

Annual Surface Water and Groundwater Monitoring Report 2023



Albany Motorsport Park

Lot 5780 Down Road South

Drome WA

COA019

09/11/2023



DOCUMENT CONTROL

Title: AMP Annual Surface Water and Groundwater Monitoring Report 2023

Author (s): C. Cramer & M. Wearing

Reviewer (s): B. Theyer

Job No.: COA0019

Client: City of Albany

REVISION RECORD

Revision	Summary	Revised By	Date
Draft ID 08-11-23	Internal QA Review	B. Theyer	08-11-2023
Final ID 09-11-23	Final Report issued to client	-	09-11-2023



Bio Diverse Solutions Australia Pty Ltd

Albany Office

29 Hercules Crescent

Albany WA 6330

08 9842 1575

www.biodiversesolutions.com.au

ABN 46 643 954 929

Denmark Office

Unit 7, 40 South Coast Highway

Denmark WA 6333

08 9848 1309

Esperance Office

Unit 2A, 113 Dempster Street

Esperance WA 6450

08 9072 1382

(C) Copyright: This document has been prepared by Bio Diverse Solutions for use by the client only, in accordance with the terms of engagement, and only for the purpose for which it was prepared.

Table of Contents

1. Introduction	1
2. Water quality	2
2.1. pH.....	2
2.2. Electrical Conductivity	2
2.3. Total Dissolved Solids	3
2.4. Dissolved Oxygen	4
2.5. Turbidity.....	4
2.6. Nutrients	4
2.7. Dissolved Metals	6
2.8. Hydrocarbons	6
2.9. PAHs in water.....	6
2.10. Surfactants	7
2.11. Microbial	7
3. Groundwater and Surface water Levels	8
3.1. Groundwater levels	8
3.2. Surface water levels	8
4. Fixed point photography	9
5. Conclusion and Recommendations.....	10
6. References	11

LIST OF FIGURES

- Figure 1: Surface water and groundwater pH
- Figure 2: Surface water and groundwater EC
- Figure 3: Surface water and groundwater TDS
- Figure 4: Surface water and groundwater DO
- Figure 5: Surface water and groundwater TN
- Figure 6: Surface water and groundwater TP
- Figure 7: Groundwater levels
- Figure 8: Surface water levels
- Figure 9: Long-term pH levels at the AMP site (May 2018 to Oct 2023)
- Figure 10: Long-term EC levels at the AMP site (Feb 2018 to Oct 2023)
- Figure 11: Long-term TN levels at the AMP site (May 2018 to Oct 2023)
- Figure 12: Long-term TP levels at the AMP site (May 2018 to Oct 2023)

LIST OF TABLES

- Table 1: AMP Monitoring Program

LIST OF APPENDICES

- Appendix A – DWER endorsed monitoring program
- Appendix B – Monitoring location plan
- Appendix C – Water quality summary data
- Appendix D – Long-term water quality monitoring results
- Appendix E – Fixed-point photography

1. Introduction

Groundwater and surface water monitoring was conducted at the Albany Motorsport Park (AMP) site from October 2022 to October 2023. Monitoring was completed quarterly and included 5 rounds of monitoring (Oct 22, Jan 23, Apr 23, Jul 23 and Oct 23). Three surface water sites, seven shallow bores and one deep bore were monitored as part of the monitoring program. The DWER endorsed monitoring program for the 2023 to 2024 monitoring period is included in Appendix A and a plan showing the location of the monitoring sites is shown in Appendix B.

Earthworks for the motocross precinct, four-wheel drive precinct and the access road have progressed significantly at the Albany Motorsport Park (AMP) site during 2023, with construction of these precincts nearing completion. Construction of the race track precinct in the east of the site has not commenced. A fence has been constructed around the wetland to provide protection of the wetland from cattle and human activity. The deep bore, constructed to a depth of 41 m in 2019, will be utilised as a production bore once use of the motocross precinct commences, noting that abstraction of water has not yet commenced.

A construction bund breach adjacent to monitoring site CS01 occurred in April 2023 following a high intensity rainfall event, with construction material continuing to wash down gradient following heavy rainfall received in June 2023. The bund breach resulted in the deposition of sand, gravel and clay into a section of the wetland (~20 m wide and ~20 m deep). The construction bund has since been repaired and remedial / further prevention works have been put in place to prevent further erosion and sedimentation within the wetland. Measures taken include;

- The removal of construction material between the construction site and the wetland to prevent further movement of the material into the wetland;
- Installation of two silt fence barriers, one adjacent to the wetland fringe and the other ~30 m up-gradient of the wetland; and
- Addition of a sediment trapping swale/contour drain to allow removal of sediment/silt from the stormwater runoff. The overflow mechanism on the swale/contour bank is reinforced to prevent further erosion.

This report summarises the findings of the surface water and groundwater quality and levels results, and compares fixed point photography to indicate any potential disturbances/impacts at the AMP site for the 2023 monitoring period. Water quality results are compared to relevant trigger values where available. The 2023 monitoring results are also compared to the 2018/2019 pre-development water quality results where applicable.

2. Water quality

2.1. pH

The pH levels at the surface water sites, shallow bores and the deep bore were found to be slightly acidic to acidic (4.75 to 6.42) and below the ANZECC and ARMCANZ (2000) lower trigger value for slightly-disturbed wetlands ecosystems in the Southwest of Australia (7 - 8.5). There has been some minor fluctuation in pH levels in the surface water and groundwater since monitoring commenced in Oct 22, this is not unusual given pH has many influencing factors. The pH levels for the 2023 monitoring period are presented in Figure 1, with the raw pH data presented in Appendix C.

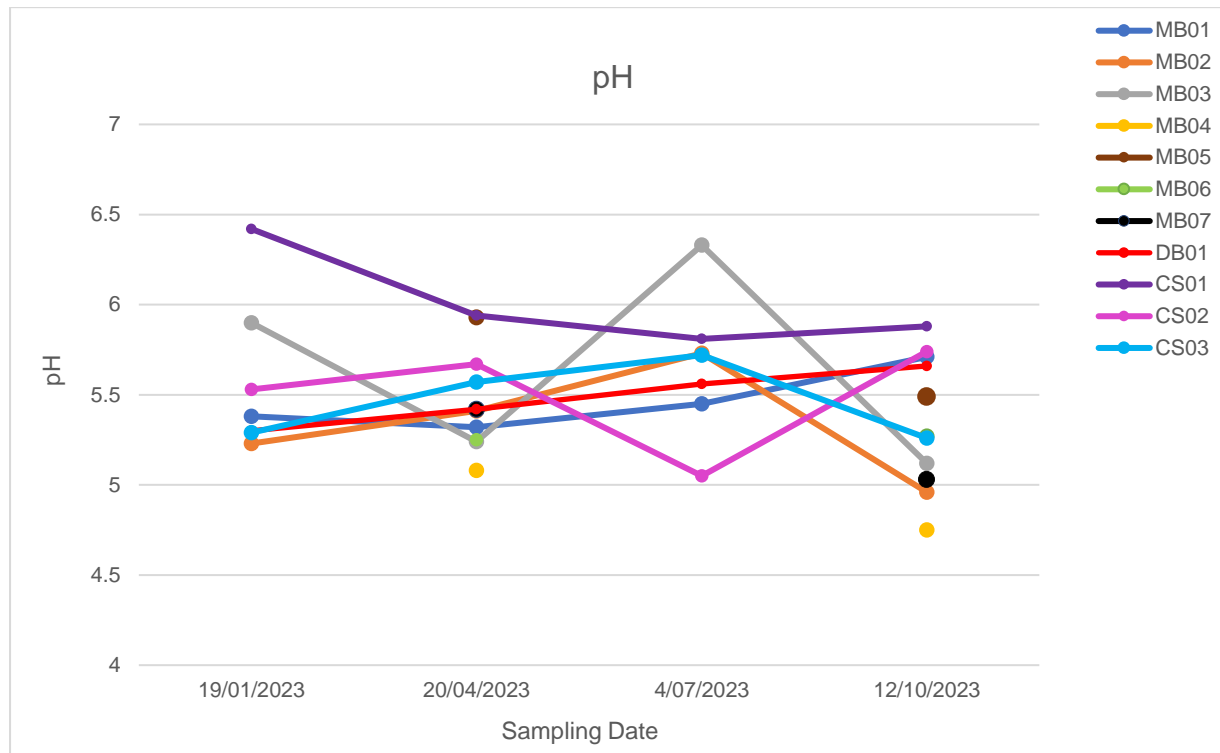


Figure 1: Surface water and groundwater pH

The long-term pH results (Figure 9, Appendix D) for CS01, CS02, DB01, MB02 and MB07 show pH levels have not altered significantly compared to the 2018/2019 monitoring results.

2.2. Electrical Conductivity

The Electrical Conductivity (EC) at the surface water sites, the shallow bores and the deep bore at the AMP site varied with both location and sampling event. Generally, EC levels across the site were low and below the ANZECC and ARMCANZ (2000) upper trigger value for slightly-disturbed wetland ecosystems in Southwest Australia (1500uS/cm). EC levels were elevated at DB01 and CS01, during each monitoring event, compared to the other monitoring sites, whilst still remaining below the ANZECC and ARMCANZ (2000) upper trigger value at these sites. EC levels at each of the monitoring sites during the 2023 monitoring period are shown in Figure 2, with the raw EC data presented in Appendix C.

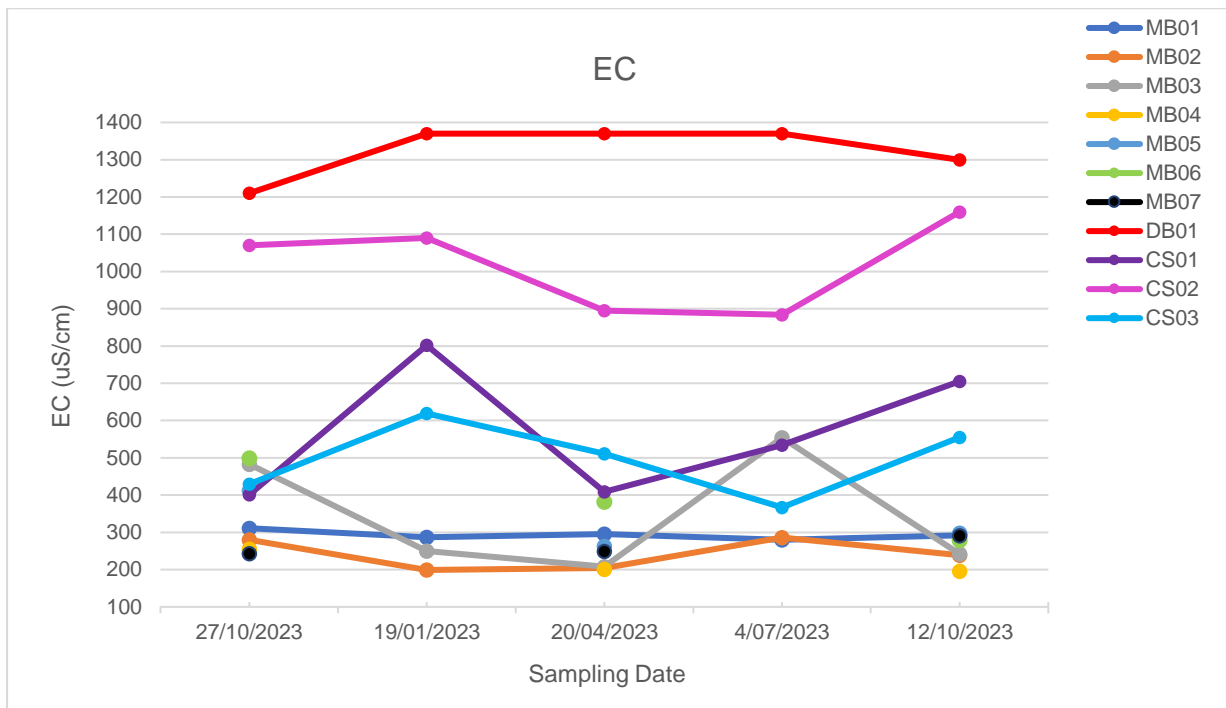


Figure 2: Surface water and groundwater EC

The long-term EC results (Figure 10, Appendix D) for CS01, CS02, DB01, MB02 and MB07 show EC levels have not altered significantly compared to the 2018/2019 monitoring results.

2.3. Total Dissolved Solids

The Total Dissolved Solids (TDS) at the surface water sites, the shallow bores and the deep bore at the AMP site varied with both location and sampling event. Generally, TDS levels across the site were low (<1). TDS levels were elevated at DB01 and CS01, during each monitoring event, compared to the other monitoring sites consistent with EC results. TDS levels for each of the monitoring sites during the 2023 monitoring period are shown in Figure 3, with the raw TDS data presented in Appendix C.

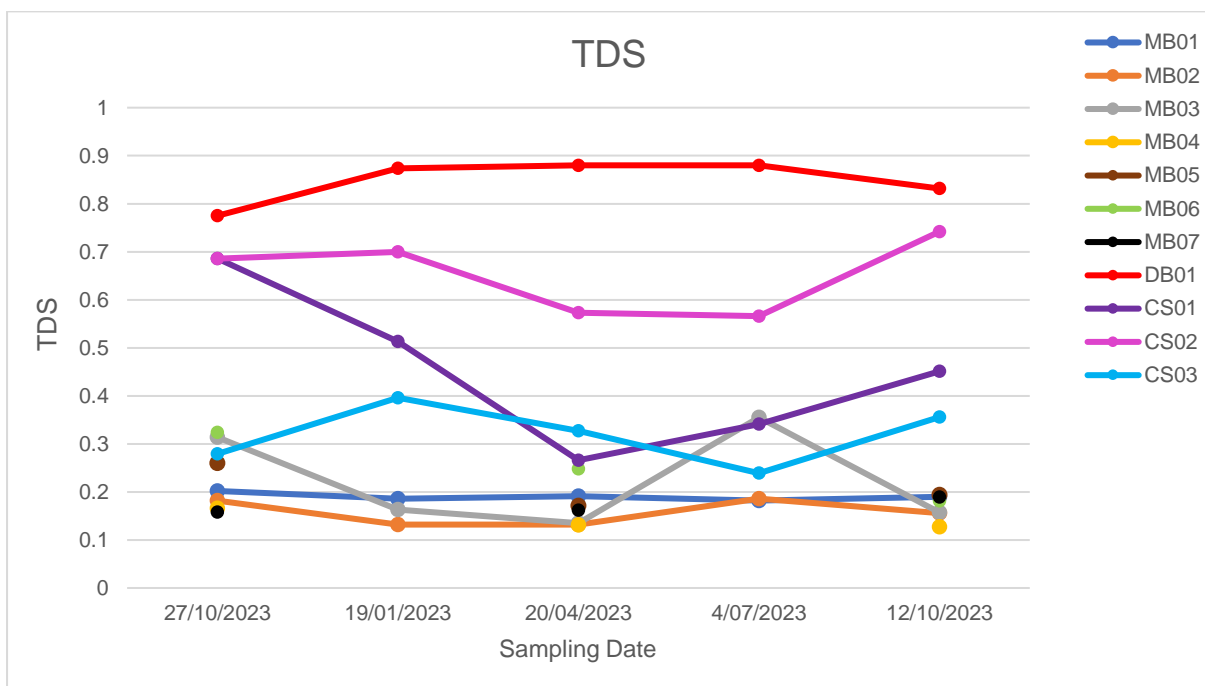


Figure 3: Surface water and groundwater TDS

2.4. Dissolved Oxygen

The Dissolved Oxygen (DO) levels recorded at the surface water sites varied from low to high, with no clear fluctuation trend. Generally, the DO at CS03 (downstream) was higher compared to CS02 (mid-stream and upstream of the construction site) and CS03 (upstream), this is likely due to the flowing nature of the creek at CS01 compared to the more stagnant nature of the creek at CS02 and CS03. Groundwater typically has a much lower DO compared to that of surface water due to the decreased interface with the atmosphere. The DO levels recorded in the shallow bores varied across the site from extremely low to high. Noting there are many factors that influence the DO levels including water temperature, salinity levels and atmospheric pressure. DO levels for each of the monitoring sites during the monitoring period are shown in Figure 4, with the raw DO data presented in Appendix C.

