Appendix 3

Final Assessment Report for the Pollution Reduction Program at the Teralba Quarry - September 2016

(Total No. of pages including blank pages = 46)

Report No. 559/54



Environmental Protection Licence 536

Final Assessment Report for the Pollution Reduction Program

at the

Teralba Quarry

Prepared by:



September 2016

Report No. 559/54



Environmental Protection Licence 536

Final Assessment Report for the Pollution Reduction Program

at the

Teralba Quarry

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Ref No. 559/44 September 2016

Teralba Quarry Report No. 559/54

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CONTENTS

			Page
1.	POL	LUTION STUDIES AND REDUCTION PROGRAM	1
	1.1	INTRODUCTION	1
	1.2	ENVIRONMENT PROTECTION LICENCE 536 CONDITIONS	1
	1.3	SURFACE WATER MONITORING LOCATION CONTEXT	4
2.	POL	LUTION REDUCTION PROGRAM RESULTS	8
	2.1	INTRODUCTION	8
	2.2	PHYSICAL PARAMETERS	8
	2.3	EPL 4 MONITORING RESULTS	10
	2.4	EPL 5 MONITORING RESULTS	13
3.	CON	ICLUSION	17
4.	ONG	GOING MONITORING	17
••	0.10		
FIGU	JRES		
Figu	re 1	Teralba Quarry Water Management A4 Full Colour	2
Figu		EPL Water Monitoring Locations – EPL 4 and EPL 5	
9 -			
TAR	LES		
Tabl		Statistical Analysis - Water Quality at EPA Point 4 - Physical Parameters -	
Tabl	CI	September 2013 to August 2016	9
Tabl	e 2	Statistical Analysis - Water Quality at EPA Point 5 - Physical Parameters - September 2013 to August 2016	9
Tabl	e 3	Statistical Analysis - Water Quality at EPA Point 4 - Dissolved (filtered) Samples - September 2013 to August 2016	11
Tabl	e 4	Statistical Analysis - Water Quality at EPA Point 4 - Total (unfiltered) Samples - September 2013 to August 2016	11
Tabl	e 5	Statistical Analysis - Water Quality at EPA Point 5 - Dissolved (filtered) Samples - September 2013 to August 2016	15
Tabl	e 6	Statistical Analysis - Water Quality at EPA Point 5 - Total (unfiltered) Samples - September 2013 to August 2016	16

Report No. 559/54

1. POLLUTION STUDIES AND REDUCTION PROGRAM

1.1 INTRODUCTION

In accordance with *Conditions U1.1* and *U1.2* of Environment Protection Licence (EPL) 536 (updated 13 November 2015), the following information provides the consolidated results of surface water monitoring undertaken at monitoring locations EPL Points 4 and 5 (EPL 4 and EPL 5) within the Teralba Quarry between September 2013 and August 2016 (the "monitoring period")¹. This assessment report has been prepared for review by the Environment Protection Authority (EPA) to satisfy *Condition U1.3* of EPL 536 and presents an assessment of pollutants² detected in the discharges at EPL 4 and EPL 5 in accordance with ANZECC water quality guidelines. The monitoring results have been reviewed in order to establish which analytes nominated in *Condition U1.2* of EPL 536 remain appropriate for ongoing monitoring at EPL 4 and EPL 5.

This information expands upon the previously submitted "Initial Report for Condition U1.1 and U1.2 for Environment Protection Licence 536" and "Second Report for Conditions U1.1, U1.2 and U1.3 for Environment Protection Licence 536", prepared by R.W. Corkery and Co Pty Limited (RWC) and supplied to the EPA in August 2014 and April 2015 respectively. The information provides an understanding of the surface water environment within the Teralba Quarry and an analysis of the potential impacts that the ongoing discharge of mine water³ and Quarry is having on the quality and quantity of water flowing towards Lake Macquarie. Figure 1 presents the water management structures at the Teralba Quarry including the unnamed watercourse from the Quarry towards Lake Macquarie. The watercourse then traverses the Teralba residential area through a concrete drain referred to as "Murphs Drain".

1.2 ENVIRONMENT PROTECTION LICENCE 536 CONDITIONS

The following presents the conditions of EPL 536 relevant to this assessment report.

Condition U1.1

"At Points 4 and 5, the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1 of the table below. The licensee must use the corresponding units of measure, sampling frequency, and sampling method specified opposite in Columns 2, 3, and 4 respectively."

³ The Mine Adit Dam essentially collects groundwater originating from a number of former underground coal mines together with small quantities of seepage from the Teralba Quarry.



¹ It is noted that *Condition U1.2* requires 24 months of data for comparison purposes, however, 38 months of data of data has been provided.

² It is noted that Condition U1.2 refers to all analytes as pollutants, however it is noted that this includes parameters such as pH, electrical conductivity and elements such as calcium. For consistency, all analytes are referred to as pollutants in this report.

Teralba Quarry

Report No. 559/54 Teralba Quarry

Pollutant	Unit of Measure	Frequency	Sample Method
Aluminium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Antimony (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Arsenic (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Barium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Beryllium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Boron (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Cadmium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Chromium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Cobalt (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Copper (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Iron (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Lead (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Lithium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Magnesium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Manganese (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Mercury (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Molybdenum (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Nickel (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Selenium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Silver (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Silica (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Silver (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Tin (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Titanium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Vanadium (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Zinc (Total and dissolved)	micrograms per litre	monthly during discharge	grab sample
Calcium	milligrams per litre	monthly during discharge	grab sample
Conductivity	microsiemens per centimetre	Special Frequency 1	grab sample
Nitrogen (ammonia)	milligrams per litre	monthly during discharge	grab sample
Oil and grease	milligrams per litre	Special Frequency 1	grab sample
Phosphorus	milligrams per litre	monthly during discharge	grab sample
Potassium	milligrams per litre	monthly during discharge	grab sample
Sulfur	milligrams per litre	monthly during discharge	grab sample
Total Suspended Solids	milligrams per litre	Special Frequency 1	grab sample
рН		Special Frequency 1	grab sample

Condition U1.2

"The monitoring program for the specified pollutants must be conducted for 24 months, commencing on the date of issue of this licence.

