	0.005	0.1	0.10	<0.005	<0.005	1	0.0011	0.0008	
RPD %			⚡	0	8	0	122	56	13	0	0	0	2	0	3	0	0	18	67	63	113	158	0	53	12	
WS2-D	Primary	5/11/2020	⚡	6	130	36,000	<5	0.8	<0.5	2,700	19,000	<5	330	1100	290	9,700	0.02	0.006	0.2	0.19	0.006	0.01	3	0.0016	0.0007	
WZ1	Duplicate		⚡	7	130	36,000	<5	1	<0.5	2,700	19,000	<5	360	1200	320	11,000	0.02	0.006	0.2	0.19	0.006	0.01	2	0.0015	0.0006	
RPD %			⚡	15	0	0	0	22	0	0	0	0	9	9	10	13	0	0	0	0	0	0	40	6	15	
WS2-S	Primary	3/12/2020	⚡	---	130	36,000	<5	0.7	0.6	2,700	19,000	<5	400	1300	380	12,000	0.02	<0.005	0.8	0.79	<0.005	0.01	3	0.0022	0.0006	
WZ1	Duplicate		⚡	---	130	36,000	<5	0.9	0.7	2,700	19,000	<5	400	1300	380	12,000	0.02	<0.005	0.7	0.69	<0.005	0.011	3	0.0018	0.0006	
RPD %			⚡	---	0	0	0	25	15	0	0	0	0	0	0	0	0	0	13	14	0	10	0	20	0	
WS3-S	Primary	13/01/2021	⚡	<5	130	38,000	<5	0.5	0.7	2,900	21,000	1.3	390	1200	400	11,000	0.02	0.005	0.2	0.2	0.006	0.006	1	0.0012	0.0006	
WZ1	Duplicate		⚡	<5	130	39,000	<5	0.5	0.7	2,800	21,000	1.3	390	1200	390	11,000	0.03	0.006	0.2	0.2	0.007	<0.005	2	0.0011	0.0005	
RPD %			⚡	0	0	3	0	0	0	4	0	0	0	0	3	0	40	0	0	0	0	18	67	9	18	
WS3-S	Primary	11/02/2021	⚡	<5	130	37,000	38	1.5	<0.5	3,000	21,000	<5	370	1200	340	11,000	0.03	0.006	0.5	0.5	<0.005	<0.005	3	0.0026	0.001	
WZ1	Duplicate		⚡	<5	130	37,000	79	2	<0.5	3,000	21,000	<5	390	1200	350	12,000	0.1	0.006	0.5	0.5	<0.005	<0.005	2	0.003	0.0021	
RPD %			⚡	0	0	0	70	29	0	0	0	0	5	0	3	9	108	0	0	0	0	0	40	14	71	

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

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

Definitions:

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

Notes:

All values in mg/L unless specified otherwise

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

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

Sample ID	Sample type	Date	Trigger	Organochlorine Pesticides																			
				Aldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	a-Chlordane	g-Chlordane	DDD	DDE	DDT	DDD + DDE + DDT	Dieldrin	a-Endosulfan	b-Endosulfan	Endosulfan sulphate	Endrin	Heptachlor	Heptachlor epoxide	Hexachlorobenzene	Methoxychlor
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			LOR	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.000006	0.00003	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
WS2-S	Primary	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS1-S	Primary	10/09/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS3-S	Primary	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS2-D	Primary	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS2-S	Primary	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS3-S	Primary	13/01/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WS3-S	Primary	11/02/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
WZ1	Duplicate		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
RPD %				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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

Definitions:

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

Notes:

All values in mg/L unless specified otherwise

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

denotes <LOR (primary laboratory)

denotes exceedance of acceptance criteria > LOR

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

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	α-BHC	β-BHC	γ-BHC	g-BHC (Lindane)	α-Chlordane	γ-Chlordane	DDD	DDE	DDT	DDD + DDE + DDT	Dieldrin	α-Endosulfan	β-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	0.00001	0.000006	0.00003	0.00001	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001
Rinsates																							
WR1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<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	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	13/01/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WR1	Water	11/02/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
Field Blank																							
WB1	Water	7/08/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<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	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	7/10/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	5/11/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	3/12/2020		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	13/01/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002
WB1	Water	11/02/2021		<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.000006	<0.00003	<0.00001	<0.00002	<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 laboratory)

denotes exceedance of acceptance criteria > LOR

Sample ID	Sample type	Date	Trigger	Perfluoroalkyl Sulfonic Acids							Perfluoroalkyl Carboxylic Acids										Perfluoroalkyl Sulfonamides							(n:2) Fluorotelomer Sulfonic Acids				PFAS Sums		
				Perfluorobutanesulfonic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorooctanesulfonate PFOS	Perfluorodecenesulfonic acid	Perfluorobutanoic acid	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroheptanoic acid	Perfluorooctanoic acid PFOA	Perfluorononanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	Perfluorooctane sulfonamide	N-Methyl perfluorooctane sulfonamide	N-Ethyl perfluorooctanesulfonamide	N-Me perfluorooctanesulfonamide-ethanol	N-Et perfluorooctanesulfonamide-ethanol	MePerfluorooctanesulf- amid oacetic acid	EtPerfluorooctanesulf- amid oacetic acid	4:2 FTSA	6:2 FTSA	8:2 FTSA	10:2 FTSA	Total Positive PFHxS & PFOS	Total Positive PFOS & PFOA	Total Positive PFAS
				µg/L 0.0004	µg/L 0.001	µg/L 0.0002	µg/L 0.001	µg/L 0.0002	µg/L 0.002	µg/L 0.002	µg/L 0.002	µg/L 0.002	µg/L 0.0004	µg/L 0.0004	µg/L 0.0002	µg/L 0.001	µg/L 0.002	µg/L 0.002	µg/L 0.005	µg/L 0.01	µg/L 0.05	µg/L 0.01	µg/L 0.005	µg/L 0.01	µg/L 0.005	µg/L 0.05	µg/L 0.002	µg/L 0.002	µg/L 0.001	µg/L 0.0004	µg/L 0.0004	µg/L 0.002	µg/L 0.0002	µg/L 0.0002
Rinsates																																		
	Water	7/08/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.005	<0.05	<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	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WR1	Water	7/10/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WR1	Water	5/11/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WR1	Water	5/11/2020		0.0008	<0.001	0.0046	<0.001	0.016	<0.002	<0.002	<0.002	0.0009	0.0004	0.0008	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	<0.001	0.0006	<0.0004	<0.002	0.021	0.017	0.024
WR1	Water	13/01/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.002	<0.0004	<0.0004	0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	<0.0002	0.0002	0.0002
WR1	Water	11/02/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<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	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	7/10/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	5/11/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	5/11/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	13/01/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	<0.0002	<0.0002	<0.0002
WB1	Water	11/02/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<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	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	10/09/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	7/10/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	7/10/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	3/12/2020		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	13/01/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<0.002	<0.002	<0.0004	<0.0004	<0.0002	<0.001	<0.002	<0.002	<0.005	<0.01	<0.05	<0.001	<0.0004	<0.0004	<0.002	<0.01	<0.005	<0.01	<0.005	<0.05	<0.002	<0.002	<0.0002	<0.0002	<0.0002
WTB1	Water	11/02/2021		<0.0004	<0.001	<0.0002	<0.001	<0.0002	<0.002	<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	<0.05	<0.002	<0.002	<0.001	<0.0004	<0.0004	<0.002	<0.0002	<0.0002	<0.0002

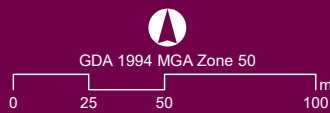
FIGURE





Figure A
Swan River crossing
Water quality sampling locations

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



Job Number: C20078-004
 Doc Number: 001
 Date: 29.06.20
 Scale: 1:2,500 @ A3
 Created by: MA
 Source: Orthophoto - Landgate, Jan 2020



MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

Appendix A

DBCA Approval



2020/1928
PERMIT P12652

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

Permit holder: Main Roads Western Australia (John Braid)

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

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

Approval date: 2 October 2020

Expiry date: 31 December 2021

CONDITIONS

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



**2020/1928
PERMIT P12652**

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

ADVICE TO APPLICANT

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



2020/1928
PERMIT P12652

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

PERMIT APPROVED

Signed:  Date: 02/10/20

Jacey Mills
Manager, Statutory Assessments

As delegate of CEO
Under Section 38 of the SCRM Act 2006

MEMO

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

Appendix B

Laboratory reports

CERTIFICATE OF ANALYSIS 256968

Client Details

Client	RPS Australia West Pty Ltd
Attention	Alan Foley
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	13 Water
Date samples received	11/02/2021
Date completed instructions received	11/02/2021

Analysis Details

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

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

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

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

Report Details

Date results requested by	25/02/2021
Date of Issue	25/02/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

David Williams, Group Organics Manager
Heram Halim, Operations Manager
Huong Tran, Chemist
Michael Kubiak, Laboratory Manager

Authorised By



Michael Kubiak, Laboratory Manager

Miscellaneous Inorganics

Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Total Dissolved Solids (grav)	mg/L	5	37,000	38,000	37,000	37,000	37,000
Total Suspended Solids	mg/L	5	20	<5	11	<5	38
Turbidity	NTU	0.1	0.8	0.6	0.5	0.6	1.5
Dissolved Organic Carbon	mg/L	1	3	3	2	4	3
Acidity as CaCO ₃	mg/L	5	<5	<5	<5	<5	<5
Sulphide in water*	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics

Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Total Dissolved Solids (grav)	mg/L	5	37,000	37,000	37,000	38,000	37,000
Total Suspended Solids	mg/L	5	<5	12	<5	18	79
Turbidity	NTU	0.1	0.8	0.4	0.8	0.9	2.0
Dissolved Organic Carbon	mg/L	1	4	4	3	2	2
Acidity as CaCO ₃	mg/L	5	<5	<5	<5	<5	<5
Sulphide in water*	mg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoride	mg/L	0.1	<5	<5	<5	<5	<5

Miscellaneous Inorganics

Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date prepared	-		12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021
Turbidity	NTU	0.1	0.2	0.2

Ionic Balance							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Calcium - Dissolved	mg/L	0.5	400	380	370	390	370
Potassium - Dissolved	mg/L	0.5	360	350	340	350	340
Magnesium - Dissolved	mg/L	0.5	1,200	1,200	1,200	1,200	1,200
Sodium - Dissolved	mg/L	0.5	12,000	11,000	11,000	11,000	11,000
Bicarbonate HCO ₃ ⁻ as CaCO ₃	mg/L	5	130	130	130	130	130
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	130	130	130	130	130
Chloride	mg/L	1	20,000	21,000	19,000	20,000	21,000
Sulphate	mg/L	1	2,900	3,000	2,800	2,900	3,000
Ionic Balance	%		-0.079	-3.2	-1.0	-1.5	-4.8
Hardness as CaCO ₃	mg/L	3	6,100	5,900	5,700	6,000	5,800

Ionic Balance							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Calcium - Dissolved	mg/L	0.5	380	380	380	400	390
Potassium - Dissolved	mg/L	0.5	350	350	350	360	350
Magnesium - Dissolved	mg/L	0.5	1,200	1,200	1,200	1,300	1,200
Sodium - Dissolved	mg/L	0.5	11,000	11,000	11,000	12,000	12,000
Bicarbonate HCO ₃ ⁻ as CaCO ₃	mg/L	5	130	130	130	130	130
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	130	130	130	130	130
Chloride	mg/L	1	21,000	21,000	21,000	21,000	21,000
Sulphate	mg/L	1	3,000	3,000	3,000	3,000	3,000
Ionic Balance	%		-3.3	-3.1	-3.0	-1.2	-1.5
Hardness as CaCO ₃	mg/L	3	5,800	5,900	5,900	6,200	6,000

Nutrients in Water							
Our Reference	UNITS	PQL	256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Total Nitrogen	mg/L	0.1	0.5	0.4	0.5	0.5	0.5
NOx as N	mg/L	0.005	<0.005	<0.005	0.014	<0.005	<0.005
Ammonia as N	mg/L	0.005	<0.005	<0.005	0.008	<0.005	<0.005
Total Phosphorus	mg/L	0.01	0.02	0.02	0.02	0.02	0.03
Phosphate as P	mg/L	0.005	<0.005	0.006	0.010	0.010	0.006

Nutrients in Water							
Our Reference	UNITS	PQL	256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Date analysed	-		12/02/2021	12/02/2021	12/02/2021	12/02/2021	12/02/2021
Total Nitrogen	mg/L	0.1	0.5	0.5	0.4	0.4	0.5
NOx as N	mg/L	0.005	0.016	0.011	0.006	<0.005	<0.005
Ammonia as N	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Phosphorus	mg/L	0.01	0.02	0.02	0.02	0.14	0.1
Phosphate as P	mg/L	0.005	0.009	0.009	0.006	0.006	0.006

Total Metals in water							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date digested	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Aluminium-Total	mg/L	0.01	0.03	0.03	0.03	0.03	0.14
Iron-Total	mg/L	0.01	0.04	0.03	0.03	0.03	0.24

Total Metals in water							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date digested	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Aluminium-Total	mg/L	0.01	0.04	0.04	0.03	0.03	0.19
Iron-Total	mg/L	0.01	0.03	0.03	0.03	0.03	0.29

Total Metals in water				
Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date digested	-		17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021
Aluminium-Total	mg/L	0.01	<0.02	<0.02
Iron-Total	mg/L	0.01	0.02	<0.02

Dissolved Metals in Water							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Silicon - Dissolved	mg/L	0.1	<0.5	<0.5	<0.5	<0.5	<0.5
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	0.02	<0.02	<0.02	<0.02	<0.02
Arsenic-Dissolved	mg/L	0.001	0.002	0.002	0.002	0.002	0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.012	0.013	0.013	0.013	0.014
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.011	0.006	0.006	0.006	0.026

Dissolved Metals in Water							
Our Reference	UNITS	PQL	256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021	17/02/2021	17/02/2021	17/02/2021
Silicon - Dissolved	mg/L	0.1	<0.5	<0.5	<0.5	<0.5	<0.5
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	0.03	<0.02
Arsenic-Dissolved	mg/L	0.001	0.002	0.002	0.002	<0.002	0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002	0.002	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	0.014	0.013	0.013	0.013	0.013
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002	0.002	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.006	0.011	0.007	0.006	0.008