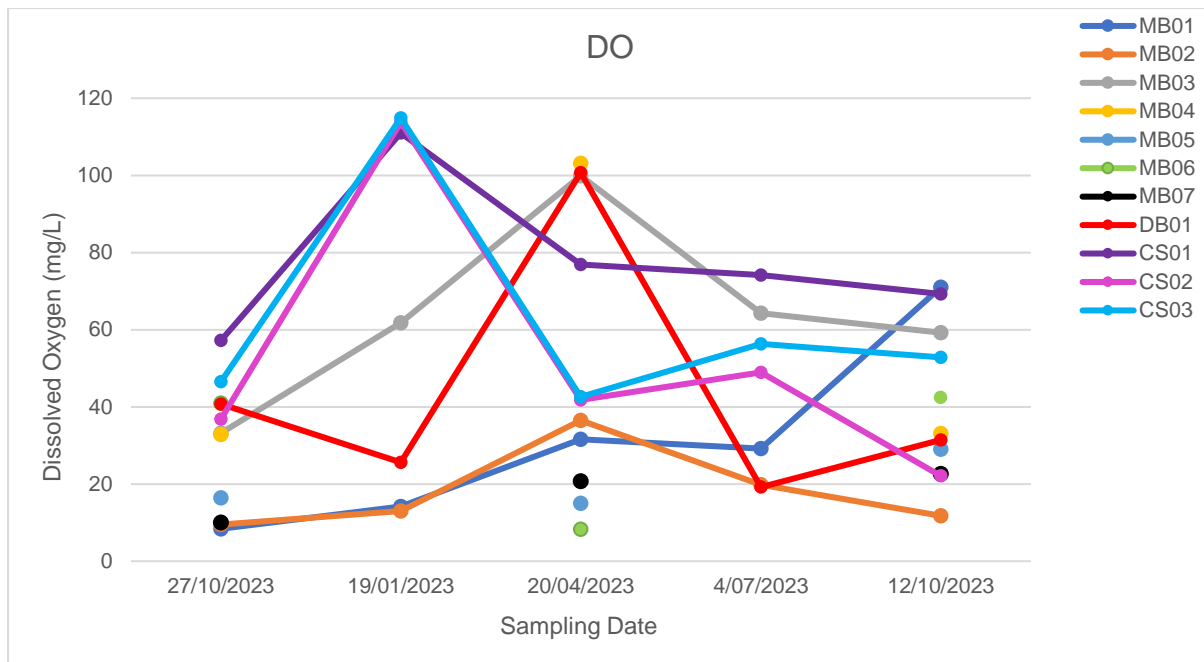


Figure 4: Surface water and groundwater DO

2.5. Turbidity

Turbidity was first measured at the surface water sites during the Jul 23 monitoring event to indicate the concentration of suspended solids and fine sediment within the surface water. Noting that fine sediment had been reported in the creek further downstream of the AMP site following heavy rainfall. Results from the Jul 23 monitoring event showed that turbidity levels were slightly elevated at CS01 (18 NTU), elevated at CS02 (210 NTU) and low at CS03 (2.9 NTU). The elevated turbidity at CS02 is likely a result of the shallow and swampy nature of the creek at this location, with water flow here being minimal. CS01 is the only monitoring site downstream of the construction site, the surface water at CS01 during the Jul 23 monitoring event was visibly clear despite having a tannin colour (as seen prior to construction during the Oct 22 monitoring event). During the Oct 23 monitoring event results showed that the turbidity at CS02 and CS03 were slightly higher than seen in the Jul 23 monitoring event, likely as a result of a decline in rainfall and the stagnant nature of the monitoring sites, whilst the turbidity at CS01 was significantly lower (2.5 NTU) compared to the Jul 23 result.

2.6. Nutrients

The Total Nitrogen (TN) at the surface water sites and the shallow bores varied with both location and sampling event. Generally, TN levels across the site were moderate to high and more often than not above the ANZECC and ARMCANZ (2000) trigger value for slightly-disturbed wetland ecosystems in Southwest Australia (1.5mg/L). Significant increases in TN were seen at CS02 and MB06 during the Oct 23 monitoring event. Noting, at all three surface water monitoring sites all or most of the nitrogen was in the form of Total Kjeldahl Nitrogen (TKN) indicating it is likely to originate from an organic source. Shallow bores MB01, MB03, MB04 and MB06 showed the majority of the TN was in the form of nitrate

(NO₃), likely due to fertilising and agricultural practices in the area. Noting, MB01, MB03, MB04 and MB06 are the deepest of the shallow monitoring bores (groundwater levels between 5.0 - 13.5 m depth), and groundwater within these bores may have originated several kilometres away over a significant time period. The TN levels at DB01 were found to be below detection limits during each of the monitoring events. Ammonia (NH₃) levels were above ANZECC and ARMCANZ (2000) trigger values at MB02 (all monitoring events), MB07 (Apr 23 monitoring event only) and CS03 (Oct 22 monitoring event only). Noting, NH₃ occurs naturally or can be produced by human activity. The TN levels at the monitoring sites during the monitoring period is shown in Figure 5, with the raw TN data shown in Appendix C.

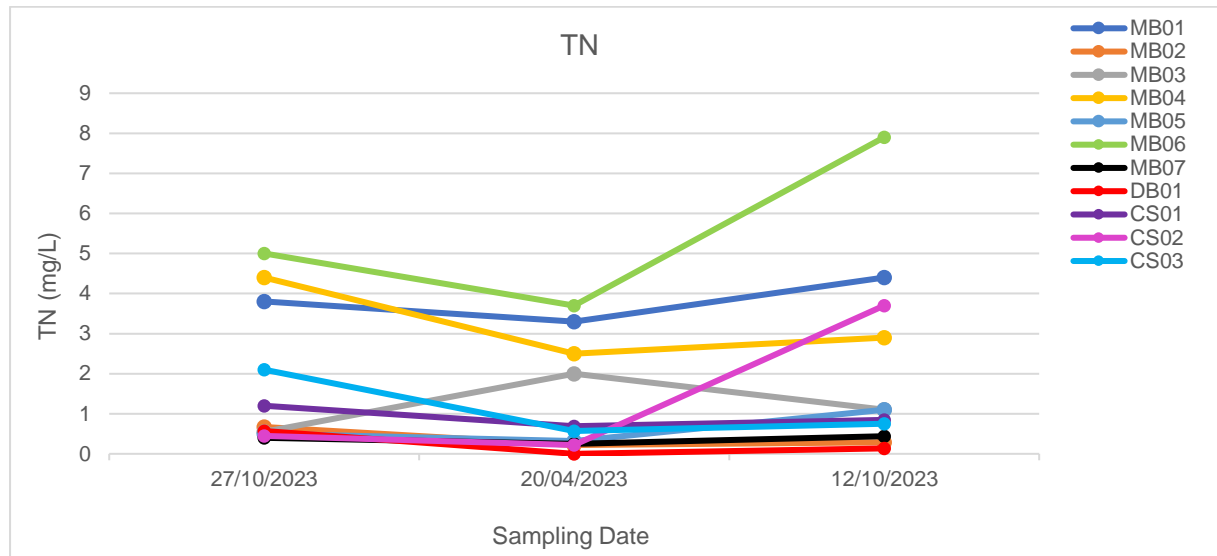


Figure 5: Surface water and groundwater TN

When comparing the 2023 TN results to the 2018/2019 monitoring results (Figure 11, Appendix D) TN levels were found to be reasonably consistent at CS01 and DB01, with continued fluctuation in TN at CS02 and a decline in TN at MB02 and MB07.

Total phosphorus (TP) varied from below detection limits to very high across the monitoring sites. TP was elevated and above the ANZECC and ARMCANZ (2000) trigger value (0.06 mg/L) at all surface water sites during each monitoring event except the Apr 23 event in which TP levels were below the trigger value at each site. A significant increase in TP was seen at CS02 during the Oct 23 monitoring event. Phosphate (PO₄) levels were generally found to be low at the surface water sites indicating that most of the phosphorus is from an organic source. The TP levels in the shallow bores were generally low and below the ANZECC and ARMCANZ (2000) trigger value. TP levels in DB01 were also low and below detection limits during each of the monitoring events. The TP levels at the monitoring sites during the monitoring period is shown in Figure 6, with the raw data shown in Appendix C.

When comparing the 2023 TP results to the 2018/2019 monitoring results (Figure 12, Appendix D) TP levels are reasonably consistent at CS01, MB02, MB07 and DB01, with continued fluctuation of TN at CS02.

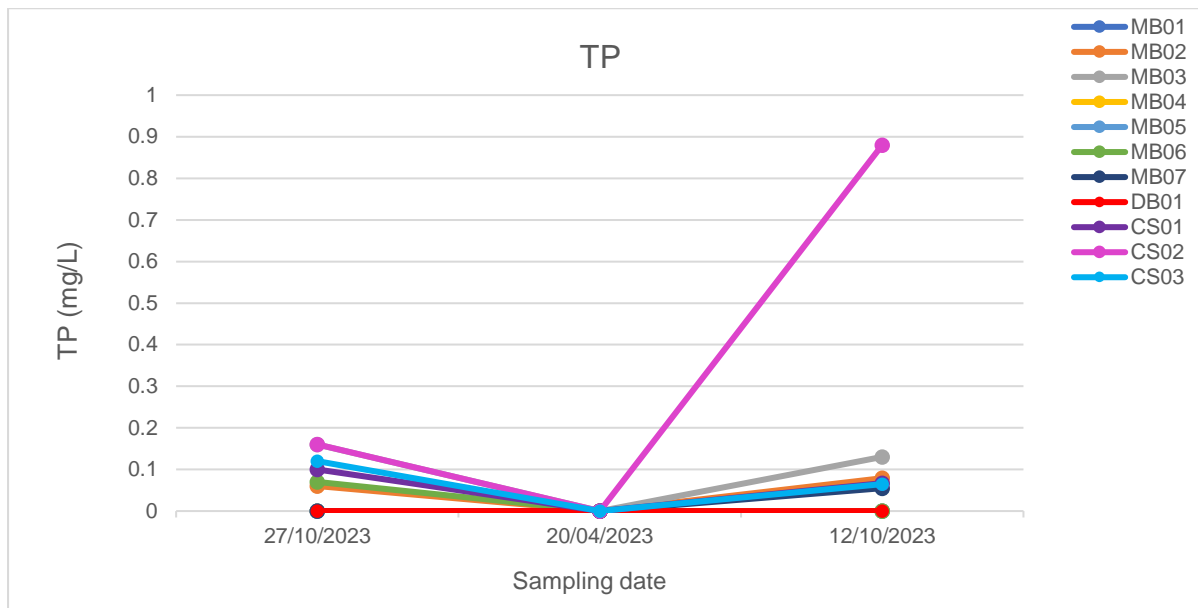


Figure 6: Surface water and groundwater TP

2.7. Dissolved Metals

Dissolved metal (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc) levels were generally found to be low and below the ANZECC & ARMCANZ (2000) trigger values for toxicants in freshwater ecosystems at 95% level of protection. There were some exceptions to this with the guideline trigger value for chromium being exceeded at MB05 and CS03 during each monitoring event. The guideline trigger value was also exceeded for zinc at MB01, MB02, MB03, MB04, MB05, MB06, DB01 and CS01, with each of these monitoring sites exceeding the trigger value during one monitoring event except DB01, which exceeded the trigger value during two monitoring events. The monitoring event in which the zinc guideline trigger value was exceeded at each monitoring site was either the Oct 22 or the Oct 23 monitoring event. The dissolved metal levels for each monitoring site for the monitoring period are shown in Appendix C.

2.8. Hydrocarbons

The Volatile Total Recoverable Hydrocarbons (TRH), Methyl tertiary-butyl ether, benzene, toluene, ethylbenzene, xylene and Naphthalene (MBTEXN), and Semi-volatile TRH laboratory results were generally found to be below the laboratory detection limit for all parameters at all monitoring sites during each monitoring event. The only exception to this was the low levels of Semi-volatile TRH found at MB03 and CS02 during each monitoring event, except for during the Oct 22 monitoring event at CS02 and the Oct 23 event at MB03. Following the detection of elevated levels of Semi-volatile TRH at CS02 in Apr 23 an additional analysis was performed on the laboratory sample subsequent to a silica gel cleanup to remove any potential biogenic organics (naturally occurring hydrocarbons). The Semi-volatile TRH results following the silica gel clean-up showed very low levels of Semi-volatile TRH, indicating the initial results were predominantly a result of naturally occurring hydrocarbons. It is likely the low levels of Semi-volatile TRH detected at CS02 and MB03 are a result of naturally occurring hydrocarbons. The TRH, MBTEXN and semi-volatile TRH levels for each monitoring site for the monitoring period are shown in Appendix C.

2.9. PAHs in water

Polycyclic Aromatic Hydrocarbons (PAHs) laboratory results were found to be below laboratory detection limits at all monitoring sites during each monitoring event. The PAH levels for each monitoring site for the monitoring period are shown in Appendix C.

2.10. Surfactants

The Methyl Blue Active Substances (MBAS) analysis, which detects foaming agents and detergents as well as other anionic substances in water showed all monitoring sites during each monitoring event had low MBAS readings or readings that were below the laboratory detection limit. The MBAS levels for each monitoring site for the monitoring period are shown in Appendix C,

2.11. Microbial

Thermotolerant Coliform (TC) and E. coli levels across the site were generally low (≤ 30 cfu/100 ml) within the shallow and deep bores. TC and E. coli levels were slightly elevated (>30 cfu/100 ml) at CS01 during the Oct 22 and Apr 23 monitoring events, CS02 during the Apr 23 monitoring event and CS03 during the Oct 22 monitoring event. TC and E. coli levels were found to be high (360 cfu/100 ml) at CS02 during the Oct 23 monitoring event. Noting, CS02 is a swampy site, with minimal surface water flow and previous exposure to grazing cattle, it is also up-gradient of the current construction site. The TC and E. coli levels for each monitoring site for the monitoring period are shown in Appendix C.

3. Groundwater and Surface water Levels

3.1. Groundwater levels

Groundwater levels across the site varied from 0.12 m BGL (in winter months) in the low-lying areas of the site (MB02) to 13.5 m BGL in the higher areas (MB03). Groundwater levels across the site generally fluctuated consistent with seasonal rainfall. The only exception to this was the comparatively high groundwater level (low depth below ground level) encountered at the deep bore in January 2023, this result is likely due to the higher-than-average rainfall recorded in late 2022 and the lag time required for rainfall to recharge the confined aquifer. There is no indication that construction works at the AMP site have impacted on the superficial or confined aquifer groundwater levels. The groundwater levels recorded in the monitoring bores in 2023 are shown in Figure 7.

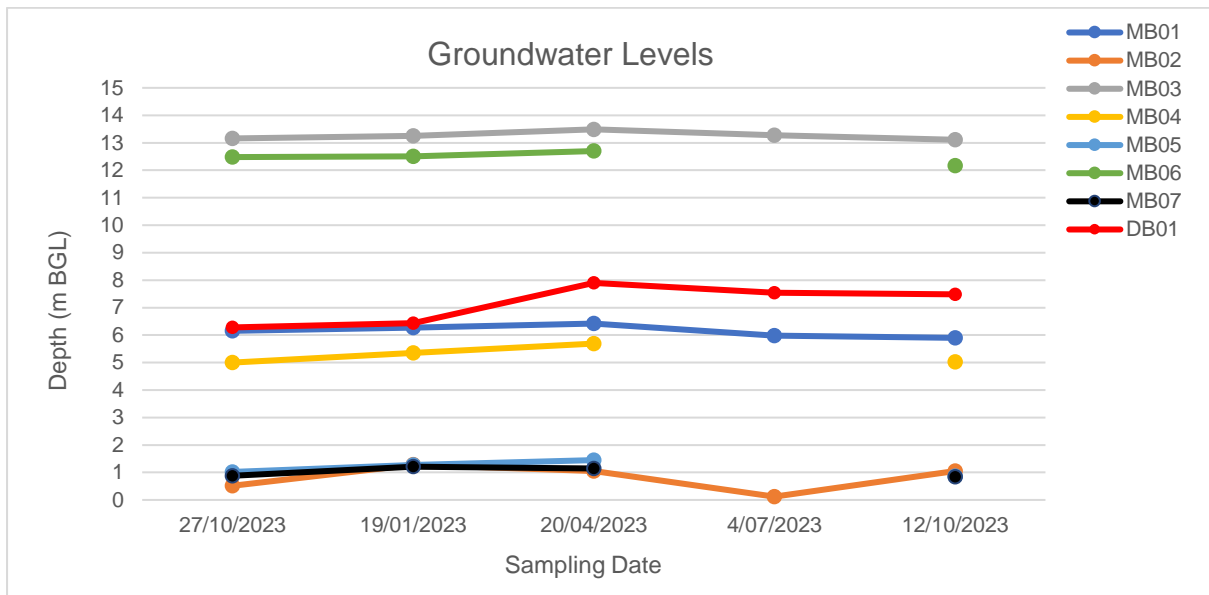


Figure 7: Groundwater levels

3.2. Surface water levels

Surface water levels within the creek fluctuated consistent with rainfall, with no indication that construction works have impacted on surface water levels within the creek. Surface water levels for the monitoring period are presented in Figure 8.