Upon completion of the first 6 months of monitoring, all results must be submitted for review to the EPA's Regional Manager-Hunter at PO Box 488G Newcastle 2300. All monitoring results must be submitted on the seventh monitoring month and no later than 30 January 2015.

Metals not detected during the first 6 months of monitoring may be removed from this PRP. The licensee may formally request the removal of non-detected metals by submitting an application to vary this licensee. The licensee must provide appropriate documentation in support of this application.

To avoid any doubt, unless a variation been granted in writing by the EPA, all metals listed in this PRP must be monitored during the full two year period."

Condition U1.3

Upon completion of this 24 month monitoring program, the licensee must within two months conduct an assessment of metals detected in the discharges in accordance with ANZECC water quality guidelines. The licensee must provide this assessment report within one month following the completion of the assessment and include all sampling results from the study.

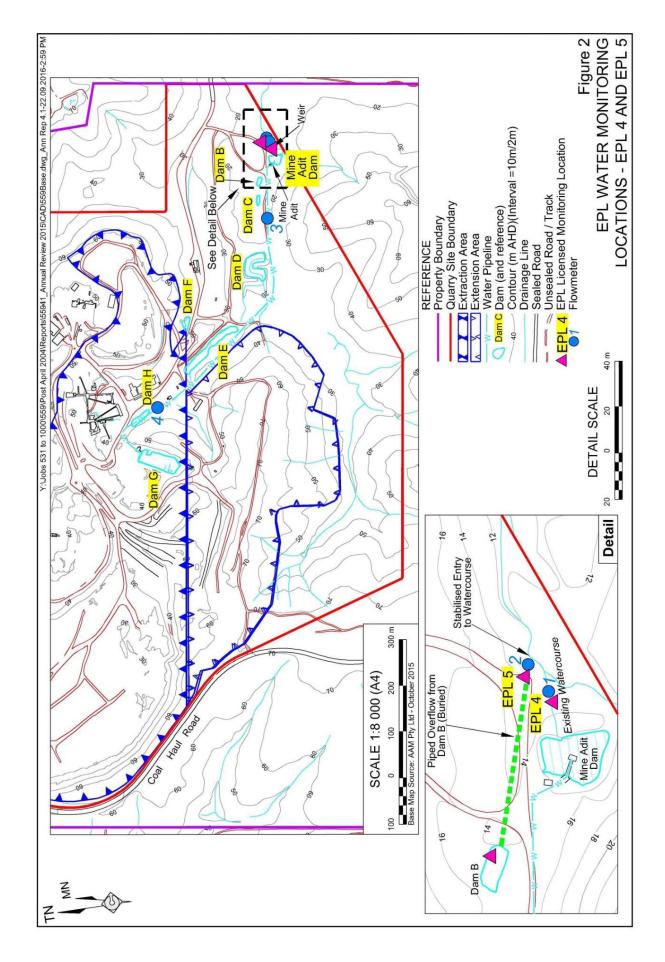
The assessment report and the sampling results, including any recommendations and actions must be submitted to the EPA Regional Manager-Hunter at PO Box 48G Newcastle NSW 2300 no later than 30 October 2016.

1.3 SURFACE WATER MONITORING LOCATION CONTEXT

Figure 2 presents an overview of the EPL 4 and EPL 5 and their interaction with other sediment dams and the water pipeline between the Mine Adit Dam and Dam G.

EPL 4 is located on the northern side of an historic and flooded Mine Adit Dam that was originally associated with the Oceanic Coal's Westside Colliery (Teralba and Northern Extended Collieries) and Coal and Allied's Northern Colliery (formerly known as Rhondda Colliery) that targeted the Fassifern Seam and Great Northern Coal Seam. The Westside Colliery is in fact connected underground with other nearby mines such as Rhondda Colliery, the owners of which (Coal and Allied) held an EPL 3139 that required the monitoring of the discharge from the Mine Adit Dam until early 2013.

The Mine Adit Dam continuously discharges water from the underground voids (groundwater) to the at-surface Mine Adit Dam that flows eastwards for a distance of approximately 40m along an unnamed watercourse to the eastern boundary of the Teralba Quarry and then towards Lake Macquarie. Groundwater from the underground coal workings is referred to as "surface water" once reaching the Mine Adit Dam. The water in the Mine Adit Dam is either pumped to Dam G for Metromix's use or allowed to flow off site (see **Figure 2**).



Teralba Quarry

EPL 5 is located at the end of a pipe from Dam B (see **Figure 2**) which is the overflow point from the surface water management system within the Teralba Quarry on the southern side of Rhondda Road. No surface water from the Quarry is able to flow into the Mine Adit Dam although it is recognised that a very small proportion of the groundwater flow entering the Mine Adit Dam is seepage from the Southern Extraction Area and the current silt cells. All surface water within the catchment south of Rhondda Road is collected and directed through a series of on-site sediment dams (Dam F to Dam B) and is discharged into the unnamed drainage channel via an outlet pipe from Dam B, effectively mixing with the water overflowing from the Mine Adit Dam before flowing eastwards approximately 2km until its confluence with Lake Macquarie.

Plates 1 to **4** display photographs of the Mine Adit Dam and Dam B and the locations of the discharge points at EPL 4 and EPL 5.

Further information regarding the context, background and interactions between the Teralba Quarry and Rhondda Colliery is available within the *Teralba Quarry Extensions Environmental Assessment* (RWC, 2011) along with their differing water catchments with no additional information provided further in this document.

The Teralba Quarry utilises water from the Mine Adit Dam (see **Figure 2**) as the main water source for washing purposes and other related activities such as wheel washing and dust control. The extraction of this water is licenced by DPI Water (Licence No. 20BL173206) with the maximum quantity of water extracted being 1 407ML per year for dewatering and "Industrial – Sand and Gravel" uses.