Dissolved Metals in Water				
Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date prepared	-		17/02/2021	17/02/2021
Date analysed	-		17/02/2021	17/02/2021
Silicon - Dissolved	mg/L	0.1	0.2	0.2
Silver-Dissolved Ultra Low	mg/L	0.00005	<0.0001	<0.0001
Aluminium-Dissolved	mg/L	0.01	<0.02	<0.02
Arsenic-Dissolved	mg/L	0.001	<0.002	<0.002
Cadmium-Dissolved	mg/L	0.0001	<0.0002	<0.0002
Cobalt-Dissolved	mg/L	0.001	<0.002	<0.002
Chromium-Dissolved	mg/L	0.001	<0.002	<0.002
Copper-Dissolved	mg/L	0.001	<0.002	<0.002
Iron-Dissolved	mg/L	0.01	<0.02	<0.02
Mercury-Dissolved	mg/L	0.00005	<0.00005	<0.00005
Manganese-Dissolved	mg/L	0.005	<0.01	<0.01
Molybdenum-Dissolved	mg/L	0.001	<0.002	<0.002
Nickel-Dissolved	mg/L	0.001	<0.002	<0.002
Lead-Dissolved	mg/L	0.001	<0.002	<0.002
Antimony-Dissolved	mg/L	0.001	<0.002	<0.002
Selenium-Dissolved	mg/L	0.001	<0.002	<0.002
Zinc-Dissolved	mg/L	0.001	0.006	0.006

vTRH(C6-C10)/MBTEXN in water

Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021
TRH C ₆ - C ₉	µg/L	10	<50	<50	<50	<50	<50
TRH C ₆ - C ₁₀	µg/L	10	<50	<50	<50	<50	<50
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	10	<50	<50	<50	<50	<50
MTBE	µg/L	1	<3	<3	<3	<3	<3
Benzene	µg/L	1	<3	<3	<3	<3	<3
Toluene	µg/L	1	<3	<3	<3	<3	<3
Ethylbenzene	µg/L	1	<3	<3	<3	<3	<3
m+p-xylene	µg/L	2	<6	<6	<6	<6	<6
o-xylene	µg/L	1	<3	<3	<3	<3	<3
Naphthalene	µg/L	1	<3	<3	<3	<3	<3
Surrogate Dibromofluoromethane	%		108	110	107	109	108
Surrogate toluene-d8	%		109	108	108	108	109
Surrogate 4-BFB	%		92	92	92	94	93

vTRH(C6-C10)/MBTEXN in water

Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date analysed	-		16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021
TRH C ₆ - C ₉	µg/L	10	<50	<50	<10	<50	<50
TRH C ₆ - C ₁₀	µg/L	10	<50	<50	<10	<50	<50
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	10	<50	<50	<10	<50	<50
MTBE	µg/L	1	<3	<3	<1	<3	<3
Benzene	µg/L	1	<3	<3	<1	<3	<3
Toluene	µg/L	1	<3	<3	<1	<3	<3
Ethylbenzene	µg/L	1	<3	<3	<1	<3	<3
m+p-xylene	µg/L	2	<6	<6	<2	<6	<6
o-xylene	µg/L	1	<3	<3	<1	<3	<3
Naphthalene	µg/L	1	<3	<3	<1	<3	<3
Surrogate Dibromofluoromethane	%		111	110	111	110	109
Surrogate toluene-d8	%		109	108	108	108	107
Surrogate 4-BFB	%		91	90	92	94	93

vTRH(C6-C10)/MBTEXN in water					
Our Reference			256968-11	256968-12	256968-13
Your Reference	UNITS	PQL	WR1	WB1	WTB1
Date Sampled			11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water
Date analysed	-		16/02/2021	16/02/2021	16/02/2021
TRH C ₆ - C ₉	µg/L	10	<10	<10	<10
TRH C ₆ - C ₁₀	µg/L	10	<10	<10	<10
TRH C ₆ -C ₁₀ less BTEX (F1)	µg/L	10	<10	<10	<10
MTBE	µg/L	1	<1	<1	<1
Benzene	µg/L	1	<1	<1	<1
Toluene	µg/L	1	<1	<1	<1
Ethylbenzene	µg/L	1	<1	<1	<1
m+p-xylene	µg/L	2	<2	<2	<2
o-xylene	µg/L	1	<1	<1	<1
Naphthalene	µg/L	1	<1	<1	<1
Surrogate Dibromofluoromethane	%		108	106	106
Surrogate toluene-d8	%		110	108	107
Surrogate 4-BFB	%		92	90	92

svTRH(C10-C40) in water							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021
Date analysed	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
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	%		98	96	86	89	93

svTRH(C10-C40) in water							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021
Date analysed	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
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	%		98	88	89	94	89

svTRH(C10-C40) in water				
Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date extracted	-		16/02/2021	16/02/2021
Date analysed	-		18/02/2021	18/02/2021
TRH C ₁₀ - C ₁₄	µg/L	50	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	100	<100	<100
TRH >C ₁₀ - C ₁₆	µg/L	50	<50	<50
TRH >C ₁₀ -C ₁₆ less N (F2)	µg/L	50	<50	<50
TRH >C ₁₆ - C ₃₄	µg/L	100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	100	<100	<100
Surrogate o-Terphenyl	%		88	81

PAHs in Water							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D ₁₄	%		96	100	106	93	94

PAHs in Water							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Naphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-D ₁₄	%		94	89	96	100	91

PAHs in Water				
Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date extracted	-		18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021
Naphthalene	µg/L	0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1
Benzo(b,j,k)fluoranthene	µg/L	0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	0.5	<0.5	<0.5
Total +ve PAH's	µg/L	0.1	<0.1	<0.1
Surrogate p-Terphenyl-D ₁₄	%		95	96

Low Level OCP in water							
Our Reference	UNITS	PQL	256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference			WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		98	101	111	96	94

Low Level OCP in water							
Our Reference	UNITS	PQL	256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference			WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date extracted	-		18/02/2021	18/02/2021	18/02/2021	18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		96	90	99	102	92

Low Level OCP in water				
Our Reference			256968-11	256968-12
Your Reference	UNITS	PQL	WR1	WB1
Date Sampled			11/02/2021	11/02/2021
Type of sample			Water	Water
Date extracted	-		18/02/2021	18/02/2021
Date analysed	-		22/02/2021	22/02/2021
Hexachlorobenzene (HCB)	µg/L	0.01	<0.01	<0.01
a-BHC	µg/L	0.05	<0.05	<0.05
Lindane (g-BHC)	µg/L	0.05	<0.05	<0.05
b-BHC	µg/L	0.05	<0.05	<0.05
Heptachlor	µg/L	0.01	<0.01	<0.01
d-BHC	µg/L	0.05	<0.05	<0.05
Aldrin	µg/L	0.01	<0.01	<0.01
Heptachlor Epoxide	µg/L	0.01	<0.01	<0.01
g-Chlordane	µg/L	0.01	<0.01	<0.01
a-Chlordane	µg/L	0.01	<0.01	<0.01
a-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDE	µg/L	0.01	<0.01	<0.01
Dieldrin	µg/L	0.01	<0.01	<0.01
Endrin	µg/L	0.01	<0.01	<0.01
pp-DDD	µg/L	0.01	<0.01	<0.01
b-Endosulfan	µg/L	0.02	<0.02	<0.02
pp-DDT	µg/L	0.006	<0.006	<0.006
Endosulfan Sulphate	µg/L	0.02	<0.02	<0.02
Methoxychlor	µg/L	0.02	<0.02	<0.02
Surrogate 2-chlorophenol-d4	%		93	93

PFAS in water TRACE Extended							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	0.0007	0.0005	0.0007	0.0007	0.0009
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	0.0023	0.0023	0.0020
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0023	0.0023	0.0031	0.0031	0.0024
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	0.0009	0.0009	0.001	0.001	0.0009
Perfluoroheptanoic acid	µg/L	0.0004	0.0006	0.0006	0.0007	0.0007	0.0006
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0007	0.0007	0.0008	0.0009	0.0005
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Surrogate ¹³ C ₈ PFOS	%		100	100	101	96	106
Surrogate ¹³ C ₂ PFOA	%		104	102	102	102	98
Extracted ISTD ¹³ C ₃ PFBS	%		99	103	100	102	102
Extracted ISTD ¹⁸ O ₂ PFHxS	%		101	105	105	101	107
Extracted ISTD ¹³ C ₄ PFOS	%		74	79	75	82	79
Extracted ISTD ¹³ C ₄ PFBA	%		66	70	60	59	65