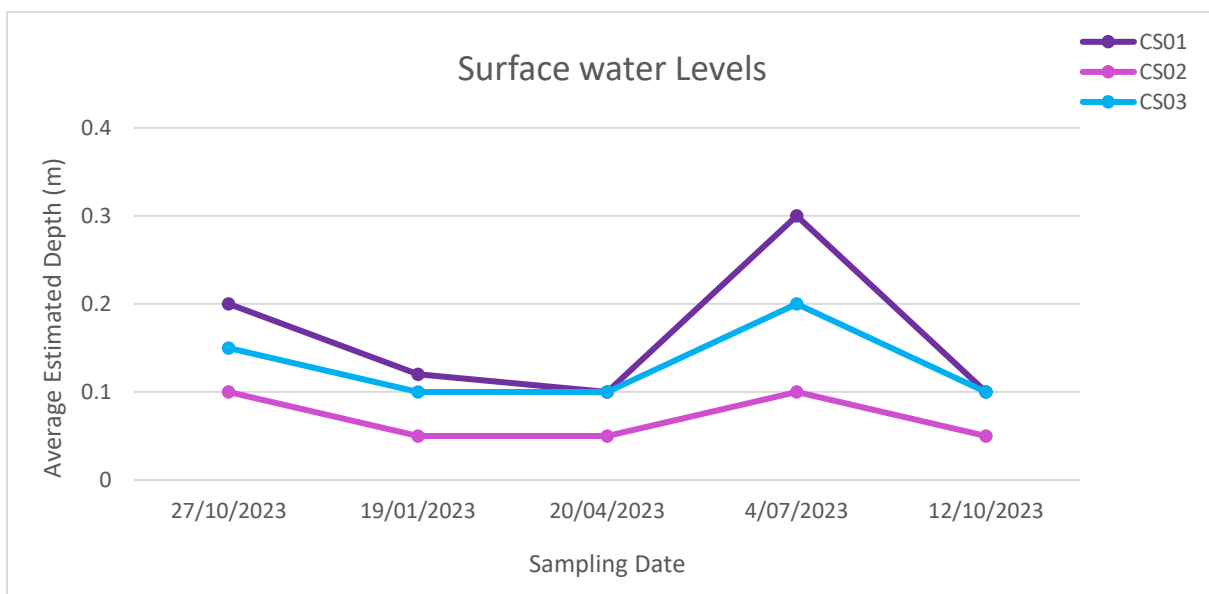


Figure 8: Surface water levels

4. Fixed point photography

Fixed-point photography commenced in Oct 22 as part of the DWER endorsed monitoring program. Fixed-point photography monitoring sites (MB01-FP, MB02-FP, MB05-FP, MB05-FP2, MB07-FP, CS01-FP, CS02-FP and CS03-FP) show little change in the wetland morphology and vegetation structure since monitoring commenced, with the exception of the changes encountered at CS01-FP following the washing of construction material into the wetland. Changes at CS01 following the washing of construction material into the wetland included covering of the wetland undergrowth with sand, gravel and clay and changes to the morphology of the creek. Fixed-point photography is shown in Appendix E.

5. Conclusion and Recommendations

Water quality and level monitoring results showed that there has been no significant change to the surface water and groundwater quality parameters as a result of construction. Generally, water quality parameters at all monitoring sites were consistent with pre-development results and characteristic of agricultural land in the southwest of Australia. Fixed-point photography also showed there has been no significant change to the wetland morphology or vegetation structure as a result of construction, with the exception of the changes encountered at CS01 as a result of the bund breach. Since the bund breach and subsequent movement of construction material into the wetland, there has been no further impacts on the wetland from construction. Noting, the undergrowth within the wetland which was previously covered in construction sand and gravel has begun to regenerate.

It is recommended that water quality and water level monitoring, and fixed-point photography continue at the AMP site during 2024, consistent with the DWER endorsed monitoring program (Appendix A). Following the 2024 monitoring period it is recommended that the monitoring program be reviewed and carried out accordingly.

6. References

ANZECC & ARMCANZ (Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand) (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

Appendix A

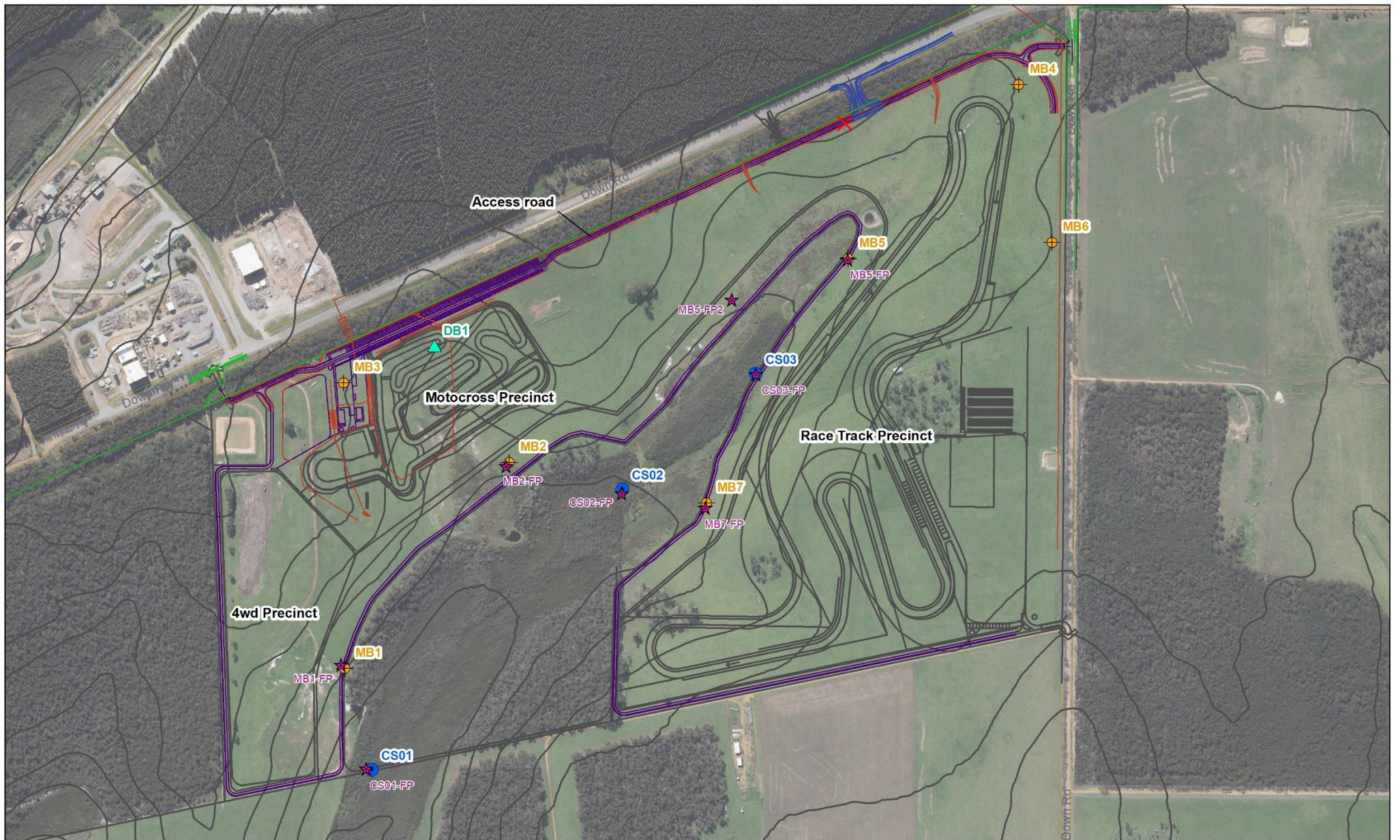
DWER endorsed monitoring program

Table 1: AMP Monitoring Program

Development Proposal	Monitoring Proposal	Monitoring Parameters	Approximate Timeframe
Pre-development: Prior to construction works of Motocross Precinct, 4WD Training Precinct and Race Track Precinct.	<ul style="list-style-type: none"> Establish 7 shallow groundwater monitoring bores, one deep bore, 3 surface water sites and 8 fixed point photography sites, as per Figure 1. Conduct full sampling round at all monitoring sites to establish baseline data. 	<ul style="list-style-type: none"> Visual inspection and fixed-point photography adjacent/within wetlands. Water levels. In-situ: pH, EC, TDS & Dissolved Oxygen. Lab: pH & EC. Turbidity. Thermotolerant Coliforms & E. coli. Surfactants. Nutrient suite. Heavy metals. TRH (C6-C10), MBTEXN & PAH. 	October 2022
Construction of Motocross Precinct and 4WD Training Precinct to commence. No construction proposed at Race Track Precinct.	<ul style="list-style-type: none"> Quarterly monitoring of sites directly upgradient and down gradient of Motocross & 4WD Training Precincts during construction (MB1, MB2, MB3, DB1, CS1, CS2, CS3). No monitoring of bores directly upgradient and down gradient of Race Track Precinct proposed. 	<ul style="list-style-type: none"> Visual inspection and fixed-point photography adjacent/within wetlands Water levels. In-situ: pH, EC, TDS & Dissolved Oxygen. 	January 2023
Construction of Motocross Precinct and 4WD Training Precinct continued. No construction proposed at Race Track Precinct.	<ul style="list-style-type: none"> Quarterly monitoring of MB1, MB2, MB3, DB1, CS1, CS2 and CS3. Biannual monitoring of bores upgradient and down gradient of future Race Track Precinct (MB4, MB5, MB6 and MB7) for baseline data. 	<ul style="list-style-type: none"> Visual inspection and fixed-point photography adjacent/within wetlands. Water levels. In-situ: pH, EC, TDS & Dissolved Oxygen. Lab: pH & EC. Turbidity. Thermotolerant Coliforms & E. coli. Surfactants. Nutrient suite. Heavy metals. TRH (C6-C10), MBTEXN & PAH. 	April 2023
Construction of Motocross Precinct and 4WD Training Precinct continues.	<ul style="list-style-type: none"> Quarterly monitoring of MB1, MB2, MB3, DB1, CS1, CS2 and CS3. No monitoring of Race Track Precinct bores proposed. 	<ul style="list-style-type: none"> Visual inspection and fixed-point photography adjacent/within wetlands Water levels. In-situ: pH, EC, TDS & Dissolved Oxygen. Turbidity 	July 2023
Motocross and 4WD Training Precincts complete. No construction proposed at Race Track Precinct.	<ul style="list-style-type: none"> Upon completion of the Motocross and 4WD Training Precincts monthly monitoring of MB1, MB2, MB3, DB1, CS1, CS2 and CS3 to commence for a minimum period of 6 months, ensuring capture of the winter period. Monitoring of Motocross Precinct bio-retention basin (inlet and outlet) to occur 3-4 times per year following frequent rainfall events (1EY event) upon completion. Biannual monitoring of MB4, MB5, MB6 and MB7 for baseline data. 	<ul style="list-style-type: none"> Visual inspection and fixed-point photography adjacent/within wetlands. Water levels. In-situ: pH, EC, TDS & Dissolved Oxygen. Lab: pH & EC. Turbidity. Thermotolerant Coliforms & E. coli. Surfactants. Nutrient suite. Heavy metals. TRH (C6-C10), MBTEXN & PAH. 	October 2023 to October 2024
Following 2 years of post-development monitoring a review of the monitoring program in consultation with DWER to occur.			October 2024

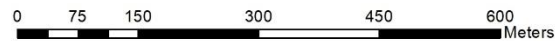
Appendix B

Monitoring location plan



Legend

- ★ Fixed Point Photography
- Shallow groundwater bores
- Surface water sites
- ▲ Deep Bore



29 Hercules Crescent
 Albany, WA 6330
 Australia
 Tel: 08 9842 1575
 Fax: 08 9842 1575

CLIENT Albany Motorsport Park Lot 5780 Down Road South Drome, WA 6330		
Surface water and Groundwater Monitoring Plan		
STATUS FINAL	FILE COA0019	DATE 29/11/2022

Appendix C

Water quality monitoring results

MB01

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.59	5.38	5.32	5.45	5.71
pH - lab	7 to 8.5 ¹⁾	5.7	-	5.4	-	5.90
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	311	287	295	280	292
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	250	-	310	-	270
Dissolved Oxygen (mg/L)		0.8	1.2	2.98	2.77	6.84
Dissolved Oxygen (%)		8.4	14.2	31.6	29.2	71.0
Total Dissolved Solids (g/L)	<1 ¹⁾	0.202	0.186	0.191	0.182	0.190
Turbidity - lab (NTU)		-	-	-	-	3.0
Nutrients (mg/L)						
TN	<1.5 ¹⁾	3.8	-	3.3	-	4.4
TKN_N*		0.8	-	0.11	-	0.59
NH ₃ _N	<0.04 ¹⁾	<0.0050	-	<0.0050	-	0.014
NO ₃ _N		2.8	-	3.2	-	3.8
NO ₂ _N		0.23	-	<0.0050	-	<0.0050
NOx_N	<0.1 ¹⁾	3.0	-	3.2	-	3.8
TP	<0.06 ¹⁾	<0.050	-	<0.050	-	<0.050
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	0.005
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	1.5
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<11 ²⁾	<1.0	-	<1.0	-	<1.0
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	5.5	-	1.5	-	27
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		<100	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		<50	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.11	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		<10	-	<10	-	20
E.coli		<10	-	<10	-	20

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

* TKN as N by calculation

MB02

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	2.93	5.23	5.41	5.73	4.96
pH - lab	7 to 8.5 ¹⁾	5.8	-	5	-	4.9
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	280	199	204	286	239
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	240	-	190	-	230
Dissolved Oxygen (mg/L)		0.9	1.07	3.22	2.07	1.13
Dissolved Oxygen (%)		9.5	13	36.5	19.8	11.80
Total Dissolved Solids (g/L)	<1 ¹⁾	0.182	0.132	0.132	0.186	0.156
Turbidity - lab (NTU)		-	-	-	-	80
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.67	-	0.22	-	0.29
TKN_N*		0.58	-	0.22	-	0.29
NH ₃ _N	<0.04 ¹⁾	0.16	-	0.017	-	0.073
NO ₃ _N		0.085	-	<0.0050	-	0.0064
NO ₂ _N		0.0071	-	<0.0050	-	<0.0050
NOx_N	<0.1 ¹⁾	0.1	-	0.0050	-	0.0081
TP	<0.06 ¹⁾	0.06	-	<0.050	-	0.079
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	1.4	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<17 ²⁾	4.8	-	<1.0	-	<1.0
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	13	-	4.9	-	3.9
VolatileTotal Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatileTotal Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		110	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		110	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		120	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		120	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
MBAS						
MBAS		<0.10	-	0.21	-	<0.10
Microbial Testing (cfu/100ml)						
Thermotolerant Coliforms		<10	-	<10	-	<10
E.coli		<10	-	<10	-	<10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

MB03

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.61	5.9	5.24	6.33	5.12
pH - lab	7 to 8.5 ¹⁾	6.8	-	5.4	-	5.40
Electrical Conductivity (uS/cm)	300-1500 ¹⁾	483	250	208	554	242
Electrical Conductivity - lab (uS/cm)	300-1500 ¹⁾	740	-	190	-	220
Dissolved Oxygen (mg/L)		3.15	5.05	9.24	6.31	5.55
Dissolved Oxygen (%)		33.2	61.8	99.9	64.3	59.2
Total Dissolved Solids (g/L)	<1 ¹⁾	0.314	0.163	0.135	0.355	0.157
Turbidity - lab (NTU)	10-100 ¹⁾	-	-	-	-	950
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.55	-	2.0	-	1.1
TKN_N*		0.33	-	0.13	-	0.63
NH ₃ _N	<0.04 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
NO ₃ _N		0.21	-	1.9	-	0.48
NO ₂ _N		0.018	-	8.3	-	<0.0050
Nox_N	<0.1 ¹⁾	0.2	-	1.9	-	0.49
TP	<0.06 ¹⁾	0.16	-	<0.050	-	0.13
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<11 ²⁾	1.5	-	2.1	-	1.4
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	4.4	-	5.9	-	11
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		220	-	<10	-	<10
TRH C6 - C10		270	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		270	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		68	-	<50	-	<50
TRH C15 - C28		630	-	130	-	<100
TRH C29 - C36		1000	-	250	-	<100
Total +ve TRH C10-C36		1698	-	380	-	<50
TRH >C10 - C16		68	-	<50	-	<50
TRH >C10 -C16 less N (F2)		68	-	<50	-	<50
TRH >C16 - C34		1400	-	310	-	<100
TRH >C34 - C40		970	-	190	-	<100
Total +ve TRH >C10-C40		2438	-	500	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.24	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coiforms		30	-	<10	-	<10
E.coli		30	-	<10	-	<10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

* TKN as N by calculation

MB04

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.83	-	5.08	-	4.75
pH - lab	7 to 8.5 ¹⁾	5.8	-	5.1	-	5.3
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	255	-	201	-	196
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	210	-	190	-	190
Dissolved Oxygen (mg/L)		3.15	-	9.51	-	3.09
Dissolved Oxygen (%)		32.8	-	103.1	-	33.1
Total Dissolved Solids (g/L)	<1 ¹⁾	0.166	-	0.131	-	0.127
Turbidity - lab (NTU)		-	-	-	-	10
Nutrients (mg/L)						
TN	<1.5 ¹⁾	4.4	-	2.5	-	2.9
TKN_N*		1.2	-	0.21	-	0.51
NH ₃ _N	<0.04 ¹⁾	<0.0050	-	<0.0050	-	0.0096
NO ₂ _N		3.0	-	2.3	-	2.4
NO ₃ _N		0.18	-	<0.0050	-	<0.0050
Nox_N	<0.1 ¹⁾	3.2	-	2.3	-	2.4
TP	<0.06 ¹⁾	<0.050	-	<0.050	-	<0.050
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
Trace Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	1.1	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickel, Ni	<11 ²⁾	<1.0	-	1.3	-	<1.0
Lead, Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	1.2	-	3.1	-	23
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 - C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MIBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 - C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		<100	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		<50	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.14	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		<10	-	<10	-	30
E.coli		<10	-	<10	-	30