Plate 1: Mine Adit Dam (E559Z_03)

Plate 2: Mine Adit Dam Overflow Point (E559AC_025)





Plate 3: Dam B (E559Z_05)

Plate 4: Overflow Point (EPL 5) (E559AC_026)



2. POLLUTION REDUCTION PROGRAM RESULTS

2.1 INTRODUCTION

In August 2013, Metromix committed to undertaking a 'pollution study' of water from the Mine Adit, a proportion of which eventually enters Lake Macquarie, to determine the levels of suspended and dissolved metals. The results of monitoring undertaken between September 2013 and August 2016 at EPL 4 and EPL 5 as part of this 'pollution study' are provided in **Appendix 1.** The following section contains a statistical presentation and summary of the data presented in Appendix 1. The statistical methods employed for the presentation are consistent with an assessment under the Australian Guidelines for Water Quality Monitoring and Reporting (NWQMS, 2000) and ANZECC methodology for comparing test site data (e.g. EPA 4 and EPA 5) with trigger values. The trigger values utilised in this assessment were obtained from ANZECC and are for the protection of the aquatic ecosystem environmental value, as these trigger values offer the highest level of protection for the identified environmental values (aquatic ecosystem, visual amenity and secondary contact recreation), for the water type (waterway affected by urban development). This water type has previously been determined by the former Department of Environment, Climate Change and Water for the Lake Macquarie and Tuggerah Lakes catchments. The level of protection (95% of species), is that for a "slightly/moderately disturbed" system, in accordance with NSW policy.

The summary data is presented in terms of minimum, 20th percentile, median, 80th percentile and maximum values. For the purpose of assessment, this review follows guidance contained in ANZECC, whereby the median value from sample concentrations collected as part of the program is compared with the relevant guideline trigger value, published in Table 3.4.1 of ANZECC and applied at the 95% species protection level (NWQMS, 2000). There are several pollutants included within the Pollution Reduction Program that do not have guideline trigger levels available within Table 3.4.1 of ANZECC (NWQMS, 2000). The data available for these pollutants is presented in this assessment report, however it is noted that these pollutants are mostly 'naturally occurring' and are not generally considered as 'pollutants' in the common use of the term. Elements such as calcium and magnesium are vital in natural ecosystems and therefore value of any assessment of these 'pollutants' is limited.

It is noted that *Condition U1.1* was modified to remove requirements to monitor antimony, barium, beryllium, boron, molybdenum, silicon, sulfur, silver and titanium as of 1 June 2015. However, Metromix has continued to monitor these pollutants and the results presented in the following subsection include a summary of these.

The results for dissolved fractions of the assessed pollutants are the focus for the purpose of assessment of compliance in this assessment as the dissolved toxicant fraction is considered the most bio-available and significantly influences the toxicity effects on aquatic biota. This is consistent with the ANZECC guidelines (NWQMS, 2000).

2.2 PHYSICAL PARAMETERS

The monitoring results for the following physical parameters recorded at EPL 4 and EPL5 are presented in **Table 1** and **Table 2**, respectively.

• pH – the range of results for pH at EPL 4 was 6.84 to 8.20 while pH at EPL 5 ranged from 7.25 to 8.06.

Statistical Analysis - Water Quality at EPA Point 4 - Physical Parameters - September 2013 to August 2016

		:			20th	;	80th			Number	Percentage of
Analyte	Unit	Guideline Trigger Value LOR	LOR	Minimum Record	Percentile Record	Median Record	Percentile Record	Maximum Record	Total Records	Records Below LOR	Records Below LOR
Hd	pH Unit	pH Unit 6.5 to 8.5 units	<0.01	6.84	7.18	7.40	7.74	8.20	38	0	%0
Conductivity	mS/cm	125 - 2200 ^b	V	1460	1784	1885	2124	2480	38	0	%0
TSS	mg/L	<50	\$	0.9	9	æ	14.8	35	38	19	20%
Oil & Grease mg/L	mg/L	5	<5	NR	NR	NR	NR	NR	22	25	100%
NR = No Result	- all results	NR = No Result - all results below Limit of Recording	ing								

Table 2 Statistical Analysis - Water Quality at EPA Point 5 - Physical Parameters - September 2013 to August 2016

		:			20th	:	80th			Number	Percentage of
Analyte	Unit	Guideline Trigger Value LOR	LOR	Minimum Record	Percentile Record	Median	Percentile Record	Maximum Record	lotal Records	l otal Records Records Below LOR	Kecords Below LOR
Hd	pH Unit	pH Unit 6.5 to 8.5 units <0.01	<0.01	7.25	7.49	7.73	7.94	8.06	19	0	%0:0
Conductivity µS/cm	mS/cm	125 - 2200 ^b	<1	834	936	1120	1506	1910	19	0	0.0%
TSS	mg/L	<50	5 >	9	9	10	18	25	19	12	63.2%
Oil & Grease mg/L	mg/L	5	5 >	NR	NR	NR	NR	NR	12	12	100.0%
NR = No Result -	- all results b	NR = No Result – all results below Limit of Recording	ina								

- Electrical conductivity the median result for electrical conductivity at EPL 4 was 1 875μS/cm while the median result at EPL 5 was 1 090μS/cm.
- Total Suspended Solids (TSS) the median result for TSS at EPL 4 was 8mg/L while the median result for TSS at EPL 5 was 10mg/L.
- Oil and Grease There has been no records of oil and grease at either location.

These results indicate that pH at EPL 5 does not vary as greatly as it does at monitoring location EPL 4 however all results remain within the guideline trigger levels. Electrical conductivity at EPL 5 is lower than that at EPL 4 with electrical conductivity at EPL 4 exceeding the guideline trigger value for some samples. This was not reflected at EPL 5 where all samples were within the guideline trigger levels for electrical conductivity. All results are below the guideline trigger levels for TSS. The median value for TSS is similar at both locations and slightly higher at EPL 5, however the 80th percentile and maximum value at EPL 4 is higher than at EPL 5.

2.3 EPL 4 MONITORING RESULTS

The monitoring results for dissolved pollutants sampled at EPL 4 are presented in **Table 3**, while the results for total pollutants sampled at EPL 4 are presented in **Table 4**.

It is noted that the monitoring results for the following pollutants were not recorded above the laboratory limit of recording for any monitored samples.

Antimony

Mercury

• Titanium

Lead

• Tin

In addition, the monitoring results for the following pollutants were only recorded above the limit of recording for a limited number of samples.