PFAS in water TRACE Extended							
Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD ¹³ C ₃ PFPeA	%		77	77	66	77	69
Extracted ISTD ¹³ C ₂ PFHxA	%		103	109	108	106	110
Extracted ISTD ¹³ C ₄ PFHpA	%		102	104	107	108	107
Extracted ISTD ¹³ C ₄ PFOA	%		108	114	111	113	118
Extracted ISTD ¹³ C ₅ PFNA	%		100	103	109	109	110
Extracted ISTD ¹³ C ₂ PFDA	%		90	91	93	97	102
Extracted ISTD ¹³ C ₂ PFUnDA	%		70	87	85	82	95
Extracted ISTD ¹³ C ₂ PFDoDA	%		57	65	63	67	74
Extracted ISTD ¹³ C ₂ PFTeDA	%		44	55	53	54	52
Extracted ISTD ¹³ C ₂ 4:2FTS	%		108	111	117	109	108
Extracted ISTD ¹³ C ₂ 6:2FTS	%		141	134	144	141	146
Extracted ISTD ¹³ C ₂ 8:2FTS	%		95	95	105	106	114
Extracted ISTD ¹³ C ₈ FOSA	%		51	58	60	63	61
Extracted ISTD d ₃ N MeFOSA	%		25	33	38	36	31
Extracted ISTD d ₅ N EtFOSA	%		28	31	42	37	34
Extracted ISTD d ₇ N MeFOSE	%		42	50	50	55	47
Extracted ISTD d ₉ N EtFOSE	%		40	45	49	52	51
Extracted ISTD d ₃ N MeFOSAA	%		68	84	77	78	87
Extracted ISTD d ₅ N EtFOSAA	%		58	60	66	62	68
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0043	0.0043	0.0054	0.0054	0.0044
Total Positive PFOS & PFOA	µg/L	0.0002	0.0030	0.0030	0.0039	0.0040	0.0029
Total Positive PFAS	µg/L	0.0002	0.0072	0.0070	0.0086	0.0087	0.0073

PFAS in water TRACE Extended							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Date prepared	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Date analysed	-		22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	0.0006	0.0007	0.0005	0.0007	0.0008
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	0.0021	0.0021	0.0020	0.0020	0.0020
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	0.0024	0.0025	0.001	0.001	0.0020
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	0.001	0.001	0.0009	0.0009	0.0009
Perfluoroheptanoic acid	µg/L	0.0004	0.0008	0.0007	0.0005	0.0006	0.0005
Perfluorooctanoic acid PFOA	µg/L	0.0002	0.0007	0.0009	0.0006	0.0007	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	%		95	99	100	97	98
Surrogate ¹³ C ₂ PFOA	%		97	97	98	106	98
Extracted ISTD ¹³ C ₃ PFBS	%		106	100	100	104	103
Extracted ISTD ¹⁸ O ₂ PFHxS	%		112	102	104	111	106
Extracted ISTD ¹³ C ₄ PFOS	%		96	83	89	88	83
Extracted ISTD ¹³ C ₄ PFBA	%		60	59	67	67	68

PFAS in water TRACE Extended							
Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Extracted ISTD ¹³ C ₃ PFPeA	%		69	66	69	68	68
Extracted ISTD ¹³ C ₂ PFHxA	%		111	112	111	110	108
Extracted ISTD ¹³ C ₄ PFHpA	%		107	107	106	104	104
Extracted ISTD ¹³ C ₄ PFOA	%		118	113	117	111	115
Extracted ISTD ¹³ C ₅ PFNA	%		114	102	108	107	108
Extracted ISTD ¹³ C ₂ PFDA	%		118	106	114	107	96
Extracted ISTD ¹³ C ₂ PFUnDA	%		115	113	116	93	86
Extracted ISTD ¹³ C ₂ PFDoDA	%		85	103	90	78	73
Extracted ISTD ¹³ C ₂ PFTeDA	%		53	63	61	52	54
Extracted ISTD ¹³ C ₂ 4:2FTS	%		118	111	116	120	110
Extracted ISTD ¹³ C ₂ 6:2FTS	%		154	143	141	146	144
Extracted ISTD ¹³ C ₂ 8:2FTS	%		126	107	127	115	116
Extracted ISTD ¹³ C ₈ FOSA	%		67	74	70	63	60
Extracted ISTD d ₃ N MeFOSA	%		38	53	45	37	37
Extracted ISTD d ₅ N EtFOSA	%		39	59	47	41	37
Extracted ISTD d ₇ N MeFOSE	%		59	69	63	57	50
Extracted ISTD d ₉ N EtFOSE	%		55	75	66	55	54
Extracted ISTD d ₃ N MeFOSAA	%		106	136	129	95	85
Extracted ISTD d ₅ N EtFOSAA	%		76	99	88	69	69
Total Positive PFHxS & PFOS	µg/L	0.0002	0.0045	0.0046	0.0030	0.0030	0.0040
Total Positive PFOS & PFOA	µg/L	0.0002	0.0031	0.0034	0.002	0.002	0.0026
Total Positive PFAS	µg/L	0.0002	0.0076	0.0079	0.0055	0.0059	0.0068

PFAS in water TRACE Extended					
Our Reference			256968-11	256968-12	256968-13
Your Reference	UNITS	PQL	WR1	WB1	WTB1
Date Sampled			11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water
Date prepared	-		22/02/2021	22/02/2021	24/02/2021
Date analysed	-		22/02/2021	22/02/2021	24/02/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluoropentanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorohexanesulfonic acid	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluoroheptanesulfonic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorooctanesulfonate PFOS	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluorodecanesulfonic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorobutanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoropentanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorohexanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluoroheptanoic acid	µg/L	0.0004	<0.0004	<0.0004	<0.0004
Perfluorooctanoic acid PFOA	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Perfluorononanoic acid	µg/L	0.001	<0.001	<0.001	<0.001
Perfluorodecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluoroundecanoic acid	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorododecanoic acid	µg/L	0.005	<0.005	<0.005	<0.005
Perfluorotridecanoic acid	µg/L	0.01	<0.01	<0.01	<0.01
Perfluorotetradecanoic acid	µg/L	0.05	<0.05	<0.05	<0.05
4:2 FTS	µg/L	0.001	<0.001	<0.001	<0.001
6:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004
8:2 FTS	µg/L	0.0004	<0.0004	<0.0004	<0.0004
10:2 FTS	µg/L	0.002	<0.002	<0.002	<0.002
Perfluorooctane sulfonamide	µg/L	0.01	<0.01	<0.01	<0.01
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	<0.005	<0.005	<0.005
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	<0.01	<0.01	<0.01
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	<0.005	<0.005	<0.005
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	<0.05	<0.05	<0.05
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	<0.002	<0.002	<0.002
Surrogate ¹³ C ₈ PFOS	%		106	99	98
Surrogate ¹³ C ₂ PFOA	%		102	100	103
Extracted ISTD ¹³ C ₃ PFBS	%		98	102	89
Extracted ISTD ¹⁸ O ₂ PFHxS	%		104	100	95
Extracted ISTD ¹³ C ₄ PFOS	%		82	79	92
Extracted ISTD ¹³ C ₄ PFBA	%		109	110	100