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

MB05

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.09	-	5.93	-	5.49
pH - lab	7 to 8.5 ¹⁾	5.8	-	5.2	-	5.8
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	412	-	263	-	298
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	370	-	250	-	290
Dissolved Oxygen (mg/L)		1.57	-	1.33	-	2.83
Dissolved Oxygen (%)		16.4	-	15	-	29.0
Total Dissolved Solids (g/L)	<1 ¹⁾	0.260	-	0.171	-	0.194
Turbidity - lab (NTU)		-	-	-	-	55
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.5	-	0.32	-	1.1
TKN_N*		0.47	-	0.32	-	1.0
NH ₃ _N	<0.04 ¹⁾	0.032	-	0.11	-	0.010
NO ₃ _N		<0.0050	-	<0.0050	-	0.043
NO ₂ _N		<0.0050	-	<0.0050	-	<0.0050
NO_N	<0.1 ¹⁾	<0.0074	-	<0.0050	-	0.046
TP	<0.06 ¹⁾	<0.050	-	<0.050	-	<0.050
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	1.3	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	1.4	-	2.4	-	2.1
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	1.1
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<11 ²⁾	1.6	-	<1.0	-	1.2
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	12	-	1.9	-	7.0
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MIBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		110	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		110	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.18	-	<0.20
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		20	-	<10	-	<10
E.coli		20	-	<10	-	<10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

MB06

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.52	-	5.25	-	5.27
pH - lab	7 to 8.5 ¹⁾	6.1	-	5.2	-	5.3
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	499	-	382	-	279
Electrical Conductivity-lab (µS/cm)	300-1500 ¹⁾	430	-	420	-	320
Dissolved Oxygen (mg/L)		3.72	-	0.67	-	3.80
Dissolved Oxygen (%)		41	-	8.3	-	42.4
Total Dissolved Solids (g/L)	<1 ¹⁾	0.324	-	0.248	-	0.181
Turbidity - lab (NTU)		-	-	-	-	3.5
Nutrients (mg/L)						
TN	<1.5 ¹⁾	5.0	-	3.7	-	7.9
TKN_N*		1.0	-	0.15	-	2.2
NH ₃ _N	<0.04 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
NO ₃ _N		3.9	-	3.5	-	5.7
NO ₂ _N		0.016	-	<0.0050	-	<0.0050
NO _x _N	<0.1 ¹⁾	3.9	-	3.6	-	5.7
TP	<0.06 ¹⁾	0.066	-	<0.050	-	<0.050
PO ₄ _P	<0.03 ¹⁾	0.0056	-	<0.0050	-	0.010
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<11 ²⁾	<1.0	-	1.9	-	2.1
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	5.7	-	3.5	-	35
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6-C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		<100	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		<50	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.31	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		<10	-	<10	-	10
E.coli		<10	-	<10	-	10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

MB07

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.3	-	5.42	-	5.03
pH - lab	7 to 8.5 ¹⁾	5.9	-	5.2	-	5.3
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	243	-	249	-	291
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	220	-	420	-	270
Dissolved Oxygen (mg/L)		0.95	-	1.7	-	2.15
Dissolved Oxygen (%)		10	-	20.7	-	22.6
Total Dissolved Solids (g/L)	<1 ¹⁾	0.158	-	0.162	-	0.189
Turbidity - lab (NTU)		-	-	-	-	500
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.4	-	0.25	-	0.44
TKN_N*		0.37	-	0.25	-	0.43
NH ₃ _N	<0.04 ¹⁾	0.026	-	0.034	-	0.051
NO ₃ _N		<0.0050	-	<0.0050	-	<0.0050
NO ₂ _N		<0.0050	-	<0.0050	-	<0.0050
NO _x _N	<0.1 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
TP	<0.06 ¹⁾	<0.050	-	<0.050	-	0.055
PO ₄ _P	<0.03 ¹⁾	<0.0050	-	<0.0050	-	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickle, Ni	<11 ²⁾	2.5	-	1.9	-	<1.0
Lead, Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	6.5	-	3.5	-	3.1
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34 (F3)		100	-	<100	-	<100
TRH >C34 - C40 (F4)		<100	-	<100	-	<100
Total +ve TRH >C10-C40		100	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j,k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.31	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		<10	-	<10	-	<10
E.coli		<10	-	<10	-	<10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

CS01

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.48	6.42	5.94	5.81	5.88
pH - lab	7 to 8.5 ¹⁾	6.4	-	6.1	6.2	6.3
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	401	802	409	534	705
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	580	-	860	-	690
Dissolved Oxygen (mg/L)		5.67	9.92	7.46	3.07	6.88
Dissolved Oxygen (%)	90 to 120 ¹⁾	57.2	111	76.9	74.2	69.3
Total Dissolved Solids (g/L)	<1 ¹⁾	0.686	0.513	0.266	0.341	0.451
Turbidity - lab (NTU)	10-100 ¹⁾	-	-	-	18	2.5
Nutrients (mg/L)						
TN	<1.5 ¹⁾	1.2	-	0.69	1.1	0.85
TKN_N*		1.0	-	0.41	1.0	0.58
NH3_N	<0.04 ¹⁾	0.01	-	<0.0050	0.012	0.0086
NO3_N		0.21	-	0.28	0.12	0.27
NO2_N		<0.050	-	<0.0050	<0.0050	<0.0050
NOx_N	<0.1 ¹⁾	0.21	-	0.28	0.11	0.27
TP	<0.06 ¹⁾	0.10	-	<0.050	<0.050	0.067
PO4_P	<0.03 ¹⁾	0.019	-	0.0054	0.021	0.0065
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Chromium, Cr	<1.0 ²⁾	1.1	-	1	1.1	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	<0.050	<0.050
Nickle, Ni	<11 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Zinc, Zn	<8.0 ²⁾	8.2	-	1	2.2	1.1
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	<10	<10
TRH C6 - C10		<10	-	<10	<10	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	<10	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	<1.0	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Toluene		<1.0	-	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	-	<1.0	<1.0	<1.0
m+p-xylene		<2.0	-	<2.0	<2.0	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Total Xylene		<3.0	-	<3.0	<3.0	<3.0
Naphthalene		<1.0	-	<1.0	<1.0	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	<50	<50
TRH C15 - C28		<100	-	<100	<100	<100
TRH C29 - C36		<100	-	<100	<100	<100
Total +ve TRH C10-C36		<50	-	<50	<50	<50
TRH >C10 - C16		<50	-	<50	<50	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	<50	<50
TRH >C16 - C34		<100	-	<100	<100	<100
TRH >C34 - C40		<100	-	<100	<100	<100
Total +ve TRH >C10-C40		<50	-	<50	<50	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Acenaphthylene		<0.10	-	<0.10	<0.10	<0.10
Acenaphthene		<0.10	-	<0.10	<0.10	<0.10
Fluorene		<0.10	-	<0.10	<0.10	<0.10
Phenanthrene		<0.10	-	<0.10	<0.10	<0.10
Anthracene		<0.10	-	<0.10	<0.10	<0.10
Fluoranthene		<0.10	-	<0.10	<0.10	<0.10
Pyrene		<0.10	-	<0.10	<0.10	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	<0.10	<0.10
Chrysene		<0.10	-	<0.10	<0.10	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	<0.20	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	<0.10	<0.10
Total +ve PAH's		<0.10	-	<0.10	<0.10	<0.10
Surfactants (mg/L)						
MBAS		0.1	-	0.16	<0.10	<0.20
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		60	-	100	-	10
E.coli		60	-	100	-	10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

CS02

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.07	5.53	5.67	5.05	5.74
pH - lab	7 to 8.5 ¹⁾	5.1	-	5.70	5.40	4.9
Electrical Conductivity (uS/cm)	300-1500 ¹⁾	1070	1090	895	884	1160
Electrical Conductivity - lab (uS/cm)	300-1500 ¹⁾	960	-	990	-	1100
Dissolved Oxygen (mg/L)		3.42	9.44	3.74	5.22	2.10
Dissolved Oxygen (%)	90 to 120 ¹⁾	36.8	113.8	41.8	48.9	22.1
Total Dissolved Solids (g/L)	<1 ¹⁾	0.686	0.7	0.573	0.566	0.742
Turbidity (NTU)	10-100 ¹⁾	-	-	-	210	360
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.45	-	0.22	7.4	3.7
TKN_N*		0.45	-	0.18	7.4	3.7
NH3_N	<0.04 ¹⁾	0.019	-	0.044	0.039	0.034
NO3_N		<0.0050	-	0.037	<0.0050	<0.0050
NO2_N		<0.0050	-	<0.0050	<0.0050	<0.0050
NOx_N	<0.1 ¹⁾	<0.0050	-	0.038	<0.0050	<0.0050
TP	<0.06 ¹⁾	0.16	-	<0.050	1.3	0.88
PO4_P	<0.03 ¹⁾	<0.0050	-	<0.0050	0.0051	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	<0.050	<0.050
Nickle, Ni	<11 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Zinc, Zn	<8.0 ²⁾	5.1	-	1.7	5	4.3
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	<10	<10
TRH C6 - C10		<10	-	<10	<10	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	<10	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	<1.0	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Toluene		<1.0	-	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	-	<1.0	<1.0	<1.0
m+p-xylene		<2.0	-	<2.0	<2.0	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Total Xylene		<3.0	-	<3.0	<3.0	<3.0
Naphthalene		<1.0	-	<1.0	<1.0	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	100	68	<50
TRH C15 - C28		<100	-	900	120	190
TRH C29 - C36		<100	-	400	<100	340
Total +ve TRH C10-C36		<50	-	1400	190	530
TRH >C10 - C16		<50	-	150	74	54
TRH >C10 -C16 less N (F2)		<50	-	150	74	54
TRH >C16 - C34		<100	-	1100	160	430
TRH >C34 - C40		<100	-	190	<100	120
Total +ve TRH >C10-C40		<50	-	1400	230	600
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Acenaphthylene		<0.10	-	<0.10	<0.10	<0.10
Acenaphthene		<0.10	-	<0.10	<0.10	<0.10
Fluorene		<0.10	-	<0.10	<0.10	<0.10
Phenanthrene		<0.10	-	<0.10	<0.10	<0.10
Anthracene		<0.10	-	<0.10	<0.10	<0.10
Fluoranthene		<0.10	-	<0.10	<0.10	<0.10
Pyrene		<0.10	-	<0.10	<0.10	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	<0.10	<0.10
Chrysene		<0.10	-	<0.10	<0.10	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	<0.20	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	<0.10	<0.10
Total +ve PAH's		<0.10	-	<0.10	<0.10	<0.10
Surfactants (mg/L)						
MBAS		0.13	-	0.19	<0.10	<0.20
Microbial Testing						
Thermotolerant Coliforms		10	-	120	-	360
E.coli		10	-	120	-	360

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

CS03

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.34	5.29	5.57	5.72	5.26
pH - lab	7 to 8.5 ¹⁾	5.8	-	5.4	6.0	5.5
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	429	619	511	367	555
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	390	-	570	-	520
Dissolved Oxygen (mg/L)		4.69	10	3.71	6.02	5.01
Dissolved Oxygen (%)	90 to 120 ¹⁾	46.5	114.9	42.6	56.3	52.8
Total Dissolved Solids (g/L)	<1 ¹⁾	0.279	0.396	0.327	0.239	0.356
Turbidity (NTU)	10-100 ¹⁾	-	-	-	2.9	4.2
Nutrients (mg/L)						
TN	<1.5 ¹⁾	2.1	-	0.6	1.9	0.75
TKN_N*		2.1	-	0.6	2.0	0.75
NH3_N	<0.04 ¹⁾	0.11	-	0.048	0.10	0.013
NO3_N		<0.050	-	<0.0050	<0.050	<0.0050
NO2_N		<0.050	-	<0.0050	<0.050	<0.0050
NOx_N	<0.1 ¹⁾	<0.050	-	<0.0050	<0.050	<0.0050
TP	<0.06 ¹⁾	0.12	-	<0.050	0.085	0.065
PO4_P	<0.03 ¹⁾	0.029	-	0.0069	0.040	0.017
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	1.4	-	<1.0	1.1	<1.0
Cadmium, Cd	<0.2 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Chromium, Cr	<1.0 ²⁾	2.5	-	2.2	2.0	1.5
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	<0.050	<0.050
Nickel, Ni	<11 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Lead Pb	<3.4 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Zinc, Zn	<8.0 ²⁾	4.6	-	1.3	6.9	1.6
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	<10	<10
TRH C6 - C10		<10	-	<10	<10	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	<10	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	<1.0	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Toluene		<1.0	-	<1.0	<1.0	<1.0
Ethylbenzene		<1.0	-	<1.0	<1.0	<1.0
m+p-xylene		<2.0	-	<2.0	<2.0	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	<1.0	<1.0
Total Xylene		<3.0	-	<3.0	<3.0	<3.0
Naphthalene		<1.0	-	<1.0	<1.0	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	<50	<50
TRH C15 - C28		<100	-	<100	<100	<100
TRH C29 - C36		<100	-	<100	<100	<100
Total +ve TRH C10-C36		<50	-	<50	<50	<50
TRH >C10 - C16		<50	-	<50	<50	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	<50	<50
TRH >C16 - C34		<100	-	<100	<100	<100
TRH >C34 - C40		<100	-	<100	<100	<100
Total +ve TRH >C10-C40		<50	-	<50	<50	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	<0.10	<0.10
Acenaphthylene		<0.10	-	<0.10	<0.10	<0.10
Acenaphthene		<0.10	-	<0.10	<0.10	<0.10
Fluorene		<0.10	-	<0.10	<0.10	<0.10
Phenanthrene		<0.10	-	<0.10	<0.10	<0.10
Anthracene		<0.10	-	<0.10	<0.10	<0.10
Fluoranthene		<0.10	-	<0.10	<0.10	<0.10
Pyrene		<0.10	-	<0.10	<0.10	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	<0.10	<0.10
Chrysene		<0.10	-	<0.10	<0.10	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	<0.20	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	<0.10	<0.10
Total +ve PAH's		<0.10	-	<0.10	<0.10	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.24	<0.10	<0.20
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		90	-	<10	-	20
E.coli		90	-	<10	-	20

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems. Target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection. Target exceedance printed in red.

* TKN as N by calculation

DB01

Parameters	Guideline	27/10/2022	19/01/2023	20/04/2023	4/07/2023	12/10/2023
Physicochemical						
pH	7 to 8.5 ¹⁾	3.65	5.3	5.42	5.56	5.66
pH - lab	7 to 8.5 ¹⁾	6.2	-	5.4	-	6.0
Electrical Conductivity (µS/cm)	300-1500 ¹⁾	1210	1370	1370	1370	1300
Electrical Conductivity - lab (µS/cm)	300-1500 ¹⁾	1000	-	1300	-	1200
Dissolved Oxygen (mg/L)		3.87	2.25	9.5	1.87	2.96
Dissolved Oxygen (%)		40.7	25.6	100.7	19.2	31.4
Total Dissolved Solids (g/L)	<1 ¹⁾	0.775	0.874	0.88	0.88	0.832
Turbidity - lab (NTU)		-	-	-	-	3.5
Nutrients (mg/L)						
TN	<1.5 ¹⁾	0.57	-	<0.10	-	0.14
TKN_N*		0.21	-	0.14	-	0.13
NH3_N	<0.04 ¹⁾	<0.0050	-	<0.0050	-	0.026
NO3_N		0.35	-	0.0097	-	0.0055
NO2_N		<0.0050	-	<0.0050	-	<0.0050
NOx_N	<0.1 ¹⁾	0.35	-	0.011	-	0.0077
TP	<0.06 ¹⁾	<0.050	-	<0.050	-	<0.050
PO4_P	<0.03 ¹⁾	0.019	-	<0.0050	-	<0.0050
Dissolved Metals (µg/L)						
Arsenic, As	<13 ²⁾	<1.0	-	<1.0	-	<1.0
Cadmium, Cd	<0.2 ²⁾	0.1	-	<0.10	-	<0.10
Chromium, Cr	<1.0 ²⁾	<1.0	-	<1.0	-	<1.0
Copper, Cu	<1.4 ²⁾	<1.0	-	<1.0	-	<1.0
Mercury, Hg	<0.6 ²⁾	<0.050	-	<0.050	-	<0.050
Nickel, Ni	<11 ²⁾	1.8	-	<1.0	-	1.1
Lead, Pb	<3.4 ²⁾	<1.0	-	<1.0	-	<1.0
Zinc, Zn	<8.0 ²⁾	46	-	3.4	-	14
Volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C6 - C9		<10	-	<10	-	<10
TRH C6 - C10		<10	-	<10	-	<10
TRH C6 -C10 less BTEX (F1)		<10	-	<10	-	<10
MBTEXN (µg/L)						
MTBE		<1.0	-	<1.0	-	<1.0
Benzene	950 ²⁾	<1.0	-	<1.0	-	<1.0
Toluene		<1.0	-	<1.0	-	<1.0
Ethylbenzene		<1.0	-	<1.0	-	<1.0
m+p-xylene		<2.0	-	<2.0	-	<2.0
o-xylene	350 ²⁾	<1.0	-	<1.0	-	<1.0
Total Xylene		<3.0	-	<3.0	-	<3.0
Naphthalene		<1.0	-	<1.0	-	<1.0
Semi-volatile Total Recoverable Hydrocarbons (µg/L)						
TRH C10 - C14		<50	-	<50	-	<50
TRH C15 - C28		<100	-	<100	-	<100
TRH C29 - C36		<100	-	<100	-	<100
Total +ve TRH C10-C36		<50	-	<50	-	<50
TRH >C10 - C16		<50	-	<50	-	<50
TRH >C10 -C16 less N (F2)		<50	-	<50	-	<50
TRH >C16 - C34		<100	-	<100	-	<100
TRH >C34 - C40		<100	-	<100	-	<100
Total +ve TRH >C10-C40		<50	-	<50	-	<50
PAHs in water (µg/L)						
Naphthalene	16 ²⁾	<0.10	-	<0.10	-	<0.10
Acenaphthylene		<0.10	-	<0.10	-	<0.10
Acenaphthene		<0.10	-	<0.10	-	<0.10
Fluorene		<0.10	-	<0.10	-	<0.10
Phenanthrene		<0.10	-	<0.10	-	<0.10
Anthracene		<0.10	-	<0.10	-	<0.10
Fluoranthene		<0.10	-	<0.10	-	<0.10
Pyrene		<0.10	-	<0.10	-	<0.10
Benzo(a)anthracene		<0.10	-	<0.10	-	<0.10
Chrysene		<0.10	-	<0.10	-	<0.10
Benzo(b,j+k)fluoranthene		<0.20	-	<0.20	-	<0.20
Benzo(a)pyrene		<0.10	-	<0.10	-	<0.10
Indeno(1,2,3-c,d)pyrene		<0.10	-	<0.10	-	<0.10
Dibenzo(a,h)anthracene		<0.10	-	<0.10	-	<0.10
Benzo(g,h,i)perylene		<0.10	-	<0.10	-	<0.10
Total +ve PAH's		<0.10	-	<0.10	-	<0.10
Surfactants (mg/L)						
MBAS		<0.10	-	0.27	-	<0.10
Microbial Testing (cfu/100mL)						
Thermotolerant Coliforms		10	-	<10	-	<10
E.coli		10	-	<10	-	<10

¹⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetland ecosystems; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection; target exceedance printed in red.