• Aluminium (13.2% of samples)

• Beryllium (2.6% of samples)

• Cadmium (5.3% of samples)

• Chromium (5.3% of samples)

• Cobalt (23.7% of samples)

• Copper (10.5% of samples)

- Phosphorous (20.0% of samples)
- Selenium (2.7% of samples)
- Vanadium (5.4% of samples)
- Zinc (27.0% of samples)
- Iron (28.9 % of samples)

The calculated median value (excluding those below the limit of recording) was below the nominated guideline trigger value (where available) for each of these pollutants except for ammonia (recorded above the limit of recording for 15 of 38 samples), chromium (recorded above the limit of recording for 2 of 38 samples) and silver (recorded above the limit of recording for 3 of 37 samples). It is noted that the three results above the guideline trigger for silver were all at the limit of recording and recorded between September and November 2013. There were no records above the limit of recording during 2014, 2015 or 2016. Of the two records above the limit of recording for chromium, one was at the limit of recording and the second (0.022mg/L) is considered to be an outlier and not reflective of conditions at EPL 4. The median value for ammonia is only slightly above the guideline trigger value at EPL 4.

Teralba Quarry

3 5	atistical	Statistical Analysis - Water Quality at EPA Point 4	ater Qual	lity at EPA		Table 3 issolved (fi	iltered) San	ıples - Sep	Table 3 Dissolved (filtered) Samples - September 2013 to August 2016	to Augus	t 2016
					20th		80th		Number		Percentage
Analyte	Unit	Guideline Trigger Value	LOR	Minimum Record	Percentile Record	Median Record	Percentile Record	Maximum Record	Records Below LOR	Total Records	of Records Below LOR
Aluminium	mg/L	0.055	<0.01	0.01	0.01	0.02	0.04	0.04	33	38	86.8%
Ammonia as N	mg/L	0.02	<0.01	0.01	0.02	0.03	0.05	90.0	11	26	42.3%
Antimony	mg/L	QI	<0.001	N.	N.	N.	NR	NR	38	38	100.0%
Arsenic	mg/L	0.013	<0.001	0.001	0.001	0.001	0.002	0.008	17	38	44.7%
Barium	mg/L	NA	<0.001	0.022	0.026	0.029	0.034	0.046	1	38	2.6%
Beryllium	mg/L	₽	<0.001	0.001	0.001	0.001	0.001	0.001	37	38	97.4%
Boron	mg/L	0.37	<0.05	0.13	0.15	0.17	0.18	0.25	1	38	2.6%
Cadmium	mg/L	0.0002	<0.0001	0.00010	0.00012	0.00015	0.00018	0.00020	36	38	94.7%
Calcium	mg/L	NA	٧	34	40.6	45	53.4	09	0	34	%0.0
Chromium	mg/L	0.001	<0.001	0.001	0.0052	0.0115	0.0178	0.022	36	38	94.7%
Cobalt	mg/L	QI	<0.001	0.001	0.001	0.001	0.001	0.001	29	38	76.3%
Copper	mg/L	0.0014	<0.001	0.0010	0.0010	0.0010	0.0010	0.0010	34	38	89.5%
Iron	mg/L	QI	<0.05	0.05	90.0	80'0	0.11	0.25	27	38	71.1%
Lead	mg/L	0.0034	<0.001	NR	NR	NR	NR	NR	38	38	100.0%
Lithium	mg/L	NA	<0.001	0.03	0.036	0.0375	0.043	34	2	38	5.3%
Magnesium	mg/L	NA	<u>\</u>	36	43	48	54	74	1	36	2.8%
Manganese	mg/L	1.9	<0.001	0.0164	0.0772	0.21	0.2456	0.376	1	38	2.6%
Mercury	mg/L	9000'0	<0.0001	A.	R.	Ä	N N	N.	38	38	100.0%
Molybdenum	mg/L	QI	<0.001	0.001	0.002	0.002	0.003	0.004	2	37	5.4%
Nickel	mg/L	0.011	<0.001	0.002	0.003	0.005	0.005	0.027	0	37	%0.0
Phosphorous as P	mg/L	0.025	<0.01	0.02	0.02	0.02	0.02	0.02	4	5	80.0%
Potassium	mg/L	NA	\ \	9	9	8	6	11	0	25	0.0%
Selenium	mg/L	0.011	<0.01	0.01	0.01	0.01	0.01	0.01	36	37	97.3%
Silicon as SiO ₂	mg/L	NA	<0.1	5.1	14.3	14.8	15.4	18.6	0	34	0.0%
Silver	mg/L	0.00005	<0.001	0.001	0.001	0.001	0.001	0.001	34	37	91.9%
Sulfur as S	mg/L	NA	\ \	53	65.8	70.5	80	115	0	30	%0.0
Tin	mg/L	ID	<0.001	<0.001	NR	NR	NR	NR	37	37	100.0%
Titanium	mg/L	NA	<0.01	<0.01	NR	N.	NR	NR	37	37	100.0%
Vanadium	mg/L	ID	<0.01	0.01	0.01	0.01	0.01	0.01	35	37	94.6%
Zinc	mg/L	0.008	<0.005	0.005	0.005	0.0065	0.008	0.014	27	37	73.0%
NR = No Result – all results below Limit of Recording	sults belc	w Limit of Recordi) gu		ID = In	ID = Insufficient Data				- VA	NA = Not Applicable

Table 4
Statistical Analysis - Water Quality at EPA Point 4 - Total (unfiltered) Samples - September 2013 to August 2016