PFAS in water TRACE Extended					
Our Reference			256968-11	256968-12	256968-13
Your Reference	UNITS	PQL	WR1	WB1	WTB1
Date Sampled			11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water
Extracted ISTD ¹³ C ₃ PFPeA	%		89	87	87
Extracted ISTD ¹³ C ₂ PFHxA	%		110	105	96
Extracted ISTD ¹³ C ₄ PFHpA	%		108	102	96
Extracted ISTD ¹³ C ₄ PFOA	%		109	116	98
Extracted ISTD ¹³ C ₅ PFNA	%		108	109	97
Extracted ISTD ¹³ C ₂ PFDA	%		101	95	103
Extracted ISTD ¹³ C ₂ PFUnDA	%		80	84	95
Extracted ISTD ¹³ C ₂ PFDoDA	%		62	63	95
Extracted ISTD ¹³ C ₂ PFTeDA	%		37	39	39
Extracted ISTD ¹³ C ₂ 4:2FTS	%		108	104	112
Extracted ISTD ¹³ C ₂ 6:2FTS	%		140	140	126
Extracted ISTD ¹³ C ₂ 8:2FTS	%		109	102	118
Extracted ISTD ¹³ C ₈ FOSA	%		69	66	72
Extracted ISTD d ₃ N MeFOSA	%		41	43	43
Extracted ISTD d ₅ N EtFOSA	%		43	43	39
Extracted ISTD d ₇ N MeFOSE	%		52	51	59
Extracted ISTD d ₉ N EtFOSE	%		48	48	50
Extracted ISTD d ₃ N MeFOSAA	%		72	67	103
Extracted ISTD d ₅ N EtFOSAA	%		56	55	91
Total Positive PFHxS & PFOS	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Total Positive PFOS & PFOA	µg/L	0.0002	<0.0002	<0.0002	<0.0002
Total Positive PFAS	µg/L	0.0002	<0.0002	<0.0002	<0.0002

Chlorophyll a & Phaeophytin a

Our Reference			256968-1	256968-2	256968-3	256968-4	256968-5
Your Reference	UNITS	PQL	WS1-S	WS1-D	WS2-S	WS2-D	WS3-S
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	2.5	2.5	2.5	2.6	2.6
Phaeophytin a	µg/L	0.2	0.5	0.5	0.5	0.6	1.0

Chlorophyll a & Phaeophytin a

Our Reference			256968-6	256968-7	256968-8	256968-9	256968-10
Your Reference	UNITS	PQL	WS4-S	WS4-D	WS5-S	WS5-D	WZ1
Date Sampled			11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Type of sample			Water	Water	Water	Water	Water
Chlorophyll a	µg/L	0.1	3.0	3.0	2.6	2.3	3.0
Phaeophytin a	µg/L	0.2	0.9	0.7	0.6	0.6	2.1

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.
METALS-022	For urine samples total Mercury is determined, however, mercury in urine is almost entirely in the inorganic form (CDC). 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	Soil samples are extracted with basified Methanol. Waters and soil extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MS/MS. PFAS results include the sum of branched and linear isomers where applicable. 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. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Total Dissolved Solids (grav)	mg/L	5	INORG-018	<5	1	37000	38000	3	98	[NT]
Total Suspended Solids	mg/L	5	INORG-019	<5	1	20	18	11	104	[NT]
Turbidity	NTU	0.1	INORG-022	<0.1	1	0.8	0.8	0	111	[NT]
Dissolved Organic Carbon	mg/L	1	INORG-110	<1	1	3	3	0	101	[NT]
Acidity as CaCO ₃	mg/L	5	INORG-005	<5	1	<5	<5	0	101	[NT]
Sulphide in water*	mg/L	0.5	INORG-051	<0.5	1	<0.5	[NT]		84	[NT]
Fluoride	mg/L	0.1	INORG-081	<0.1	1	<5	<5	0	112	107

QUALITY CONTROL: Miscellaneous Inorganics					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	12/02/2021	12/02/2021		[NT]	[NT]
Turbidity	NTU	0.1	INORG-022	[NT]	11	0.2	0.2	0	[NT]	[NT]

QUALITY CONTROL: Ionic Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Calcium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	400	[NT]		101	[NT]
Potassium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	360	[NT]		105	[NT]
Magnesium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	1200	[NT]		104	[NT]
Sodium - Dissolved	mg/L	0.5	METALS-020	<0.5	1	12000	[NT]		102	[NT]
Bicarbonate HCO ₃ as CaCO ₃	mg/L	5	INORG-006	<5	1	130	130	0	100	[NT]
Carbonate CO ₃ ²⁻ as CaCO ₃	mg/L	5	INORG-006	<5	1	<5	<5	0	100	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	INORG-006	<5	1	130	130	0	100	[NT]
Chloride	mg/L	1	INORG-081	<1	1	20000	20000	0	101	123
Sulphate	mg/L	1	INORG-081	<1	1	2900	2900	0	104	110
Hardness as CaCO ₃	mg/L	3	METALS-008	<3	1	6100	[NT]		[NT]	[NT]

QUALITY CONTROL: Ionic Balance						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	7	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	7	12/02/2021	12/02/2021		[NT]	[NT]
Calcium - Dissolved	mg/L	0.5	METALS-020	[NT]	7	380	390	3	[NT]	[NT]
Potassium - Dissolved	mg/L	0.5	METALS-020	[NT]	7	350	350	0	[NT]	[NT]
Magnesium - Dissolved	mg/L	0.5	METALS-020	[NT]	7	1200	1200	0	[NT]	[NT]
Sodium - Dissolved	mg/L	0.5	METALS-020	[NT]	7	11000	11000	0	[NT]	[NT]
Bicarbonate HCO ₃ as CaCO ₃	mg/L	5	INORG-006	[NT]	7	130	[NT]		[NT]	[NT]
Carbonate CO ₃ ²⁻ as CaCO ₃	mg/L	5	INORG-006	[NT]	7	<5	[NT]		[NT]	[NT]
Total Alkalinity as CaCO ₃	mg/L	5	INORG-006	[NT]	7	130	[NT]		[NT]	[NT]
Chloride	mg/L	1	INORG-081	[NT]	7	21000	[NT]		[NT]	[NT]
Sulphate	mg/L	1	INORG-081	[NT]	7	3000	[NT]		[NT]	[NT]
Hardness as CaCO ₃	mg/L	3	METALS-008	[NT]	7	5900	6000	2	[NT]	[NT]

QUALITY CONTROL: Nutrients in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date prepared	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Date analysed	-			12/02/2021	1	12/02/2021	12/02/2021		12/02/2021	12/02/2021
Total Nitrogen	mg/L	0.1	INORG-110	<0.1	1	0.5	[NT]		103	[NT]
NOx as N	mg/L	0.005	INORG-055	<0.005	1	<0.005	<0.005	0	99	[NT]
Ammonia as N	mg/L	0.005	INORG-057	<0.005	1	<0.005	<0.005	0	87	[NT]
Total Phosphorus	mg/L	0.01	INORG-060	<0.01	1	0.02	0.02	0	109	105
Phosphate as P	mg/L	0.005	INORG-060	<0.005	1	<0.005	<0.005	0	116	[NT]

QUALITY CONTROL: Nutrients in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	2	12/02/2021	12/02/2021		[NT]	[NT]
Date analysed	-			[NT]	2	12/02/2021	12/02/2021		[NT]	[NT]
Total Nitrogen	mg/L	0.1	INORG-110	[NT]	2	0.4	0.4	0	[NT]	[NT]
NOx as N	mg/L	0.005	INORG-055	[NT]	2	<0.005	[NT]		[NT]	[NT]
Ammonia as N	mg/L	0.005	INORG-057	[NT]	2	<0.005	[NT]		[NT]	[NT]
Total Phosphorus	mg/L	0.01	INORG-060	[NT]	2	0.02	[NT]		[NT]	[NT]
Phosphate as P	mg/L	0.005	INORG-060	[NT]	2	0.006	[NT]		[NT]	[NT]

QUALITY CONTROL: Total Metals in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date digested	-			17/02/2021	1	17/02/2021	17/02/2021		17/02/2021	17/02/2021
Date analysed	-			17/02/2021	1	17/02/2021	17/02/2021		17/02/2021	17/02/2021
Aluminium-Total	mg/L	0.01	METALS-022	<0.01	1	0.03	0.03	0	97	85
Iron-Total	mg/L	0.01	METALS-022	<0.01	1	0.04	0.04	0	114	108