* TKN as N by calculation

Appendix D

Long-term water quality monitoring results

Long-term water quality monitoring results

Groundwater and surface water monitoring was conducted at the AMP site in 2018 to 2019. Water quality monitoring results from Oct 22 to Oct 23 are compared to monitoring results from the 2018/2019 monitoring period for pH, EC, TN and TP. Noting, monitoring sites have altered since the 2018/2019 monitoring period. CS01, CS02 and DB01 remain in the same location, whilst SB04 is in the same location as MB02 and SB09 is in the same location as MB07. All other monitoring sites as part of the 2018/2019 monitoring program are either not in the vicinity of the current monitoring sites or they have insufficient data to be compared to the current sites.

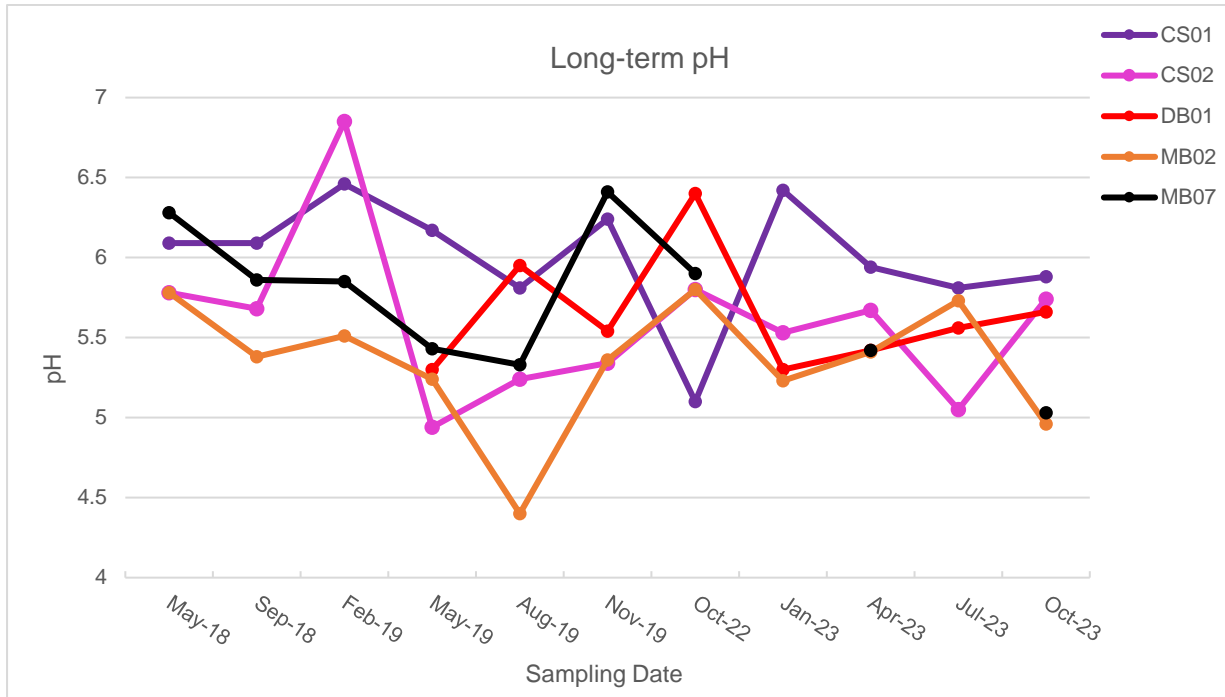


Figure 9: Long-term pH levels at the AMP site (May 2018 to Oct 2023)

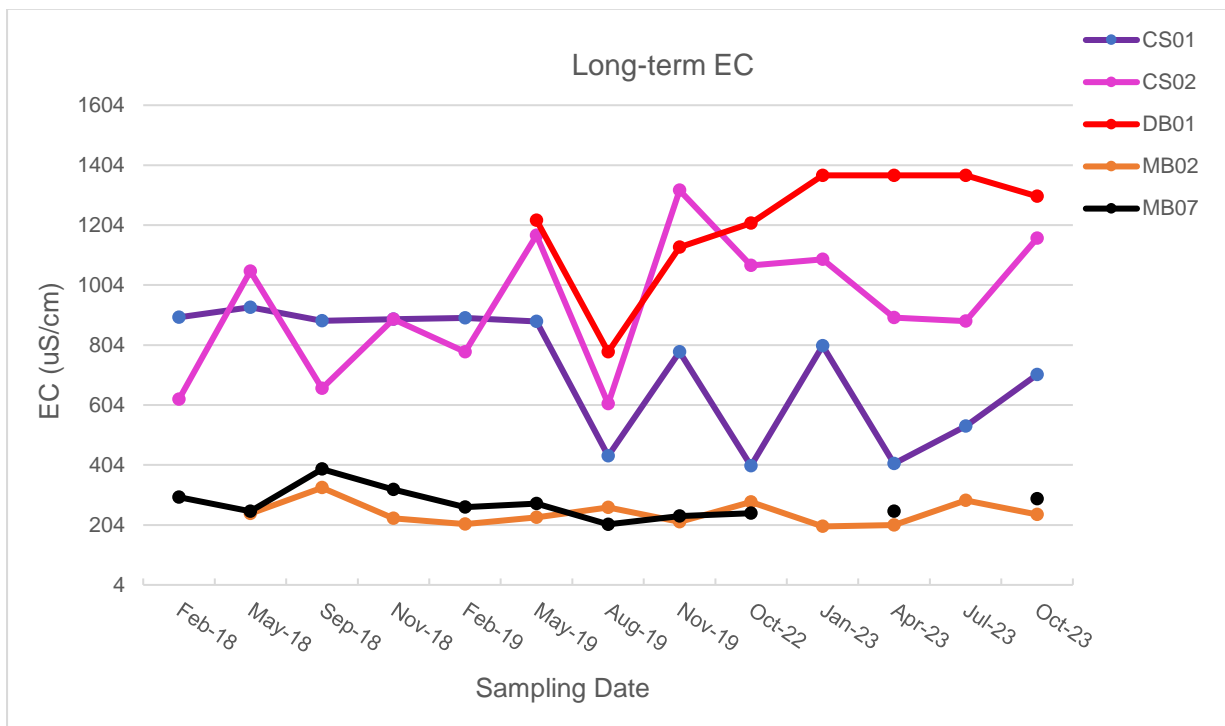


Figure 10: Long-term EC levels at the AMP site (Feb 2018 to Oct 2023)

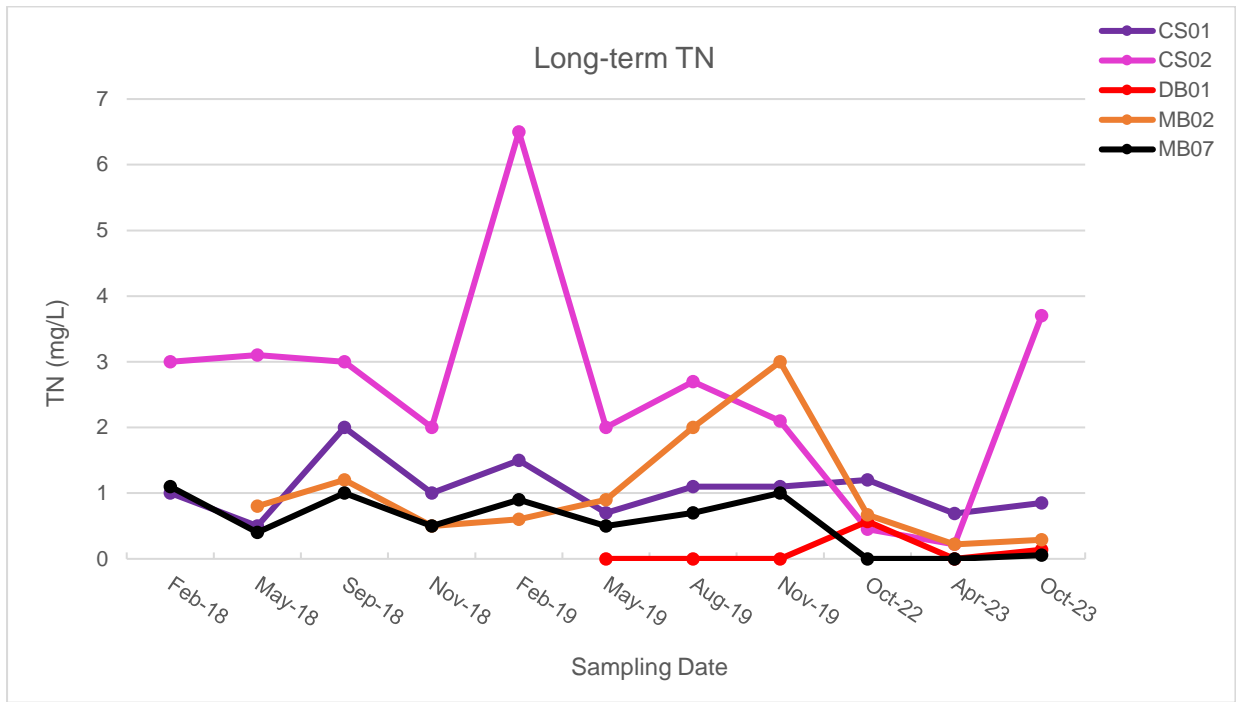


Figure 11: Long-term TN levels at the AMP site (May 2018 to Oct 2023)

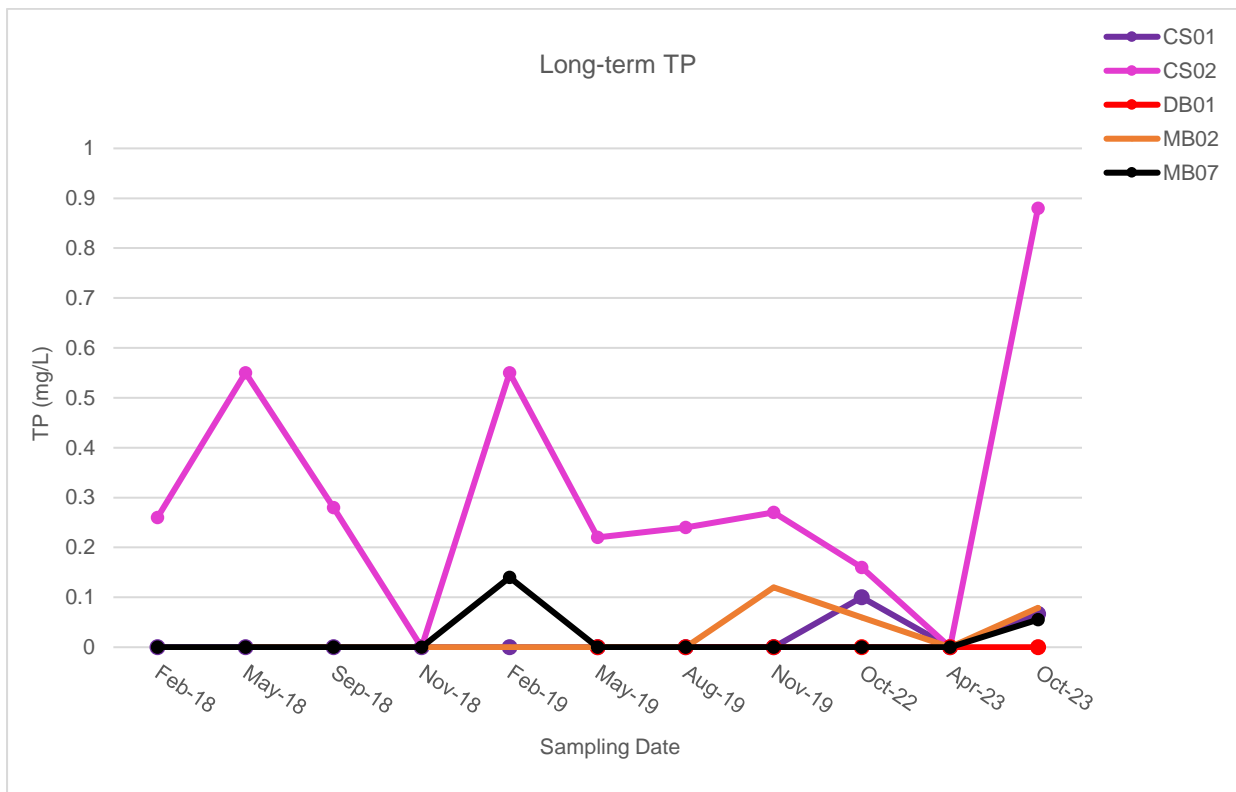


Figure 12: Long-term TP levels at the AMP site (May 2018 to Oct 2023)

CS01

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	4.46	6.09	6.09	-	6.46	6.17	5.81	6.24
pH lab	7 to 8.5 ³⁾	-	-	-	6.30	6.50	6.10	6.00	
Electrical Conductivity (uS/cm)	<1500 ³⁾	897	930	885	890	894	883	434	781
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	-	923	700	810	940	840	680	840
Dissolved Oxygen (mg/L)		8.78	9.54	3.93	7.51	7.66	8.16	11.36	12.00
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	574	590	566	569	572	565	278	500
BOD (mg/L)		-	<5	<5	27	<5	<5	<5	17
Nutrients (mg/L)									
TN	<1.5 ³⁾	1.0	0.5	2.0	1.0	1.5	0.7	1.1	1.1
NO2_N	<0.1 ³⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NO3_N	<0.1 ³⁾	0.26	0.90	0.20	0.23	0.30	0.23	0.22	0.29
NH3_N	<0.04 ³⁾	<0.005	<0.005	0.036	0.007	<0.005	0.005	0.013	0.005
TP	<0.06 ³⁾	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
PO4_P	<0.03 ³⁾	<0.005	<0.005	0.019	<0.05	0.012	<0.005	0.019	<0.005
Heavy Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	0.06	0.06	0.14	0.06	<0.001	0.06	0.15	0.07
Arsenic, As	<0.013 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium, Cd	<0.0002 ²⁾	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper, Cu	<0.0014 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron, Fe	<0.3 ³⁾	0.86	0.32	0.99	0.46	<0.01	0.34	0.76	0.48
Mercury, Hg		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese, Mn	<1.9 ²⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickle, Ni		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead, Pb	<0.008 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	0.008	0.01	0.008	0.01	<0.001	0.002	0.015	0.005
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	7	10	7	12	10	10	12
Carbonate CO3 2- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	7	10	7	12	10	10	12
MBTEXN (µg/L)									
MTBE		<1	<1	<1	<1	<1	<1	<1	<1
Benzene	950 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Toluene		<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene		<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene		<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	350 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene		<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10		<10	<10	<10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)		<10	<10	<10	<10	<10	<10	<10	<10
TRH C10 - C14		<50	97	<50	<50	<50	<50	<50	<50
TRH C15 - C28		<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36		110	<100	<100	<100	<100	<100	<100	<100
TRH >C10 - C16		<50	71	<50	<50	<50	<50	<50	<50
TRH >C10 -C16 less N (F2)		<50	71	<50	<50	<50	<50	<50	<50
TRH >C16 - C34		140	<100	<100	<100	<100	<100	<100	<100
TRH >C34 - C40		<100	<100	<100	<100	<100	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAHs		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100ml ¹⁾	N/A	40	10	40	40	10	<10	10
Thermotolerant Coliforms		N/A	10	10	30	70	10	20	100
E.coli		N/A	10	10	30	70	<10	20	10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