		•			<i>,</i>						
		Guideline		Minimim	20th Percentile	Median	80th Percentile	Maximim	Total	Number	Percentage of Records
Analyte	Unit	Trigger Value	LOR	Record	Record	Record	Record	Record	Records	Below LOR	Below LOR
Aluminium	T/BW	0.055	<0.01	<0.01	0.01	0.022	90'0	0.108	38	1	2.6%
Ammonia as N	T/BW	0.02	<0.01	<0.01	0.01	0.02	0.04	90'0	31	10	32.3%
Antimony	T/6w	OI	<0.001	<0.001	0.002	0.002	0.002	0.002	38	37	97.4%
Arsenic	T/BW	0.013	<0.001	<0.001	0.001	0.001	0.002	0.002	38	14	36.8%
Barium	7/6w	NA	<0.001	<0.001	0.023	0.028	6.03	0.0358	38	1	2.6%
Beryllium	7/6w	QI	<0.001	<0.001	NR	NR	NR	NR	38	38	100.0%
Boron	T/BW	0.37	2 0'0>	<0.05	0.12	0.16	0.17	0.2	38	1	2.6%
Cadmium	T/BW	0.0002	L000'0>	<0.0001	0.0001	0.0001	0.0001	0.0001	38	37	97.4%
Calcinm	T/BW	ΑN	 >	√	98	40.2	44.5	51.2	22	0	%0:0
Chromium	T/BW	0.001	<0.001	<0.001	0.001	0.001	0.002	900'0	38	32	84.2%
Cobalt	T/BW	Ω	<0.001	<0.001	0.001	0.001	100.0	0.001	38	25	65.8%
Copper	T/BW	0.0014	<0.001	<0.001	0.001	0.001	600.0	0.015	38	32	84.2%
Iron	T/BW	a	5 0'0>	<0.05	0.028	0.11	0.27	0.424	98	1	2.8%
Lead	T/6w	0.0034	<0.001	<0.001	0.001	0.0056	0.0125	0.0194	38	36	94.7%
Lithium	T/BW	NA	<0.001	0.029	0.036	0.039	0.042	0.049	38	1	2.6%
Magnesium	7/6w	AN	L>	32	45	48	99	1.2	36	1	2.8%
Manganese	T/6w	1.9	<0.001	0.034	0.1184	0.223	0.2698	0.408	38	1	2.6%
Mercury	T/BW	9000'0	<0.0001	0	NR	NR	NR	NR	38	38	100.0%
Molybdenum	T/BW	a	<0.001	0.002	0.002	0.003	600.0	0.004	98	1	2.8%
Nickel	T/6w	0.011	<0.001	0.002	0.004	0.004	900'0	0.032	37	0	%0:0
Phosphorous as P	mg/L	0.025	<0.01	0.01	0.016	0.02	0.028	90.0	34	20	58.8%
Potassium	7/6w	NA	 >	9	7.4	8	10	12	23	0	%0:0
Selenium	T/BW	0.011	<0.01	0.02	0.02	0.02	0.02	0.02	37	36	97.3%
Silicon as SiO ₂	T/BW	NA	1.0>	12	14.08	14.8	16.08	8.07	32	0	%0:0
Silver	7/6w	0.00005	<0.001	0.001	0.001	0.001	0.001	0.001	37	36	97.3%
Sulfur as S	T/BW	NA	L>	99	65	69	84.4	101	19	0	%0:0
Tin	mg/L	OI	<0.001	0.002	0.002	0.002	0.002	0.002	37	36	97.3%
Titanium	T/6w	NA	L0.0>	0.01	0.014	0.02	0.02	0.02	37	34	91.9%
Vanadium	mg/L	ID	<0.01	0.01	0.014	0.02	0.02	0.02	37	34	91.9%
Zinc	mg/L	0.008	<0.005	900.0	900.0	0.006	0.009	0.261	36	25	69.4%
NR = No Result - all results below Limit of Recording	esults bel	ow Limit of Recording	g		ID = Insufficient Data)ata				NA =	= Not Applicable

Barium

The calculated median value (excluding those below the limit of recording) was either below the nominated guideline trigger value or there is no available trigger for comparison for each of the following pollutants.

Boron

Magnesium
 Calcium
 Lithium

Nickel
 Manganese
 Molybdenum

Arsenic

Sulfur
 Potassium
 Silicon

The results for total pollutants (**Table 4**) are generally consistent with those presented in **Table 2** for dissolved pollutants including records of chromium and silver which were above the guideline trigger value for the few samples that were above the limit of recording. These results are not statistically significant and are not representative of conditions at EPL 4.

It is noted that the median values for total aluminium and copper exceed the guideline trigger values at EPL 4. However, this is not a bio-available fraction and possibly absorbed onto particulate matter in the sample.

2.4 EPL 5 MONITORING RESULTS

Monitoring at EPL 5 was less frequent over the period of the Pollution Reduction Program as occurrences of water discharged at this location was not as frequent as that at the EPL 4 (Mine Adit Dam). In total, 19 samples were available for analysis, however a result for each pollutant is not available for each sample. The monitoring results for dissolved pollutants sampled at EPL 5 are presented in **Table 5**, while the results for total pollutants sampled at EPL 5 are presented in **Table 6**.

It is noted that the monitoring results for the following pollutants were not recorded above the laboratory limit of recording for any monitored samples.

Beryllium
 Lead
 Phosphorous
 Silver

• Chromium • Mercury • Selenium • Titanium

In addition, the monitoring results for the following pollutants were only recorded above the limit of recording for a limited number of samples.

Aluminium (31.6% of samples) • Cobalt (5.3% of samples)

Ammonia (27.3% of samples) • Tin (5.6% of samples)

Antimony (16.7% of samples) • Vanadium (11.1% of samples)

• Cadmium (5.3% of samples) • Zinc (30.8% of samples)

Teralba Quarry

The calculated median value (excluding those below the limit of recording) was below the nominated guideline trigger value or there is no available trigger for comparison for each of the following pollutants.

- Arsenic
 Copper
 Manganese
 Potassium
- Barium Iron Molybdenum Silicon
- Boron
 Lithium
 Nickel
 Sulfur
- Calcium Magnesium

The median value did not exceed the guideline trigger values at EPL 5 for all assessed dissolved pollutants, where a trigger value is available, except for ammonia for which the median record is at the guideline trigger level. The results for ammonia at EPL 5 are consistent with the results recorded at EPL 4 and indicate that elevated levels of ammonia are not a result of quarrying activities.

The results for total pollutants (**Table 6**) are generally consistent with those presented in **Table 5** for dissolved pollutants excluding single samples of lead and silver that exceeded the guideline triggers but are not representative of conditions at monitoring location EPL 5 given that all remaining samples were below the limit of recording.

It is noted that the median values for total chromium and zinc are equal to the guideline trigger values, while median results for total aluminium, copper and phosphorous exceed the guideline trigger values at EPL 5. However, this is not a bio-available fraction and possibly absorbed onto particulate matter in the sample. It is assumed that the high level of phosphorous suspended in samples is a result of fertiliser application within the Quarry. The dissolved fraction is below the limit of recording for all available samples. This exceedance is not considered significant given that the marine environment would contain relatively high levels of this element.