QUALITY CONTROL: Total Metals in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date digested	-			[NT]	11	17/02/2021	17/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	17/02/2021	17/02/2021		[NT]	[NT]
Aluminium-Total	mg/L	0.01	METALS-022	[NT]	11	<0.02	<0.02	0	[NT]	[NT]
Iron-Total	mg/L	0.01	METALS-022	[NT]	11	0.02	<0.02	0	[NT]	[NT]

QUALITY CONTROL: Dissolved Metals in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date prepared	-			17/02/2021	1	17/02/2021	17/02/2021		17/02/2021	17/02/2021
Date analysed	-			17/02/2021	1	17/02/2021	17/02/2021		17/02/2021	17/02/2021
Silicon - Dissolved	mg/L	0.1	METALS-020	<0.1	1	<0.5	[NT]		89	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	<0.00005	1	<0.0001	<0.0001	0	100	91
Aluminium-Dissolved	mg/L	0.01	METALS-022	<0.01	1	0.02	0.02	0	104	85
Arsenic-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.002	0.002	0	98	102
Cadmium-Dissolved	mg/L	0.0001	METALS-022	<0.0001	1	<0.0002	<0.0002	0	101	98
Cobalt-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	94	82
Chromium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	87	88
Copper-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	91	84
Iron-Dissolved	mg/L	0.01	METALS-022	<0.01	1	<0.02	<0.02	0	94	103
Mercury-Dissolved	mg/L	0.00005	METALS-021	<0.00005	1	<0.00005	<0.00005	0	114	99
Manganese-Dissolved	mg/L	0.005	METALS-022	<0.005	1	<0.01	<0.01	0	98	95
Molybdenum-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.012	0.013	8	100	107
Nickel-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	91	87
Lead-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	100	81
Antimony-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	102	93
Selenium-Dissolved	mg/L	0.001	METALS-022	<0.001	1	<0.002	<0.002	0	92	95
Zinc-Dissolved	mg/L	0.001	METALS-022	<0.001	1	0.011	0.009	20	95	91

QUALITY CONTROL: Dissolved Metals in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	7	17/02/2021	17/02/2021		[NT]	[NT]
Date analysed	-			[NT]	7	17/02/2021	17/02/2021		[NT]	[NT]
Silicon - Dissolved	mg/L	0.1	METALS-020	[NT]	7	<0.5	<0.5	0	[NT]	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	[NT]	7	<0.0001	[NT]		[NT]	[NT]
Aluminium-Dissolved	mg/L	0.01	METALS-022	[NT]	7	<0.02	[NT]		[NT]	[NT]
Arsenic-Dissolved	mg/L	0.001	METALS-022	[NT]	7	0.002	[NT]		[NT]	[NT]
Cadmium-Dissolved	mg/L	0.0001	METALS-022	[NT]	7	<0.0002	[NT]		[NT]	[NT]
Cobalt-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Chromium-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Copper-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Iron-Dissolved	mg/L	0.01	METALS-022	[NT]	7	<0.02	[NT]		[NT]	[NT]
Mercury-Dissolved	mg/L	0.00005	METALS-021	[NT]	7	<0.00005	[NT]		[NT]	[NT]
Manganese-Dissolved	mg/L	0.005	METALS-022	[NT]	7	<0.01	[NT]		[NT]	[NT]
Molybdenum-Dissolved	mg/L	0.001	METALS-022	[NT]	7	0.013	[NT]		[NT]	[NT]
Nickel-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Lead-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Antimony-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Selenium-Dissolved	mg/L	0.001	METALS-022	[NT]	7	<0.002	[NT]		[NT]	[NT]
Zinc-Dissolved	mg/L	0.001	METALS-022	[NT]	7	0.011	[NT]		[NT]	[NT]

QUALITY CONTROL: Dissolved Metals in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	17/02/2021	17/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	17/02/2021	17/02/2021		[NT]	[NT]
Silicon - Dissolved	mg/L	0.1	METALS-020	[NT]	11	0.2	[NT]		[NT]	[NT]
Silver-Dissolved Ultra Low	mg/L	0.00005	METALS-022	[NT]	11	<0.0001	<0.0001	0	[NT]	[NT]
Aluminium-Dissolved	mg/L	0.01	METALS-022	[NT]	11	<0.02	<0.02	0	[NT]	[NT]
Arsenic-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Cadmium-Dissolved	mg/L	0.0001	METALS-022	[NT]	11	<0.0002	<0.0002	0	[NT]	[NT]
Cobalt-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Chromium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Copper-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Iron-Dissolved	mg/L	0.01	METALS-022	[NT]	11	<0.02	<0.02	0	[NT]	[NT]
Mercury-Dissolved	mg/L	0.00005	METALS-021	[NT]	11	<0.00005	<0.00005	0	[NT]	[NT]
Manganese-Dissolved	mg/L	0.005	METALS-022	[NT]	11	<0.01	<0.01	0	[NT]	[NT]
Molybdenum-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Nickel-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Lead-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Antimony-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Selenium-Dissolved	mg/L	0.001	METALS-022	[NT]	11	<0.002	<0.002	0	[NT]	[NT]
Zinc-Dissolved	mg/L	0.001	METALS-022	[NT]	11	0.006	0.006	0	[NT]	[NT]

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	-			16/02/2021	[NT]	[NT]	[NT]	[NT]	16/02/2021	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	[NT]	[NT]	[NT]	[NT]	104	[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]	110	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	99	[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]	96	[NT]
Naphthalene	µg/L	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	109	[NT]
Surrogate toluene-d8	%		Org-023	109	[NT]	[NT]	[NT]	[NT]	111	[NT]
Surrogate 4-BFB	%		Org-023	92	[NT]	[NT]	[NT]	[NT]	95	[NT]

QUALITY CONTROL: svTRH(C10-C40) in water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-8
Date extracted	-			16/02/2021	5	16/02/2021	16/02/2021		16/02/2021	16/02/2021
Date analysed	-			18/02/2021	5	18/02/2021	18/02/2021		18/02/2021	18/02/2021
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	5	<50	<50	0	91	94
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	5	<100	<100	0	90	91
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	5	<100	<100	0	84	85
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	5	<50	<50	0	92	94
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	5	<100	<100	0	90	92
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	5	<100	<100	0	91	87
Surrogate o-Terphenyl	%		Org-020	93	5	93	95	2	93	93

QUALITY CONTROL: PAHs in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-7
Date extracted	-			18/02/2021	6	18/02/2021	18/02/2021		18/02/2021	18/02/2021
Date analysed	-			22/02/2021	6	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Naphthalene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	99	109
Acenaphthylene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Fluorene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	100	105
Phenanthrene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	105	113
Anthracene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	104	109
Pyrene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	98	109
Benzo(a)anthracene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Chrysene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	103	110
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-022/025	<0.2	6	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	100	103
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-022/025	<0.1	6	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-D ₁₄	%		Org-022/025	93	6	94	95	1	95	107

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	256968-7
Date extracted	-			18/02/2021	6	18/02/2021	18/02/2021		18/02/2021	18/02/2021
Date analysed	-			22/02/2021	6	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Hexachlorobenzene (HCB)	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
a-BHC	µg/L	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	110	107
Lindane (g-BHC)	µg/L	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	[NT]	[NT]
b-BHC	µg/L	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	82	106
Heptachlor	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	94	109
d-BHC	µg/L	0.05	Org-022/025	<0.05	6	<0.05	<0.05	0	[NT]	[NT]
Aldrin	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	106	100
Heptachlor Epoxide	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	108	93
g-Chlordane	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
a-Chlordane	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
a-Endosulfan	µg/L	0.02	Org-022/025	<0.02	6	<0.02	<0.02	0	[NT]	[NT]
pp-DDE	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	95	108
Dieldrin	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	118	110
Endrin	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	[NT]	[NT]
pp-DDD	µg/L	0.01	Org-022/025	<0.01	6	<0.01	<0.01	0	97	109
b-Endosulfan	µg/L	0.02	Org-022/025	<0.02	6	<0.02	<0.02	0	[NT]	[NT]
pp-DDT	µg/L	0.006	Org-022/025	<0.006	6	<0.006	<0.006	0	[NT]	[NT]
Endosulfan Sulphate	µg/L	0.02	Org-022/025	<0.02	6	<0.02	<0.02	0	121	107
Methoxychlor	µg/L	0.02	Org-022/025	<0.02	6	<0.02	<0.02	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022/025	90	6	96	98	2	91	107