CS02

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	6.34	5.78	5.68	-	6.85	4.94	5.24	5.34
pH Lab	7 to 8.5 ³⁾	-	-	-	5.60	5.20	5.00	5.10	5.20
Electrical Conductivity (uS/cm)	<1500 ³⁾	623	1050	659	890	781	1170	608	1320
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	-	1100	930	920	1100	1200	990	1400
Dissolved Oxygen (mg/L)		5.14	4.66	7.83	6.71	2.4	4.49	7.94	8.08
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	400	675	422	570	500	748	389	846
BOD (mg/L)		-	7	<5	71	47	14	6	33
Nutrients (mg/L)									
TN	<1.5 ³⁾	3.0	3.1	3.0	2.0	6.5	2.0	2.7	2.1
NO ₂ _N	<0.1 ³⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NO ₃ _N	<0.1 ³⁾	0.007	<0.5	0.041	0.006	0.012	<0.005	<0.005	<0.005
NH ₃ _N	<0.04 ³⁾	<0.005	<0.005	0.019	<0.005	0.009	<0.005	<0.005	0.006
TP	<0.06 ³⁾	0.26	0.55	0.28	<0.05	0.55	0.22	0.24	0.27
PO ₄ _P	<0.03 ³⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	0.46	0.02	0.03	0.01	<0.01	0.04	0.05	0.05
Arsenic, As	<0.013 ²⁾	0.013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001
Cadmium, Cd	<0.0002 ²⁾	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper, Cu	<0.0014 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001
Iron, Fe	<0.3 ³⁾	40	0.05	0.26	0.06	0.09	0.1	0.67	1.4
Mercury		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese, Mn	<1.9 ³⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickle		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	0.002	0.015	0.002	0.004	0.041	0.006	0.004	0.021
Alkalinity (mg/L)									
Bicarbonate HCO ₃ as CaCO ₃		N/A	N/A	170	7	7	<5	6	8
Carbonate CO ₃ 2- as CaCO ₃		N/A	N/A	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO ₃		N/A	N/A	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	200 ⁴⁾	N/A	N/A	170	7	7	<5	6	8
MBTEXN (µg/L)									
MTBE		<1	<1	<1	<1	<1	<1	<1	<1
Benzene	950 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Toluene		<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene		<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene		<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	350 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene		<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10		<10	<10	<10	<10	<10	<10	<10	<10
TRH C6 -C10 less BTEX (F1)		<10	<10	<10	<10	<10	<10	<10	<10
TRH C10 - C14		<50	220	<50	<50	<50	<50	<50	<50
TRH C15 - C28		<100	<100	<100	<100	<100	<100	<100	<100
TRH C29 - C36		330	<100	<100	<100	<100	<100	<100	140
TRH >C10 - C16		<50	92	<50	<50	<50	<50	<50	<50
TRH >C10 -C16 less N (F2)		<50	92	<50	<50	<50	<50	<50	<50
TRH >C16 - C34		280	100	<100	<100	<100	120	110	160
TRH >C34 - C40		220	<100	<100	<100	<100	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100ml ¹⁾	N/A	50	80	90	180	160	<10	20
Thermotolerant Coliforms		N/A	260	20	460	400	<10	<10	40
E.coli		N/A	260	20	460	400	<10	<10	10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB03

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2018	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	N/A	N/A	6.09	N/A	N/A	N/A	N/A	N/A
pH lab	7 to 8.5 ³⁾	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A
Electrical Conductivity (uS/cm)	<1500 ³⁾	N/A	N/A	963	N/A	N/A	N/A	N/A	N/A
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	N/A	N/A	1100	N/A	N/A	N/A	N/A	N/A
Dissolved Oxygen (mg/L)		N/A	N/A	2.07	N/A	N/A	N/A	N/A	N/A
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	N/A	N/A	620	N/A	N/A	N/A	N/A	N/A
BOD (mg/L)		N/A	N/A	45	N/A	N/A	N/A	N/A	N/A
Nutrients (mg/L)									
TN	<1.5 ³⁾	N/A	N/A	8.0	N/A	N/A	N/A	N/A	N/A
NO2_N	<0.1 ³⁾	N/A	N/A	<0.005	N/A	N/A	N/A	N/A	N/A
NO3_N	<0.1 ³⁾	N/A	N/A	0.18	N/A	N/A	N/A	N/A	N/A
NH3_N	<0.04 ³⁾	N/A	N/A	1.5	N/A	N/A	N/A	N/A	N/A
TP	<0.06 ³⁾	N/A	N/A	0.2	N/A	N/A	N/A	N/A	N/A
PO4_P	<0.03 ³⁾	N/A	N/A	0.2	N/A	N/A	N/A	N/A	N/A
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	N/A	N/A	0.59	N/A	N/A	N/A	N/A	N/A
Arsenic, As	<0.013 ²⁾	N/A	N/A	0.002	N/A	N/A	N/A	N/A	N/A
Cadmium, Cd	<0.0002 ²⁾	N/A	N/A	<0.0001	N/A	N/A	N/A	N/A	N/A
Chromium, Cr	<0.001 ²⁾	N/A	N/A	0.006	N/A	N/A	N/A	N/A	N/A
Copper, Cu	<0.0014 ²⁾	N/A	N/A	0.004	N/A	N/A	N/A	N/A	N/A
Iron, Fe	<0.3 ³⁾	N/A	N/A	2.0	N/A	N/A	N/A	N/A	N/A
Mercury		N/A	N/A	<0.00005	N/A	N/A	N/A	N/A	N/A
Manganese, Mn	<1.9 ²⁾	N/A	N/A	0.24	N/A	N/A	N/A	N/A	N/A
Nickle		N/A	N/A	0.003	N/A	N/A	N/A	N/A	N/A
Lead Pb	<0.008 ²⁾	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Zinc, Zn	<0.008 ²⁾	N/A	N/A	0.013	N/A	N/A	N/A	N/A	N/A
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	N/A	170	N/A	N/A	N/A	N/A	N/A
Carbonate CO3 2- as CaCO3		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Hydroxide OH- as CaCO3		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	N/A	170	N/A	N/A	N/A	N/A	N/A
MBTEXN (µg/L)									
MTBE		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Benzene	950 ³⁾	N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Toluene		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Ethylbenzene		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
m+p-xylene		N/A	N/A	<10	N/A	N/A	N/A	N/A	N/A
o-xylene	350 ³⁾	N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Naphthalene		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH C6 - C10		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH C6-C10 less BTEX (F1)		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH C10 - C14		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH C15 - C28		N/A	N/A	380	N/A	N/A	N/A	N/A	N/A
TRH C29 - C36		N/A	N/A	170	N/A	N/A	N/A	N/A	N/A
TRH >C10 - C16		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH >C10 -C16 less N (F2)		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH >C16 - C34		N/A	N/A	500	N/A	N/A	N/A	N/A	N/A
TRH >C34 - C40		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Acenaphthylene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Acenaphthene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Fluorene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Phenanthrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Fluoranthene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(a)anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Chrysene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(b,j+k)fluoranthene		N/A	N/A	<0.2	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-c,d)pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Dibenzo(a,h)anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene TEQ		N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A
Total +ve PAH's		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100mL ¹⁾	N/A	N/A	<10	N/A	N/A	N/A	N/A	N/A
Thermotolerant Coliforms		N/A	N/A	10	N/A	N/A	N/A	N/A	N/A
E.coli		N/A	N/A	10	N/A	N/A	N/A	N/A	N/A

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems in 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB04

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	N/A	5.78	5.38	-	5.51	5.24	4.40	5.36
pH Lab	7 to 8.5 ³⁾	N/A	-	-	6.30	5.40	5.50	4.60	5.6
Electrical Conductivity (uS/cm)	<1500 ³⁾	N/A	242	328	226	207	229	262	214
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	N/A	210	340	210	200	190	400	210
Dissolved Oxygen (mg/L)	N/A	4.66	1.93	5.6	2.04	2.43	5.32	5.37	
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	N/A	675	210	147	135	148	168	139
BOD (mg/L)	-	11	<5	140	240	8	7	44	
Nutrients (mg/L)									
TN	<1.5 ³⁾	N/A	0.8	1.2	0.5	0.6	0.9	2.0	3
NO2_N	<0.1 ³⁾	N/A	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NO3_N	<0.1 ³⁾	N/A	<0.5	<0.005	0.013	0.024	<0.005	<0.025	<0.005
NH3_N	<0.04 ³⁾	N/A	0.34	0.11	0.2	0.12	0.25	0.027	0.27
TP	<0.06 ³⁾	N/A	<0.05	<0.05	<0.005	<0.05	<0.05	<0.05	0.12
PO4_P	<0.03 ³⁾	N/A	<0.005	<0.005	<0.005	<0.005	0.06	<0.05	<0.005
Dissolved Metals (mg/L)									
Aluminium, Al	<0.05 ²⁾	N/A	0.02	0.56	0.12	0.07	0.02	2.5	0.27
Arsenic, As	<0.013 ²⁾	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium, Cd	<0.0002 ²⁾	N/A	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	N/A	<0.001	0.002	<0.001	<0.001	<0.001	0.003	0.001
Copper, Cu	<0.0014 ²⁾	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron, Fe	<0.3 ³⁾	N/A	0.01	3.0	4.1	0.05	0.12	1.7	2.4
Mercury	N/A	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00012	<0.00005	
Manganese, Mn	<1.9 ²⁾	N/A	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickle	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	N/A	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	N/A	0.008	0.013	0.004	<0.001	0.008	0.066	0.005
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	8	6	13	13	12	<5	15
Carbonate CO3 2- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	8	6	13	13	12	<5	15
MBTEXN (µg/L)									
MTBE		N/A	<1	<1	<1	<1	<1	<1	<1
Benzene	950 ³⁾	N/A	<1	<1	<1	<1	<1	<1	<1
Toluene		N/A	8	2	2	2	1	1	2
Ethylbenzene		N/A	<1	<1	<1	<1	<1	<1	<1
m+p-xylene		N/A	<2	<2	<2	<2	<2	<2	<2
o-xylene	350 ³⁾	N/A	<1	<1	<1	<1	<1	<1	<1
Naphthalene		N/A	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		N/A	<10	<10	<10	<10	<10	<10	<10
TRH C6 - C10		N/A	<10	<10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)		N/A	<10	<10	<10	<10	<10	<10	<10
TRH C10 - C14		N/A	<50	<50	<50	70	<50	<50	<50
TRH C15 - C28		N/A	<100	<100	140	180	<100	<100	150
TRH C29 - C36		N/A	<100	<100	<100	<100	<100	<100	<100
TRH >C10 - C16		N/A	<50	<50	<50	65	<50	<50	<50
TRH >C10 -C16 less N (F2)		N/A	<50	<50	<50	65	<50	<50	<50
TRH >C16 - C34		N/A	<100	<100	140	250	100	110	180
TRH >C34 - C40		N/A	<100	<100	<100	<100	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j,k)fluoranthene		N/A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		N/A	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's		N/A	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100ml ¹⁾	N/A	<10	<10	<10	30	<10	<10	<1
Thermotolerant Coliforms		N/A	<10	<10	<10	<10	<10	20	360
E.coli		N/A	<10	<10	<10	<10	<10	20	<10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB06

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2018	28/09/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ²⁾	2.5	4.78	4.16	-	N/A	3.82	4.04	4.87
pH lab	7 to 8.5 ³⁾	-	-	-	3.30	N/A	4.60	4.10	4.1
Electrical Conductivity (uS/cm)	<1500 ³⁾	311	321	1070	328	N/A	467	242	318
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	-	320	320	590	N/A	420	350	360
Dissolved Oxygen (mg/L)		4.53	2.24	8.95	6.7	N/A	4.04	5.0	1.62
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	203	208	690	213	N/A	304	155	207
BOD (mg/L)		-	29	23	18	N/A	8	65	95
Nutrients (mg/L)									
TN	<1.5 ³⁾	0.2	4.9	5.2	17	N/A	7.1	5.5	11
NO2_N	<0.1 ³⁾	<0.005	<0.005	<0.005	<0.005	N/A	<0.005	<0.005	<0.025
NO3_N	<0.1 ³⁾	0.024	<0.5	<0.05	0.013	N/A	<0.005	<0.005	<0.025
NH3_N	<0.04 ³⁾	0.7	1	0.67	2.4	N/A	0.5	0.78	0.74
TP	<0.06 ³⁾	1.3	1.2	1.1	2.2	N/A	3.1	0.88	0.87
PO4_P	<0.03 ³⁾	1.1	0.79	0.88	1.9	N/A	2.4	0.67	0.79
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	1.8	0.32	0.26	0.25	N/A	0.40	0.23	0.03
Arsenic, As	<0.013 ²⁾	<0.001	<0.001	<0.001	<0.001	N/A	0.001	<0.001	<0.001
Cadmium, Cd	<0.0002 ²⁾	<0.0001	<0.0001	<0.0001	<0.0001	N/A	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	0.002	<0.002	0.001	0.002	N/A	0.002	0.002	<0.001
Copper, Cu	<0.0014 ²⁾	<0.001	<0.001	<0.001	<0.001	N/A	0.003	<0.001	<0.001
Iron, Fe	<0.3 ³⁾	0.9	0.8	0.38	1	N/A	0.41	0.61	0.03
Mercury		<0.00005	<0.00005	<0.00005	<0.00005	N/A	<0.00005	<0.00005	<0.00005
Manganese, Mn	<1.9 ²⁾	0.01	<0.005	<0.005	0.006	N/A	<0.005	<0.005	<0.005
Nickle		0.003	<0.001	<0.001	<0.001	N/A	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	0.006	<0.001	<0.001	<0.001	N/A	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	0.097	0.014	0.01	0.028	N/A	0.046	0.009	0.002
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	<5	<5	<5	N/A	5	<5	<5
Carbonate CO3 2- as CaCO3		N/A	<5	<5	<5	N/A	<5	<5	<5
Hydroxide OH- as CaCO3		N/A	<5	<5	<5	N/A	<5	<5	<5
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	<5	<5	<5	N/A	5	<5	<5
MBTEXN (µg/L)									
MTBE		<1	<10	<3	<3	N/A	<3	<1	<1
Benzene	950 ³⁾	<1	<10	<3	<3	N/A	<3	<1	<1
Toluene		<1	<10	7	30	N/A	<3	<1	14
Ethylbenzene		<1	<10	<3	<3	N/A	<3	<1	<1
m+p-xylene		<2	<20	<6	<6	N/A	<6	<2	<2
o-xylene	350 ³⁾	<1	<10	<3	<3	N/A	<3	<1	<1
Naphthalene		<1	<10	<3	<3	N/A	<3	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<100	<50	<50	N/A	<50	<10	18
TRH C6 - C10		<10	<100	<50	<50	N/A	<50	<10	20
TRH C6-C10 less BTEX (F1)		<10	<100	<50	<50	N/A	<50	<10	<10
TRH C10 - C14		<50	97	<50	160	N/A	<50	<50	<50
TRH C15 - C28		<100	<100	100	120	N/A	130	150	130
TRH C29 - C36		110	<100	<100	<100	N/A	<100	260	150
TRH >C10 - C16		<50	71	<50	150	N/A	<50	<50	<50
TRH >C10 - C16 less N (F2)		<50	71	<50	150	N/A	<50	<50	<50
TRH >C16 - C34		140	<100	140	160	N/A	180	340	230
TRH >C34 - C40		<100	<100	<100	<100	N/A	<100	120	100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	N/A	<0.1	0.2	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	N/A	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	N/A	<0.5	<0.5	<0.5
Total +ve PAHs		<0.1	<0.1	<0.1	<0.1	N/A	<0.1	0.9	<0.1
Microbial Testing									
Faecal Enterococci (cfu/100mL)	<200cfu/100mL ¹⁾	N/A	10	10	<10	N/A	<10	<10	<1
Thermotolerant Coliforms		N/A	<10	20	<10	N/A	<10	<10	<10
E.coli		N/A	<10	20	<10	N/A	<10	<10	<10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB07