Report No. 559/54

Table 5 Statistical Analysis - Water Quality at EPA Point 5 - Dissolved (filtered) Samples - September 2013 to August 2016

מי ו	idiisiical A	Statistical Alialysis - Water Quality	וכו אחמוו		at El A i Ollit 3 - Dissolveu (ilitereu) samples	ייחווול חבאור	cal Janipics	- סבאובווואב	- September 2010 to August 2010	igust 2010	
		Guideline			20th		80th			Number	Percentage of
Analyte	Unit	Trigger Value	LOR	Minim um Record	Percentile Record	Median Record	Percentile Record	Maximum Record	Total Records	Records Below LOR	Records Below LOR
Aluminium	mg/L	0.055	<0.01	0.01	0.01	0.02	0.02	96.0	19	13	68.4%
Ammonia as N	mg/L	0.02	<0.01	0.01	0.014	0.02	0.026	0.03	11	8	72.7%
Antimony	mg/L	QI	<0.001	0.001	0.0014	0.002	0.002	0.002	18	15	83.3%
Arsenic	mg/L	0.013	<0.001	0.001	0.002	0.002	0.0046	2	19	9	31.6%
Barium	mg/L	NA	<0.001	0.017	0.0212	0.026	0.0284	0.035	19	0	%0:0
Beryllium	mg/L	QI	<0.001	NR	NR	NR	NR	NR	19	19	100.0%
Boron	mg/L	0.37	<0.05	90.0	20:0	60.0	0.106	0.18	19	-	5.3%
Cadmium	mg/L	0.0002	<0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	19	18	94.7%
Calcinm	mg/L	ΝΑ	Þ	21	26.2	31	33.8	42	12	0	%0:0
Chromium	mg/L	0.001	<0.001	NR.	N.	N.	A'N	N.	19	19	100.0%
Cobalt	mg/L	QI	<0.001	600'0	600'0	600.0	600'0	600.0	19	18	94.7%
Copper	mg/L	0.0014	<0.001	0.001	0.001	0.001	0.001	0.002	19	11	67.9%
Iron	mg/L	D	<0.05	90.0	0.06	60'0	0.12	1.06	19	11	92.3%
Lead	mg/L	0.0034	<0.001	N.R.	AN	N.	N. R.	N.	19	19	100.0%
Lithium	mg/L	NA	<0.001	0.011	0.0114	0.0135	0.0194	0.028	19	1	5.3%
Magnesium	mg/L	NA	 >	23	27.2	32	43.2	49	18	0	%0.0
Manganese	mg/L	1.9	<0.001	0.008	0.0252	0.0915	0.2018	1.67	19	1	5.3%
Mercury	mg/L	0.0006	<0.0001	NR	NR	NR	NR	NR	18	18	100.0%
Molybdenum	mg/L	ID	<0.001	0.001	0.002	0.002	0.0036	600.0	19	1	5.3%
Nickel	mg/L	0.011	<0.001	0.002	600.0	0.0035	0.004	900.0	18	0	%0:0
Phosphorous as P	mg/L	0.025	<0.01	NR	NR	NR	NR	NR	2	2	100.0%
Potassium	mg/L	ΝΑ	>	5	5.2	6.5	2	11	12	0	%0:0
Selenium	mg/L	0.011	<0.01	NR	NR	NR	NR	NR	18	18	100.0%
Silicon as SiO ₂	mg/L	NA	<0.1	6.5	7.8	12.1	15.2	20.4	17	1	2.9%
Silver	mg/L	0.00005	<0.001	NR	AN	NR	NR	NR	18	18	100.0%
Sulfur as S	mg/L	NA	! >	34	41.4	47	68.2	71	15	0	%0:0
Tin	mg/L	ID	<0.001	0.02	0.02	0.02	0.02	0.02	18	17	94.4%
Titanium	mg/L	NA	<0.01	NR	NR	NR.	NR	NR	18	18	100.0%
Vanadium	mg/L	ID	<0.01	0.007	0.0082	0.01	0.0118	0.013	18	16	88.9%
Zinc	mg/L	0.008	<0.005	0.005	0.0056	0.006	0.008	0.011	13	6	69.2%
NR = No Result – all res	sults below Lin	- all results below Limit of Recording			ID = Insufficient Data	nt Data				Ž	NA = Not Applicable

Table 6 Statistical Analysis - Water Quality at EPA Point 5 - Total (unfiltered) Samples - September 2013 to August 2016