QUALITY CONTROL: PFAS in water TRACE Extended						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Date prepared	-			22/02/2021	1	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Date analysed	-			22/02/2021	1	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Perfluorobutanesulfonic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0007	0.0006	15	105	110
Perfluoropentanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	103	104
Perfluorohexanesulfonic acid	µg/L	0.0002	Org-029	<0.0002	1	0.0020	0.0020	0	97	97
Perfluoroheptanesulfonic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	91	90
Perfluorooctanesulfonate PFOS	µg/L	0.0002	Org-029	<0.0002	1	0.0023	0.0023	0	105	104
Perfluorodecanesulfonic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	69	63
Perfluorobutanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	98	102
Perfluoropentanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	119	126
Perfluorohexanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0009	0.0008	12	92	92
Perfluoroheptanoic acid	µg/L	0.0004	Org-029	<0.0004	1	0.0006	0.0005	18	102	110
Perfluorooctanoic acid PFOA	µg/L	0.0002	Org-029	<0.0002	1	0.0007	0.0006	15	98	100
Perfluorononanoic acid	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	93	98
Perfluorodecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	102	94
Perfluoroundecanoic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	93	84
Perfluorododecanoic acid	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	102	105
Perfluorotridecanoic acid	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	76	107
Perfluorotetradecanoic acid	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	106	120
4:2 FTS	µg/L	0.001	Org-029	<0.001	1	<0.001	<0.001	0	106	112
6:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	106	114
8:2 FTS	µg/L	0.0004	Org-029	<0.0004	1	<0.0004	<0.0004	0	109	111
10:2 FTS	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	74	73
Perfluorooctane sulfonamide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	110	118
N-Methyl perfluorooctane sulfonamide	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	100	95
N-Ethyl perfluorooctanesulfon -amide	µg/L	0.01	Org-029	<0.01	1	<0.01	<0.01	0	90	101
N-Me perfluorooctanesulfonamid -oethanol	µg/L	0.005	Org-029	<0.005	1	<0.005	<0.005	0	92	102
N-Et perfluorooctanesulfonamid -oethanol	µg/L	0.05	Org-029	<0.05	1	<0.05	<0.05	0	101	108
MePerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	104	101
EtPerfluorooctanesulf- amid oacetic acid	µg/L	0.002	Org-029	<0.002	1	<0.002	<0.002	0	106	109
Surrogate ¹³ C ₈ PFOS	%		Org-029	92	1	100	101	1	105	101
Surrogate ¹³ C ₂ PFOA	%		Org-029	101	1	104	104	0	100	100
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	97	1	99	104	5	101	100

QUALITY CONTROL: PFAS in water TRACE Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Extracted ISTD ¹⁸ O ₂ PFHxS	%		Org-029	95	1	101	108	7	102	105
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	82	1	74	80	8	80	79
Extracted ISTD ¹³ C ₄ PFBA	%		Org-029	106	1	66	67	2	110	67
Extracted ISTD ¹³ C ₃ PFPeA	%		Org-029	78	1	77	80	4	80	74
Extracted ISTD ¹³ C ₂ PFHxA	%		Org-029	103	1	103	108	5	108	104
Extracted ISTD ¹³ C ₄ PFHpA	%		Org-029	99	1	102	104	2	102	104
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	107	1	108	110	2	109	108
Extracted ISTD ¹³ C ₅ PFNA	%		Org-029	97	1	100	105	5	100	103
Extracted ISTD ¹³ C ₂ PFDA	%		Org-029	88	1	90	98	9	89	98
Extracted ISTD ¹³ C ₂ PFUnDA	%		Org-029	76	1	70	79	12	84	86
Extracted ISTD ¹³ C ₂ PFDoDA	%		Org-029	50	1	57	59	3	62	62
Extracted ISTD ¹³ C ₂ PFTeDA	%		Org-029	52	1	44	51	15	45	49
Extracted ISTD ¹³ C ₂ 4:2FTS	%		Org-029	103	1	108	105	3	104	109
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	122	1	141	139	1	128	136
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	92	1	95	98	3	103	102
Extracted ISTD ¹³ C ₈ FOSA	%		Org-029	71	1	51	60	16	69	58
Extracted ISTD d ₃ N MeFOSA	%		Org-029	36	1	25	30	18	36	36
Extracted ISTD d ₅ N EtFOSA	%		Org-029	33	1	28	31	10	36	35
Extracted ISTD d ₇ N MeFOSE	%		Org-029	53	1	42	46	9	57	50
Extracted ISTD d ₉ N EtFOSE	%		Org-029	51	1	40	41	2	54	46

QUALITY CONTROL: PFAS in water TRACE Extended					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	256968-2
Extracted ISTD d ₃ N MeFOSAA	%		Org-029	69	1	68	71	4	80	83
Extracted ISTD d ₅ N EtFOSAA	%		Org-029	58	1	58	58	0	64	66

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	22/02/2021	22/02/2021		[NT]	[NT]
Date analysed	-			[NT]	11	22/02/2021	22/02/2021		[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	106	104	2	[NT]	[NT]
Surrogate ¹³ C ₂ PFOA	%		Org-029	[NT]	11	102	99	3	[NT]	[NT]
Extracted ISTD ¹³ C ₃ PFBS	%		Org-029	[NT]	11	98	103	5	[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	104	101	3	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFOS	%		Org-029	[NT]	11	82	75	9	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFBA	%		Org-029	[NT]	11	109	112	3	[NT]	[NT]
Extracted ISTD ¹³ C ₃ PFPeA	%		Org-029	[NT]	11	89	88	1	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFHxA	%		Org-029	[NT]	11	110	109	1	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFHpA	%		Org-029	[NT]	11	108	110	2	[NT]	[NT]
Extracted ISTD ¹³ C ₄ PFOA	%		Org-029	[NT]	11	109	116	6	[NT]	[NT]
Extracted ISTD ¹³ C ₅ PFNA	%		Org-029	[NT]	11	108	106	2	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFDA	%		Org-029	[NT]	11	101	91	10	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFUnDA	%		Org-029	[NT]	11	80	78	3	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFDoDA	%		Org-029	[NT]	11	62	63	2	[NT]	[NT]
Extracted ISTD ¹³ C ₂ PFTeDA	%		Org-029	[NT]	11	37	45	20	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 4:2FTS	%		Org-029	[NT]	11	108	113	5	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 6:2FTS	%		Org-029	[NT]	11	140	142	1	[NT]	[NT]
Extracted ISTD ¹³ C ₂ 8:2FTS	%		Org-029	[NT]	11	109	97	12	[NT]	[NT]
Extracted ISTD ¹³ C ₈ FOSA	%		Org-029	[NT]	11	69	69	0	[NT]	[NT]
Extracted ISTD d ₃ N MeFOSA	%		Org-029	[NT]	11	41	44	7	[NT]	[NT]
Extracted ISTD d ₅ N EtFOSA	%		Org-029	[NT]	11	43	45	5	[NT]	[NT]
Extracted ISTD d ₇ N MeFOSE	%		Org-029	[NT]	11	52	51	2	[NT]	[NT]
Extracted ISTD d ₉ N EtFOSE	%		Org-029	[NT]	11	48	51	6	[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	72	69	4	[NT]	[NT]
Extracted ISTD d ₅ N EtFOSAA	%		Org-029	[NT]	11	56	60	7	[NT]	[NT]

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

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

#1-7,9,10 - TRHC6-C10/BTEX: PQL has been raised as the sample/s were foamy and required dilution.