Parameters	Guideline	43158.00	43250.00	43347.00	43432.00	43522.00	43613.00	43705.00	43795.00
Physico-chemical									
pH	7 to 8.5 ³⁾	2.82	4.77	4.50	-	5.68	4.15	4.23	4.56
pH lab	7 to 8.5 ³⁾	-	-	-	4.70	5.60	4.20	4.40	4.20
Electrical Conductivity (uS/cm)	<1500 ³⁾	337	280	211	449	485	665	1261	406
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	-	380	210	450	490	410	200	450
Dissolved Oxygen (mg/L)		3.90	5.34	2.60	4.95	1.22	9.54	4.74	4.89
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	224	181	141	291	316	424	807	264
BOD (mg/L)		-	61	13	110	160	23	29	220
Nutrients (mg/L)									
TN	<1.5 ³⁾	0.30	6.1	6.5	28.0	28.0	8.9	4.9	30.0
NO ₂ -N	<0.1 ³⁾	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NO ₃ -N	<0.1 ³⁾	0.27	<0.5	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005
NH ₃ -N	<0.04 ³⁾	0.22	0.77	0.19	6.4	12.0	0.82	0.16	0.65
TP	<0.06 ³⁾	0.65	0.81	0.45	1.90	1.70	0.63	0.25	0.67
PO ₄ -P	<0.03 ³⁾	0.52	0.73	0.23	1.30	1.00	0.31	0.10	0.16
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	0.86	0.14	0.18	0.10	0.07	0.21	0.18	0.13
Arsenic, As	<0.013 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium, Cd	<0.0002 ²⁾	0.00	<0.0001	<0.0001	0.00	0.00	<0.0001	<0.0001	0.00
Chromium, Cr	<0.001 ²⁾	0.00	0.00	<0.001	0.00	0.00	0.00	<0.001	<0.001
Copper, Cu	<0.0014 ²⁾	0.00	<0.001	0.00	<0.001	0.00	<0.001	0.00	<0.001
Iron, Fe	<0.3 ³⁾	1.10	0.51	0.21	0.54	0.17	0.50	0.17	0.27
Mercury	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Manganese, Mn	<1.9 ²⁾	0.01	<0.005	<0.005	0.03	0.01	0.01	<0.005	<0.005
Nickle	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	0.07	0.01	0.01	0.02	0.01	0.08	0.04	0.08
Alkalinity (mg/L)									
Bicarbonate HCO ₃ as CaCO ₃		N/A	<5	<5	11	38	5	<5	<5
Carbonate CO ₃ 2- as CaCO ₃		N/A	<5	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO ₃		N/A	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	200 ⁴⁾	N/A	<5	<5	11	38	5	<5	<5
MBTEXN (µg/L)									
MTBE		<1	<10	<5	<3	<3	<1	<1	<1
Benzene	950 ³⁾	<1	<10	<5	<3	<3	<1	<1	<1
Toluene		<1	11	5	770	150	39	<1	43
Ethylbenzene		<1	<10	<5	<3	<3	<1	<1	<1
m+p-xylene		<2	<20	<10	<6	<6	<2	<2	<2
o-xylene	350 ³⁾	<1	<10	<5	<3	<3	<1	<1	<1
Naphthalene		<1	<10	<5	<3	<3	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<100	<100	1000	200	51	<10	120
TRH C6 - C10		<10	<100	<100	1000	220	55	<10	120
TRH C6 -C10 less BTEX (F1)		<10	<100	<100	260	70	16	<10	81
TRH C10 - C14		<50	220	<50	360	170	57	<50	94
TRH C15 - C28		<100	<100	<100	240	1700	270	110	640
TRH C29 - C36		330	<100	<100	210	2100	470	140	1000
TRH >C10 - C16		<50	92	<50	300	200	<50	<50	99
TRH >C10 -C16 less N (F2)		<50	92	<50	300	200	<50	<50	99
TRH >C16 - C34		280	100	140	380	3400	670	210	1400
TRH >C34 - C40		220	<100	<100	100	800	160	<100	740
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing									
Faecal Enterococci (cfu/100mL)	<200cfu/100mL ¹⁾	N/A	30	10	<10	<10	<10	10	<1
Thermotolerant Coliforms		N/A	<10	<10	<10	<10	<10	<10	280
E.coli		N/A	<10	<10	<10	<10	<10	<10	<10

1) Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.
 2) ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.
 3) ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.
 4) ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB08

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	N/A	4.56	4.41	-	6.28	5.22	4.38	5.59
pH lab	7 to 8.5 ³⁾	N/A	-	-	4.60	6.40	5.30	4.40	5.00
Electrical Conductivity (uS/cm)	<1500 ³⁾	N/A	217	1200	888	1010	525	1020	1630
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	N/A	350	1400	920	930	500	1600	1500
Dissolved Oxygen (mg/L)		N/A	4.68	2.57	5.72	2.42	1.16	5.86	2.24
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	N/A	140	770	565	645	336	653	1040
BOD (mg/L)		-	50	23	82	-	480	36	860
Nutrients (mg/L)									
TN	<1.5 ³⁾	N/A	7.1	11	13	110	79	9.5	68
NO ₂ _N	<0.1 ³⁾	N/A	<0.005	<0.05	<0.05	<0.1	<0.1	<0.025	<0.005
NO ₃ _N	<0.1 ³⁾	N/A	<0.5	<0.05	<0.05	<0.005	<0.1	<0.005	<0.005
NH ₃ _N	<0.04 ³⁾	N/A	0.69	0.24	4	55	14	0.2	23
TP	<0.06 ³⁾	N/A	<0.05	0.33	0.52	16	1.1	0.25	2.6
PO ₄ _P	<0.03 ³⁾	N/A	<0.005	0.075	0.21	1.9	0.4	0.098	1.6
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	N/A	4.8	5.5	4.5	8.2	6.9	5.5	4.0
Arsenic, As	<0.013 ²⁾	N/A	<0.001	0.002	0.004	0.008	0.004	0.003	0.006
Cadmium, Cd	<0.0002 ²⁾	N/A	<0.0001	0.0001	<0.0001	0.0016	0.0002	0.0001	0.0004
Chromium, Cr	<0.001 ²⁾	N/A	0.01	0.007	0.013	0.04	0.024	0.008	0.011
Copper, Cu	<0.0014 ²⁾	N/A	<0.001	0.003	0.001	0.007	0.002	<0.001	0.001
Iron, Fe	<0.3 ³⁾	N/A	1.4	2.4	2.7	2.5	2.1	4.2	2.3
Mercury		N/A	<0.00005	<0.00005	<0.00005	0.00013	0.00013	<0.00026	<0.00005
Manganese, Mn	<1.9 ²⁾	N/A	0.012	0.041	0.048	0.038	0.03	0.043	0.058
Nickel		N/A	0.001	0.001	0.002	0.002	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	N/A	<0.001	<0.001	0.036	0.004	0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	N/A	0.039	0.031	<0.001	0.064	0.02	0.034	0.038
Alkalinity (mg/L)									
Bicarbonate HCO ₃ as CaCO ₃		N/A	<5	<5	9	190	46	<5	64
Carbonate CO ₃ 2- as CaCO ₃		N/A	<5	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO ₃		N/A	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO ₃	200 ⁴⁾	N/A	<5	<5	9	190	46	<5	64
MBTEXN (µg/L)									
MTBE		<1	<10	<5	<3	<3	<3	<10	<10
Benzene	950 ³⁾	<1	<10	<5	<3	<3	<3	<10	<10
Toluene		<1	11	5	210	980	310	35	580
Ethylbenzene		<1	<10	<5	<3	<3	<3	<10	<10
m+p-xylene		<2	<20	<10	<6	<6	<6	<20	<20
o-xylene	350 ³⁾	<1	<10	<5	<3	<3	<3	<10	<10
Naphthalene		<1	<10	<5	<3	<3	<3	<10	<10
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<100	<100	280	990	540	<2000	920
TRH C6 - C10		<10	<100	<100	290	1100	580	<2000	1000
TRH C6-C10 less BTEX (F1)		<10	<100	<100	84	140	270	<2000	430
TRH C10 - C14		N/A	85	<50	260	760	190	60	1200
TRH C15 - C28		N/A	190	<100	140	10000	450	<100	490
TRH C29 - C36		N/A	130	<100	<100	5300	450	<100	220
TRH >C10 - C16		N/A	74	<50	230	990	200	50	1200
TRH >C10 -C16 less N (F2)		N/A	74	<50	230	990	200	50	1200
TRH >C16 - C34		N/A	270	<100	160	16000	840	130	580
TRH >C34 - C40		N/A	<100	<100	<100	1600	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	<0.8	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAHs		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100mL ¹⁾	N/A	<10	90	N/A	<100	<10	70	<1
Thermotolerant Coliforms		N/A	<10	80	N/A	<100	<10	30	4500
E.coli		N/A	<10	80	N/A	<100	<10	20	4200

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB09

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	4.03	6.28	5.86	-	5.85	5.43	5.33	6.41
pH lab	7 to 8.5 ³⁾	-	-	-	5.80	5.60	5.70	5.60	5.80
Electrical Conductivity (uS/cm)	<1500 ³⁾	296	250	390	322	263	275	206	233
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	-	280	320	260	250	260	300	270
Dissolved Oxygen (mg/L)		2.22	4.84	4.6	5.54	2.05	0.8	4.95	7.41
Total Dissolved Solids (mg/L)	<1000 ³⁾	192	161	250	208	171	179	132	151
BOD (mg/L)		-	6	7	<5	8	<5	<5	22
Nutrients (mg/L)									
TN	<1.5 ³⁾	1.1	0.4	1	0.5	0.9	0.5	0.7	1
NO2_N	<0.1 ³⁾	<0.005	<0.5	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005
NO3_N	<0.1 ³⁾	<0.005	<0.005	<0.05	<0.005	0.016	0.005	<0.005	0.008
NH3_N	<0.04 ³⁾	0.11	0.13	0.1	0.26	0.51	0.074	0.12	0.23
TP	<0.06 ³⁾	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	<0.05
PO4_P	<0.03 ³⁾	<0.005	<0.005	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	1.2	0.04	0.09	<0.01	<0.01	0.02	0.09	0.12
Arsenic, As	<0.013 ²⁾	0.006	0.003	0.002	<0.001	0.002	0.001	0.002	0.003
Cadmium, Cd	<0.0002 ²⁾	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	0.003	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001
Copper, Cu	<0.0014 ²⁾	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron, Fe	<0.3 ³⁾	2.8	5.6	6.3	1.3	0.96	1.6	4.9	3.7
Mercury		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0001	0.00034	<0.00005
Manganese, Mn	<1.9 ²⁾	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead Pb	<0.008 ²⁾	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	0.069	0.006	0.006	0.003	0.008	0.004	0.008	0.006
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	25	19	26	16	22	18	21
Carbonate CO3 2- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Hydroxide OH- as CaCO3		N/A	<5	<5	<5	<5	<5	<5	<5
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	25	19	26	16	22	18	21
MBTEXN (µg/L)									
MTBE		<1	<1	<1	<1	<1	<1	<1	<1
Benzene	950 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Toluene		<1	7	<1	<1	13	2	<1	3
Ethylbenzene		<1	<1	<1	<1	<1	<1	<1	<1
m+p-xylene		<2	<2	<2	<2	<2	<2	<2	<2
o-xylene	350 ³⁾	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene		<1	<1	<1	<1	<1	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		<10	<10	<10	<10	20	<10	<10	<10
TRH C6 - C10		<10	<10	<10	<10	26	<10	<10	<10
TRH C6 -C10 less BTEX (F1)		<10	<10	<10	<10	13	<10	<10	<10
TRH C10 - C14		<50	66	<50	<50	<50	<50	<50	<50
TRH C15 - C28		<100	140	<100	<100	180	<100	120	<100
TRH C29 - C36		<100	<100	<100	<100	<100	<100	<100	<100
TRH >C10 - C16		<50	69	<50	<50	<50	<50	<50	<50
TRH >C10 -C16 less N (F2)		<50	69	<50	<50	<50	<50	<50	<50
TRH >C16 - C34		<100	140	<100	<100	190	100	130	110
TRH >C34 - C40		<100	<100	<100	<100	<100	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100m ¹⁾	N/A	<10	10	<10	<10	<10	<10	20
Thermotolerant Coliforms		N/A	<10	<10	<10	<10	<10	10	<10
E.coli		N/A	<10	<10	<10	<10	<10	10	<10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

SB12

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	N/A	N/A	7.52	N/A	N/A	N/A	N/A	N/A
pH lab	7 to 8.5 ³⁾	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A
Electrical Conductivity (uS/cm)	<1500 ³⁾	N/A	N/A	80	N/A	N/A	N/A	N/A	N/A
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	N/A	N/A	160	N/A	N/A	N/A	N/A	N/A
Dissolved Oxygen (mg/L)		N/A	N/A	2.7	N/A	N/A	N/A	N/A	N/A
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	N/A	N/A	50	N/A	N/A	N/A	N/A	N/A
BOD (mg/L)		N/A	N/A	13	N/A	N/A	N/A	N/A	N/A
Nutrients (mg/L)									
TN	<1.5 ³⁾			13	N/A	N/A	N/A	N/A	N/A
NO ₂ _N	<0.1 ³⁾	N/A	N/A	<0.005	N/A	N/A	N/A	N/A	N/A
NO ₃ _N	<0.1 ³⁾	N/A	N/A	0.12	N/A	N/A	N/A	N/A	N/A
NH ₃ _N	<0.04 ³⁾	N/A	N/A	0.15	N/A	N/A	N/A	N/A	N/A
TP	<0.06 ³⁾	N/A	N/A	0.16	N/A	N/A	N/A	N/A	N/A
PO ₄ _P	<0.03 ³⁾	N/A	N/A	0.009	N/A	N/A	N/A	N/A	N/A
Alkalinity (mg/L)									
Bicarbonate HCO ₃ as CaCO ₃		N/A	N/A	35	N/A	N/A	N/A	N/A	N/A
Carbonate CO ₃ 2- as CaCO ₃		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Hydroxide OH- as CaCO ₃		N/A	N/A	<5	N/A	N/A	N/A	N/A	N/A
Total Alkalinity as CaCO ₃	200 ⁴⁾	N/A	N/A	35	N/A	N/A	N/A	N/A	N/A
Dissolved Metals (mg/L)									
Aluminium, Al	<0.055 ²⁾	N/A	N/A	0.2	N/A	N/A	N/A	N/A	N/A
Arsenic, As	<0.013 ²⁾	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Cadmium, Cd	<0.0002 ²⁾	N/A	N/A	<0.0001	N/A	N/A	N/A	N/A	N/A
Chromium, Cr	<0.001 ²⁾	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Copper, Cu	<0.0014 ²⁾	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Iron, Fe	<0.3 ³⁾	N/A	N/A	0.13	N/A	N/A	N/A	N/A	N/A
Mercury		N/A	N/A	<0.00005	N/A	N/A	N/A	N/A	N/A
Manganese, Mn	<1.9 ²⁾	N/A	N/A	<0.005	N/A	N/A	N/A	N/A	N/A
Nickle		N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Lead Pb	<0.008 ²⁾	N/A	N/A	<0.001	N/A	N/A	N/A	N/A	N/A
Zinc, Zn	<0.008 ²⁾	N/A	N/A	0.003	N/A	N/A	N/A	N/A	N/A
MBTEXN (µg/L)									
MTBE		N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
Benzene	950 ³⁾	N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
Toluene		N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
Ethylbenzene		N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
m+p-xylene		N/A	N/A	<2	N/A	N/A	N/A	N/A	N/A
o-xylene	350 ³⁾	N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
Naphthalene		N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		N/A	N/A	<10	N/A	N/A	N/A	N/A	N/A
TRH C6 - C10		N/A	N/A	<10	N/A	N/A	N/A	N/A	N/A
TRH C6-C10 less BTEX (F1)		N/A	N/A	<10	N/A	N/A	N/A	N/A	N/A
TRH C10 - C14		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH C15 - C28		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH C29 - C36		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH >C10 - C16		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH >C10 - C16 less N (F2)		N/A	N/A	<50	N/A	N/A	N/A	N/A	N/A
TRH >C16 - C34		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
TRH >C34 - C40		N/A	N/A	<100	N/A	N/A	N/A	N/A	N/A
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Acenaphthylene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Acenaphthene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Fluorene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Phenanthrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Fluoranthene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(a)anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Chrysene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(b,j+k)fluoranthene		N/A	N/A	<0.2	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Indeno(1,2,3-c,d)pyrene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Dibenzo(a,h)anthracene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(g,h,i)perylene		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Benzo(a)pyrene TEQ		N/A	N/A	<0.5	N/A	N/A	N/A	N/A	N/A
Total +ve PAHs		N/A	N/A	<0.1	N/A	N/A	N/A	N/A	N/A
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100mL ¹⁾	N/A	N/A	330	N/A	N/A	N/A	N/A	N/A
Thermotolerant Coliforms		N/A	N/A	12000	N/A	N/A	N/A	N/A	N/A
E.coli		N/A	N/A	8000	N/A	N/A	N/A	N/A	N/A

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.