•	ويعربا ويراقط المسايرة والمسايرة			in 35 (iii	יומוכן מחשוול מו בן עו פוונים - ופומו (חווווניוכם) פמוויףוכים) 		ochiciinosi polos vagast polos		9431 2010	
		Guideline		Minim	20th Percentile	Median	80th Percentile	Maximim	Total	Number	Percentage of Records
Analyte	Unit	Value	LOR	Record	Record	Record	Record	Record	Records	Below LOR	Below LOR
Aluminium	mg/L	0.055	<0.01	0.02	0.076	0.36	892'0	6.46	19	2	11%
Ammonia as N	mg/L	0.02	<0.01	0.01	0.016	0.02	0.03	0.08	18	6	20%
Antimony	mg/L	Q	<0.001	0.001	0.001	0.001	0.0012	0.002	18	13	72%
Arsenic	mg/L	0.013	<0.001	0.001	0.002	0.003	0.004	2	19	3	16%
Barium	mg/L	AN	<0.001	0.025	0.0266	0.03	0.033	990.0	19	0	%0
Beryllium	mg/L	QI	<0.001	NR	NR	NR	NR	NR	18	18	100%
Boron	mg/L	0.37	<0.05	90:0	0.07	0.1	0.116	0.15	19	1	2%
Cadmium	mg/L	0.0002	<0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	19	18	82%
Calcinm	mg/L	AN	\	22	24	31.5	35.4	44	14	0	%0
Chromium	mg/L	0.001	<0.001	0.001	0.001	0.001	0.0028	200.0	18	10	26%
Cobalt	mg/L	QI	<0.001	0.001	0.0016	0.002	0.0052	0.01	19	15	%62
Copper	mg/L	0.0014	<0.001	0.001	0.001	0.002	0.002	0.005	19	3	16%
Iron	mg/L	₽	<0.05	0.14	0.24	0.48	0.82	7.28	19	0	%0
Lead	mg/L	0.0034	<0.001	0.005	0.005	0.005	0.005	0.005	19	18	95%
Lithium	mg/L	AN	<0.001	0.002	0.012	0.014	0.02	0.031	19	0	%0
Magnesium	mg/L	AN	<1	24	28	34	45.6	51	18	0	%0
Manganese	mg/L	1.9	<0.001	0.029	0.0588	0.097	0.2184	1.8	19	0	%0
Mercury	mg/L	9000'0	<0.0001	NR	NR	NR	NR	NR	18	18	100%
Molybdenum	mg/L	Ω	<0.001	0.001	0.002	0.003	0.004	600.0	19	1	2%
Nickel	mg/L	0.011	<0.001	0.003	0.0034	0.004	9500'0	0.008	18	0	%0
Phosphorous as P	mg/L	0.025	<0.01	0.02	0.02	0.03	90.0	20.0	18	2	39%
Potassium	mg/L	AN	\	9	9	6.5	8	11	14	0	%0
Selenium	mg/L	0.011	<0.01	NR	NR	NR	NR	NR	18	18	100%
Silicon as SiO ₂	mg/L	AN	<0.1	9.8	10.2	12.8	14.16	22.8	17	0	%0
Silver	mg/L	0.00005	<0.001	0.001	0.001	0.001	0.001	0.001	18	17	94%
Sulfur as S	mg/L	AN	\ \	32	42.6	52	69	92	12	0	%0
Tin	mg/L	QI	<0.001	0.01	0.012	0.015	0.018	0.02	18	16	%68
Titanium	mg/L	AN	<0.01	0.01	0.01	0.01	0.01	0.01	18	17	94%
Vanadium	mg/L	QI	<0.01	900.0	0.0066	0.0085	0.0172	0.028	18	14	78%
Zinc	mg/L	0.008	<0.005	900'0	0.006	0.008	9600'0	0.012	13	8	62%
NR = No Result - all results below Limit of Recording	sults below Lin	nit of Recording			ID = Insufficient Data	nt Data				Ž	NA = Not Applicable

CONCLUSION

Water testing at Metromix's Teralba Quarry has demonstrated that the Quarry operations have not adversely impacted the water quality in the surrounding and downstream areas of the Quarry.

With respect to dissolved pollutants, the results collected from 38 months of sampling and analysis indicate virtually no exceedances of guideline trigger values. The dissolved pollutant fraction is considered the most bioavailable and significantly influences the toxicity effects on aquatic biota arising from concentrations in waters (NWQMS, 2000). There were generally no exceedances of the guideline trigger values for dissolved pollutants at monitoring location EPL 5, from where water discharged from the Quarry flows to Lake Macquarie. The only exceedance noted was the result for dissolved chromium and silver at EPL 4 on one occasion. However, these records are considered outliers and not representative given that the majority of samples were below the limit of recording for these pollutants.

The results of sampling and analyses for the total or suspended fraction of pollutants indicates some exceedances of guideline trigger values. However, it should be noted that these results are derived from analyses of unfiltered samples and may be due to the presence of colloidal material. In addition, TSS concentrations for all samples are well below the guideline values suggesting that, despite some exceedance of trigger values, it is doubtful that discharge from EPA 4 and EPA 5 significantly contribute to the total load of metals in the receiving system.

4. ONGOING MONITORING

The analysis of 38 months of sampling data at monitoring locations EPL 4 and EPL 5 indicate that the majority of pollutants included in the monitoring undertaken for the Pollution Reduction Program are either not present in significant concentrations or were below the limit of recording. The assessment has concluded that the water flowing from the underground mine network (monitored at EPL 4) and from the southern side of Teralba Quarry (EPL 5) has not adversely impacted the water quality at these locations or within Lake Macquarie.

It is therefore recommended that monitoring of all pollutants included in the current program ceases from November 2016. The surface water monitoring program for Teralba Quarry will be modified to be consistent with the requirements of *Condition M2.3* of EPL 536 which requires monthly monitoring at EPL 4 and monitoring daily during discharge at EPL 5. The following pollutants will be monitored, consistent with *Condition M2.3*.

- pH
- Electrical Conductivity
- Oil and grease
- Total suspended solids

Upon confirmation that the EPA is satisfied with the assessment presented above and the ongoing monitoring program, an application to vary EPL 536 would be prepared and submitted to the EPA to remove or suitably vary *Condition U1.1*, *Condition U1.2* and *Condition U1.3*.

Appendix 1

Monitoring Data EPL 4 and EPL 5

(Total No. of pages including blank pages = 16)

Report No. 559/54

Report No. 559/54

		December	7.63	1870	9	<5		
		тэст	7.13	1820	<2>	<2		
		October	9.7	1780	<2	<5		
		September	7.4	1640	8	<5		
		€ - jeuguA	7.59	1840	<2	<5		
		S - JeuguA	7.54	1890	9	NR		
	14	f - JeuguA	7.56	2000	35	NR		
ters	2014	γίυι	7.41	1910	<5	NR		
Table A1 Water Quality - EPL Point No. 4 (Adit) - Physical Parameters		əunç	7.79	1860	9	NR		
– Physica		Мау	7.54	1850	10	NR		
lo. 4 (Adit)		li1qA	7.34	2010	5 >	NR		
PL Point N		Магсћ	7.32	2100	9	NR		
uality - EF		February	7.48	2170	<5	NR.		
V1 Water C		January	7.7	1940	9	NR		
Table A		December	7.1	1890	26	NR		
	13	Лочетрег	7.3	2210	<5	NR		
	2013	October	7.8	2410	<5	NR		
		September	7.7	2180	\$>	NR		
		JinU	ph Unit	ms/sm	mg/L	mg/L		
		Guideline Trigger Value	Hd	Conductivity	TSS	Oil & Grease		
		Sample	6	125 - 2200 ^b	<50	5	NR = No Result ND = No Discharge	