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

Chlorophyll a and Phaeophytin a analysis conducted by Marine and Freshwater Research Laboratory. Report MPL21-4.

PFAS analysis conducted by Envirolab Services. Report 261807.

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).

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



DATA QUALITY ASSESSMENT SUMMARY

Report Details	
Envirolab Report Reference	256968
Client ID	RPS Australia West Pty Ltd
Project Reference	EEC20078.004 - Fremantle Traffic Bridge
Date Issued	25/02/2021

QC DATA

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

QC Specification Exceptions			
QC Type	Reference	Analysis	Comments
Precision (as %RPD)	256968-1	Zinc-Dissolved	20% RPD fails internal acceptance criteria

See Report 256968-[R00] for QA/QC details



HOLDING TIME COMPLIANCE EVALUATION

All preservation / holding times (based on AS/ASPHA/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	256968-1	11/02/2021			##
Phaeophytin a	256968-1	11/02/2021			##
Chlorophyll a	256968-2	11/02/2021			##
Phaeophytin a	256968-2	11/02/2021			##
Chlorophyll a	256968-3	11/02/2021			##
Phaeophytin a	256968-3	11/02/2021			##
Chlorophyll a	256968-4	11/02/2021			##
Phaeophytin a	256968-4	11/02/2021			##
Chlorophyll a	256968-5	11/02/2021			##
Phaeophytin a	256968-5	11/02/2021			##
Chlorophyll a	256968-6	11/02/2021			##
Phaeophytin a	256968-6	11/02/2021			##
Chlorophyll a	256968-7	11/02/2021			##
Phaeophytin a	256968-7	11/02/2021			##
Chlorophyll a	256968-8	11/02/2021			##
Phaeophytin a	256968-8	11/02/2021			##
Chlorophyll a	256968-9	11/02/2021			##
Phaeophytin a	256968-9	11/02/2021			##
Chlorophyll a	256968-10	11/02/2021			##
Phaeophytin a	256968-10	11/02/2021			##

Holding Table Comments

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

Certain analyses have had their recommended technical holding times elongated by filtering and/or freezing on receipt at the laboratory (e.g. BOD, chlorophyll/Phaeophytin, 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

Date: 4 March 2021
Regarding: Surface Water Quality – Event #7 summary

Appendix C

Surface water sampling logs

Site location: Fremantle Ports

[illegible]

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	

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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): Yes
Sampling area: Fremantle Railway Bridge	Sample preservation (ice/esky): Yes
Sampling location: WS2	QAQC samples: ---
Scientist: Zak Langtry	Tide (High/Low): Low
Date: 11/02/2021	Tide Height (m): 0.43 - 1.12
Weather: Fine / Overcast	Water Column (m): 4.5

Sample I.D.	E/N	Depth (m)	Time	Odour (Y/N):	Staining (Y/N):	Sheen (Y/N):	Appearance	Colour	Temp. (°C)	pH	E.C. (µS/cm)	Redox. (mV)	D.O. (ppm)	D.O. (% sat)
---	382,418 / 6,454,259	0.0	9:24:00	Yes	No	No	Clear	Colourless	22.0	8.17	54,331	89	5.52	78
---	382,418 / 6,454,259	0.5	9:25:00	Yes	No	No	Clear	Colourless	22.0	8.18	54,388	87	5.75	78
WS2-S	382,418 / 6,454,259	1.0	9:26:00	Yes	No	No	Clear	Colourless	22.1	8.19	54,438	87	6.05	85
---	382,418 / 6,454,259	1.5	9:27:00	Yes	No	No	Clear	Colourless	22.1	8.20	54,449	87	5.46	76
---	382,418 / 6,454,259	2.0	9:28:00	Yes	No	No	Clear	Colourless	22.1	8.20	54,464	88	5.86	82
---	382,418 / 6,454,259	2.5	9:29:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,476	88	5.78	82
---	382,418 / 6,454,259	3.0	9:30:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,496	89	6.16	88
---	382,418 / 6,454,259	3.5	9:31:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,518	90	5.91	84
WS2-D	382,418 / 6,454,259	4.0	9:32:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,527	91	5.32	73
---	382,418 / 6,454,259	4.5	9:33:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,545	91	6.09	87
---	382,418 / 6,454,259	4.8	9:33:00	Yes	No	No	Clear	Colourless	22.1	8.21	54,524	92	5.23	75

Additional details / comments:	
Other:	Low general boat traffic / incoming tide

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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): Yes
Sampling area: Fremantle Port - Jetty	Sample preservation (ice/esky): Yes
Sampling location: WS5	QAQC samples: ---
Scientist: Zak Langtry	Tide (High/Low): Low
Date: 11/02/2021	Tide Height (m): 0.43 - 1.12
Weather: Fine / Overcast	Water Column (m): 7.6

Sample I.D.	E/N	Depth (m)	Time	Odour (Y/N):	Staining (Y/N):	Sheen (Y/N):	Appearance	Colour	Temp. (°C)	pH	E.C. (µS/cm)	Redox. (mV)	D.O. (ppm)	D.O. (% sat)
---	382,269 / 6,454,227	0.0	10:39:00	No	No	No	Clear	Colourless	22.2	8.22	54,646	103	6.61	95
---	382,269 / 6,454,227	0.5	10:41:00	No	No	No	Clear	Colourless	22.2	8.22	54,660	101	6.66	95
WS5-S	382,269 / 6,454,227	1.0	10:48:00	No	No	No	Clear	Colourless	22.2	8.25	54,644	104	6.93	98
---	382,269 / 6,454,227	1.5	10:49:00	No	No	No	Clear	Colourless	22.2	8.26	54,646	103	6.88	98
---	382,269 / 6,454,227	2.0	10:50:00	No	No	No	Clear	Colourless	22.2	8.26	54,643	102	6.55	90
---	382,269 / 6,454,227	2.5	10:50:00	No	No	No	Clear	Colourless	22.2	8.26	54,640	102	6.51	93
---	382,269 / 6,454,227	3.0	10:51:00	No	No	No	Clear	Colourless	22.2	8.26	54,637	101	6.68	94
---	382,269 / 6,454,227	3.5	10:52:00	No	No	No	Clear	Colourless	22.2	8.26	54,618	101	6.55	95
---	382,269 / 6,454,227	4.0	10:53:00	No	No	No	Clear	Colourless	22.2	8.26	54,644	101	6.80	96
---	382,269 / 6,454,227	4.5	10:54:00	No	No	No	Clear	Colourless	22.2	8.26	54,665	101	6.86	97
---	382,269 / 6,454,228	5.0	10:55:00	No	No	No	Clear	Colourless	22.2	8.26	54,659	101	6.79	96.3
---	382,269 / 6,454,229	5.5	10:56:00	No	No	No	Clear	Colourless	22.2	8.27	54,647	101	6.85	97.1
---	382,269 / 6,454,230	6.0	10:57:00	No	No	No	Clear	Colourless	22.2	8.27	54,679	101	6.76	95.3
WS5-D	382,269 / 6,454,231	6.5	10:58:00	No	No	No	Clear	Colourless	22.2	8.27	54,667	101	6.61	95
---	382,269 / 6,454,232	7.0	10:59:00	No	No	No	Clear	Colourless	22.2	8.27	54,677	101	6.62	93.5
---	382,269 / 6,454,233	7.5	11:00:00	No	No	No	Clear	Colourless	22.2	8.27	54,673	101	6.39	88.4

Additional details / comments:

Other: Low harbour traffic