DB01

Parameters	Guideline	27/02/2018	30/05/2018	4/09/2018	28/11/2018	26/02/2019	28/05/2019	28/08/2019	26/11/2019
Physico-chemical									
pH	7 to 8.5 ³⁾	N/A	N/A	N/A	N/A	N/A	5.30	5.95	5.54
pH lab	7 to 8.5 ³⁾	N/A	N/A	N/A	N/A	N/A	5.90	5.90	5.60
Electrical Conductivity (uS/cm)	<1500 ³⁾	N/A	N/A	N/A	N/A	N/A	1220	781	1130
Electrical Conductivity lab (uS/cm)	<1500 ³⁾	N/A	N/A	N/A	N/A	N/A	1200	1200	1200
Dissolved Oxygen (mg/L)		N/A	N/A	N/A	N/A	N/A	1.3	9.69	4.69
Total Dissolved Solids (mg/L)	<1000mg/L ³⁾	N/A	N/A	N/A	N/A	N/A	782	500.000	724
BOD (mg/L)		N/A	N/A	N/A	N/A	N/A	<5	6	<5
Nutrients (mg/L)									
TN	<1.5 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
NO2_N	<0.1 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.005	<0.005	<0.005
NO3_N	<0.1 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.005	<0.005	<0.005
NH3_N	<0.04 ³⁾	N/A	N/A	N/A	N/A	N/A	0.008	<0.005	<0.005
TP	<0.06 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.05	<0.05	<0.05
PO4_P	<0.03 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.005	<0.005	<0.005
Dissolved Metals (mg/L)									
Aluminium, Al	<0.056 ²⁾	N/A	N/A	N/A	N/A	N/A	0.01	0.01	0.04
Arsenic, As	<0.013 ²⁾	N/A	N/A	N/A	N/A	N/A	<0.001	<0.001	<0.001
Cadmium, Cd	<0.0002 ²⁾	N/A	N/A	N/A	N/A	N/A	<0.0001	<0.0001	<0.0001
Chromium, Cr	<0.001 ²⁾	N/A	N/A	N/A	N/A	N/A	<0.001	<0.001	<0.001
Copper, Cu	<0.0014 ²⁾	N/A	N/A	N/A	N/A	N/A	<0.001	<0.001	<0.001
Iron, Fe	<0.3 ³⁾	N/A	N/A	N/A	N/A	N/A	0.13	0.11	0.51
Mercury, Hg		N/A	N/A	N/A	N/A	N/A	<0.00005	<0.00005	<0.00005
Manganese, Mn	<1.9 ²⁾	N/A	N/A	N/A	N/A	N/A	0.31	0.07	0.036
Nickle, Ni		N/A	N/A	N/A	N/A	N/A	0.003	0.002	0.001
Lead, Pb	<0.008 ²⁾	N/A	N/A	N/A	N/A	N/A	<0.001	<0.001	<0.001
Zinc, Zn	<0.008 ²⁾	N/A	N/A	N/A	N/A	N/A	0.006	0.007	0.004
Alkalinity (mg/L)									
Bicarbonate HCO3 as CaCO3		N/A	N/A	N/A	N/A	N/A	60	48	29
Carbonate CO3 2- as CaCO3		N/A	N/A	N/A	N/A	N/A	<5	<5	<5
Hydroxide OH- as CaCO3		N/A	N/A	N/A	N/A	N/A	<5	<5	<5
Total Alkalinity as CaCO3	200 ⁴⁾	N/A	N/A	N/A	N/A	N/A	60	48	29
MBTEXN (µg/L)									
MTBE		N/A	N/A	N/A	N/A	N/A	<1	<1	<1
Benzene	950 ³⁾	N/A	N/A	N/A	N/A	N/A	<1	<1	<1
Toluene		N/A	N/A	N/A	N/A	N/A	<1	<1	<1
Ethylbenzene		N/A	N/A	N/A	N/A	N/A	<1	<1	<1
m+p-xylene		N/A	N/A	N/A	N/A	N/A	<2	<2	<2
o-xylene	350 ³⁾	N/A	N/A	N/A	N/A	N/A	<1	<1	<1
Naphthalene		N/A	N/A	N/A	N/A	N/A	<1	<1	<1
Total Recoverable Hydrocarbons (µg/L)									
TRH C6 - C9		N/A	N/A	N/A	N/A	N/A	24	140	<10
TRH C6 - C10		N/A	N/A	N/A	N/A	N/A	24	140	<10
TRH C6-C10 less BTEX (F1)		N/A	N/A	N/A	N/A	N/A	24	140	<10
TRH C10 - C14		N/A	N/A	N/A	N/A	N/A	<50	<50	<50
TRH C15 - C28		N/A	N/A	N/A	N/A	N/A	<100	<100	<100
TRH C29 - C36		N/A	N/A	N/A	N/A	N/A	<100	<100	<100
TRH >C10 - C16		N/A	N/A	N/A	N/A	N/A	<50	<50	<50
TRH >C10 - C16 less N (F2)		N/A	N/A	N/A	N/A	N/A	<50	<50	<50
TRH >C16 - C34		N/A	N/A	N/A	N/A	N/A	<100	<100	<100
TRH >C34 - C40		N/A	N/A	N/A	N/A	N/A	<100	<100	<100
PAHs in water (µg/L)									
Naphthalene	16 ³⁾	N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Acenaphthylene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Acenaphthene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Fluorene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Phenanthrene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Anthracene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Fluoranthene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Pyrene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Benzo(a)anthracene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Chrysene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene		N/A	N/A	N/A	N/A	N/A	<0.2	<0.2	<0.2
Benzo(a)pyrene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ		N/A	N/A	N/A	N/A	N/A	<0.5	<0.5	<0.5
Total +ve PAH's		N/A	N/A	N/A	N/A	N/A	<0.1	<0.1	<0.1
Microbial Testing (cfu/100mL)									
Faecal Enterococci	<200cfu/100ml ¹⁾	N/A	N/A	N/A	N/A	N/A	<1	30	<1
Thermotolerant Coliforms		N/A	N/A	N/A	N/A	N/A	<1	<10	<10
E.coli		N/A	N/A	N/A	N/A	N/A	<1	<10	<10

¹⁾ Department of Health (2006) Microbial quality of recreational water Guidance Note; target exceedance printed in red.

²⁾ ANZECC and ARMCANZ (2000) Trigger values for toxicants in freshwater ecosystems at 95% level of protection, stated otherwise; target exceedance printed in red.

³⁾ ANZECC and ARMCANZ (2000) Trigger values for South-west Australia for slightly-disturbed wetlands ecosystems; target exceedance printed in red.

⁴⁾ ADWG (2011) Drinking water aesthetic value; target exceedance printed in red.



Unit 5A, 209 Chester Pass Rd
 Albany, WA 6330
 Australia
 Tel: 08 9842 1575
 Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
- Cadastre
- 5m Contours
- ▲ Deep Bore
- ▲ Shallow Bore
- Creek Sample Site



Scale
 1:9,000 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2016
 Cadastre and Contours: Landgate 2016
 Overview Map: World Topographic map service, ESRI 2012

CLIENT
 City of Albany
 Lot 5780 Down Road
 Drome, WA 6330

AMP Monitoring Location Plan

STATUS	FILE	DATE
FINAL	MSC0137	19/12/2019

Appendix E

Fixed-point photography

Fixed Point Photography

MB1-FP

27 Oct 2022



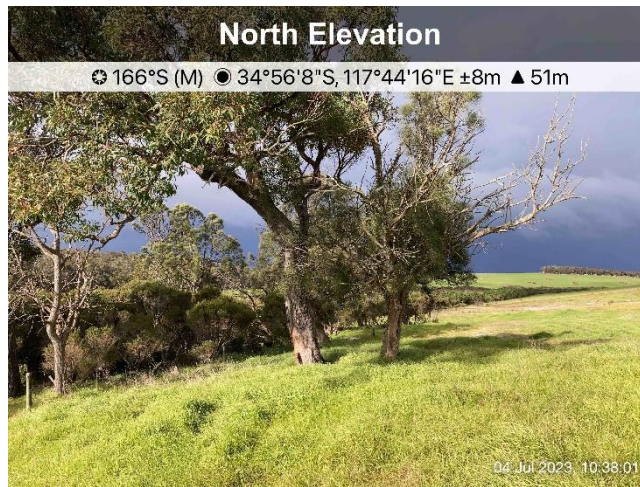
19 Jan 2023



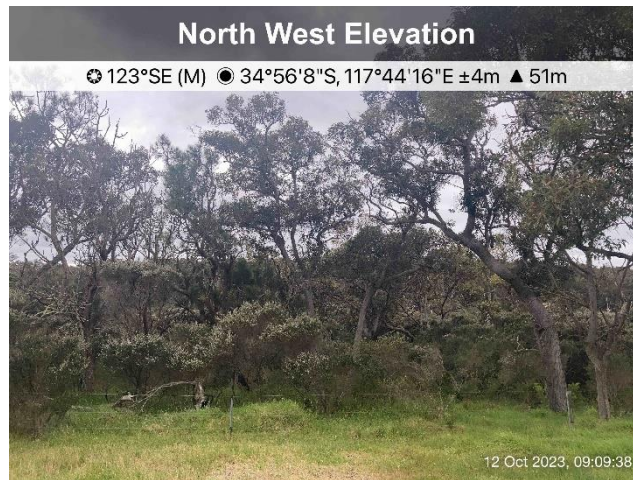
20 April 2023



4 July 2023



12 October 2023



MB2-FP

27 Oct 2022



19 Jan 2023



20 April 2023



4 July 2023

East Elevation

☉ 276°W (M) ● 34°55'56"S, 117°44'27"E ±4m ▲ 50m



North Elevation

☉ 187°S (M) ● 34°55'56"S, 117°44'27"E ±4m ▲ 50m



North West Elevation

☉ 122°SE (M) ● 34°55'56"S, 117°44'28"E ±4m ▲ 50m



12 October 2023

East Elevation

☉ 276°W (M) ● 34°55'56"S, 117°44'27"E ±4m ▲ 50m



North Elevation

☉ 186°S (M) ● 34°55'56"S, 117°44'27"E ±4m ▲ 50m



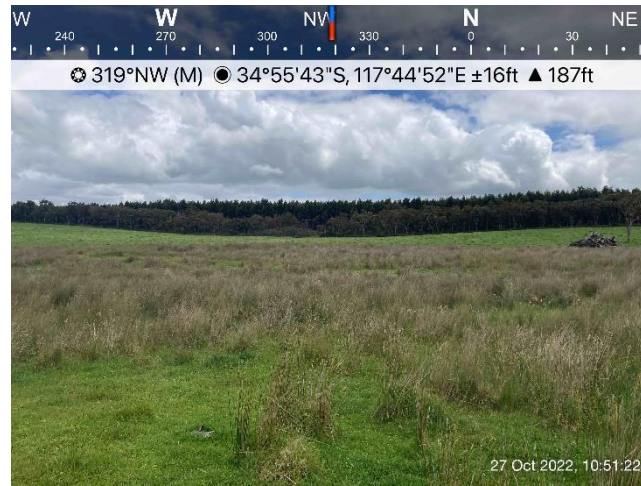
North West Elevation

☉ 122°SE (M) ● 34°55'56"S, 117°44'27"E ±4m ▲ 51m



MB5-FP

27 Oct 2022



20 April 2023



12 October 2023



MB5-FP2

27 Oct 2022



19 Jan 2023



20 April 2023



12 October 2023



MB7-FP

27 Oct 2022



20 April 2023

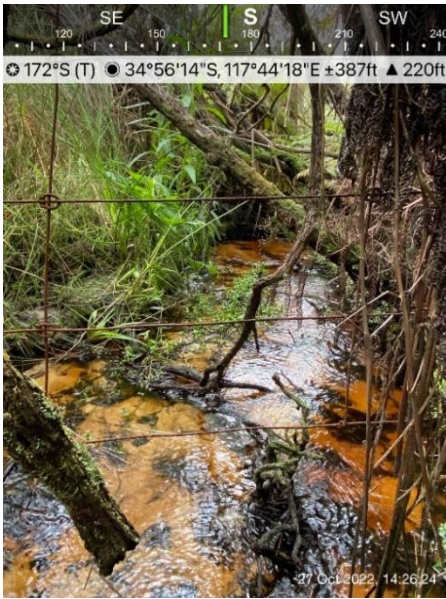


12 October 2023

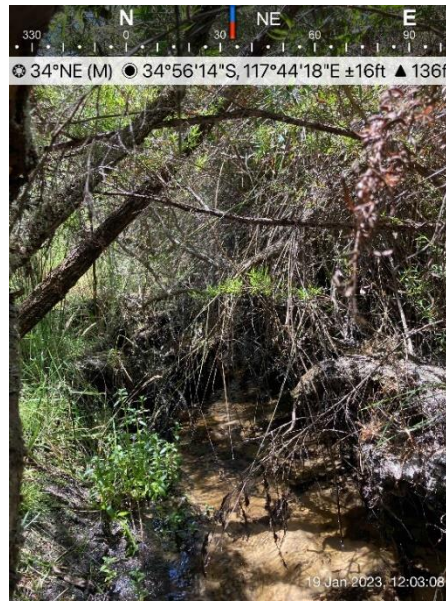


CS1-FP

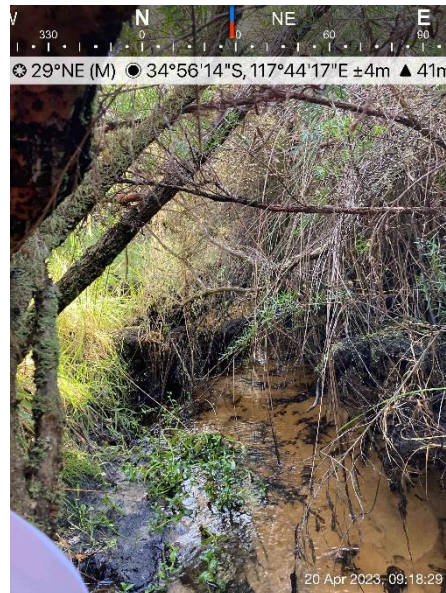
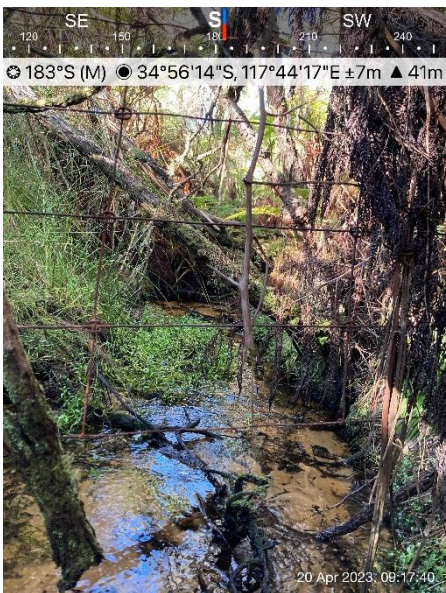
27 Oct 2022



19 January 2023



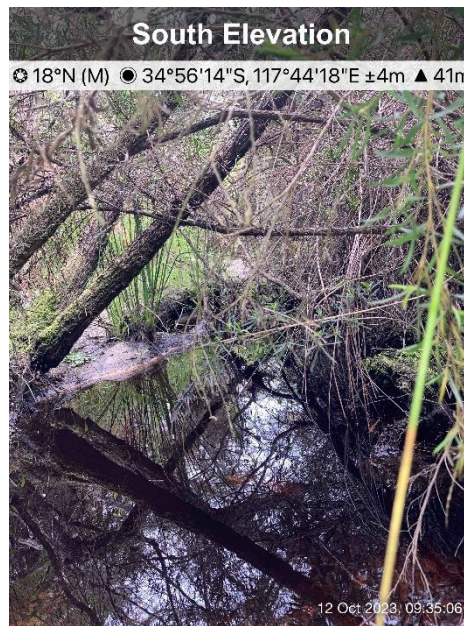
20 April 2023



4 July 2023

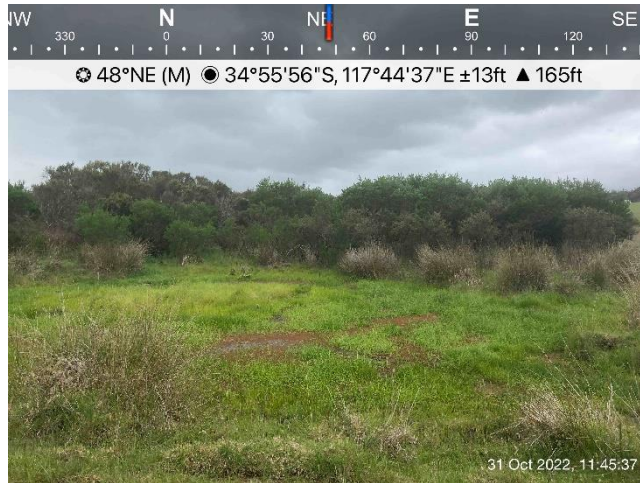


12 October 2023

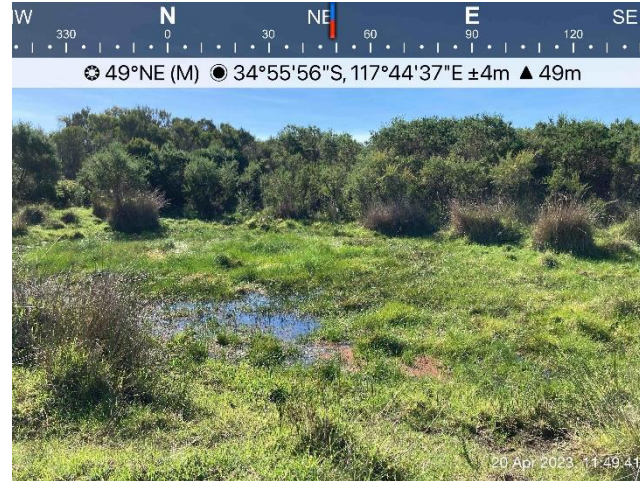


CS2-FP

27 Oct 2022



20 April 2023



4 July 2023



12 October 2023



CS3-FP

27 Oct 2022



19 Jan 2023



20 April 2023



4 July 2023



12 October 2023