	July August	8.08 8.2	1700 2060	6 <5	<5 <5	
	aunc	8.13 8	1880 1	2	<2>	
•	VeM	8.04	1900	<2>	<2>	
2016	linqA	8.09	1760	<5>	<5>	
	Магсћ	8.16	1880	<2	<2	
	February	6.84	1790	35	<2>	
	Asunery	6.92	1710	12	<2>	
	December	7.03	2030	8	<2	
	November	7.03	2140	12	<2>	
	19dot2O	7.37	2480	<2	<2>	
	September	7.37	2400	<2	<2>	
	ÌsuguA	7	0 2200	<2>	<2>	
2015	VluC	5 7.28	0 1780	9	<2>	
	une	2 7.15	30 1770	<2	5 <5	
	li1qA YsM	.39 7.1	00 1460	<5 11	<5 <5	
	Магсћ	7.35 7.3	1850 1900	19 <	< 2 <	
	February	7.34 7.	1820 18	<5 1	> 2>	
	Vienne	7.34 7	1840 1	11	<5>	
L	tinU	ph Unit	nS/cm	mg/L	mg/L	
	Guideline Trigger Value	Ha.	Conductivity	TSS	Oil & Grease	
	Sample	6.5 to 8.5 units	125 - 2200 ^b	<20		NR = No Result

		December	ND	ND	ND	ND			
		Иочетрег	ND	ND	QN	QN			
		October	7.7	991	9	<5			
		September	7.25	1090	14	<5			
		€ - 12uguA	9.7	1280	<5	<5			
		S - JeuguA	7.8	1090	<5>	5>			
	2014	l - teuguA	8.0	1530	<5	<2			
neters	20	Λluly	90'8	1910	<5	NR			
able A2 - Water Quality - EPA Point No. 5 (Dam B) - Physical Parameters		əunç	8.01	1120	<5	NR			
B) – Phys		VвМ	7.5	1150	10	NR			
o. 5 (Dam		lingA	7.9	834	19	NR			
A Point N		March	7.5	1490	<5	NR			
uality - EF		February	QN	Q	Q	Q			
- Water Q		January	ND	ND	QV	QN			
Table A		December	7.7	1660	9	NR			
	2013	Иочетрег	8.0	1600	25	NR			
	50	October	ON	ND	QN	QN			
		September	QN	Q	Q	Q			
		jinU	ph Unit	mS/cm	mg/L	mg/L			
		Guideline Trigger Value	Hd	Conductivity	TSS	Oil & Grease			
		Sample	6.5 to 8.5 units	125 - 2200 ^b	<50	5	NR = No Result	ND = No Discharge	

		tsuguA	QN	QN	ND	ND		
		Vluly	QN	QN	ND	QN		
		nne	QN	QΝ	QN	QN		
	2016	Мау	QΝ	ΩN	QΝ	QΝ		
	20	li1qA	ND	QN	ND	ND		
		Магсћ	QN	QN	ND	ND		
		February	QN	QN	ND	ND		
d)		January	7.48	940	<5	<2		
ers (Cont		December	Q	QN	Q	QV		
Paramet		Почетрег	Q	QN	Q	Q		
Physical		October	QN	ON	QN	ND		
)am B) –		September	QN	QN	QN	QN		
ıt No. 5 (I		isuguA	QN	ON	QN	QN		
EPA Poir	2015	Λluly	7.33	1050	<5	<5>		
A2 - Water Quality - EPA Point No. 5 (Dam B) – Physical Parameters (Cont'd)	7(əunç	7.89	1390	<5	<2		
2 - Water		Мау	7.44	929	9	<5		
Table A		linqA	7.74	874	<5	<5>		
		Магсћ	6.7	1130	<5	<5>		
		February	7.73	839	<5	<2		
		Лаппагу	QN	QN	QN	QN		
		tinU	ph Unit	mS/cm	mg/L	mg/L		
		Guideline Trigger Value	Hd	Conductivity	TSS	Oil & Grease		
		Sample	o 8.5 units	- 2200 ^b			No Result	No Discharge

Table A3 - Water Quality - EPA Point No. 4 (Adit) - Dissolved (Filtered) Samples

					,								8							Page 1 of 2
				02	2013								22	2014						
Sample	Guideline Trigger Value	JinU	September	October	November	Decemper	January	February	Магсһ	linqA	Иау	əunc	γluι	l - teuguA	S - †zuguA	€ - ÌzuguA	September	October	November	December
Aluminium	0.055	mg/L	W.	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02
Ammonia as N	0.02 ^b	mg/L	0.03	NR	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	N.	<0.01	0.03	0.05	<0.01	<0.01	<0.01	<0.01	N.	0.02
Antimony	□	mg/L	NR.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.013	mg/L	NR.	0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	0.001	0.001	0.002	<0.001
Barium	NA	mg/L	NR.	0.024	0:030	0.029	0.028	0.029	0.029	0.026	0.028	0.026	0.031	0.025	0.025	0.028	0.027	0.029	0.027	0.029
Beryllium	₽	mg/L	NR.	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.37	mg/L	Ä	0.22	0.18	0.17	0.17	0.18	0.23	0.18	0.15	0.13	0.17	0.14	0.15	0.14	0.13	0.14	0.16	0.18
Cadmium	0.0002	mg/L	W.	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcinm	NA	mg/L	55	09	53	43	46	46	45	46	41	41	45	40	41	38	34	W.	41	N.
Chromium	0.001	mg/L	Ä	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	□	mg/L	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001
Copper	0.0014	mg/L	NR.	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	Q	mg/L	NR	0.05	<0.05	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	80.0	<0.05	<0.05	<0.05	80.0	<0.05	0.08	<0.05
Lead	0.0034	mg/L	NR.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	NA	mg/L	NR	0.037	0.039	0.045	0.037	0.044	0.036	0.036	0.038	<0.012	0.039	0.031	0.033	0.036	0.036	0.036	0.036	0.040
Magnesium	NA	mg/L	NR.	74	62	46	54	51	55	54	43	45	48	49	48	42	36	44	40	NR
Manganese	1.9	mg/L	NR	0.038	0.086	0.316	0.217	0.237	0.203	0.159	0.244	0.090	0.274	0.21	0.0164	0.207	0.229	0.159	0.223	0.215
Mercury	0.0006	mg/L	NR	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	Q	mg/L	NR	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	<0.001	0.002	0.002	NR	0.003	0.003
Nickel	0.011	mg/L	0.006	0.004	0.005	0.004	0.005	0.005	0.005	0.005	0.005	0.004	0.007	0.005	0.004	0.004	0.005	NR	0.004	0.005
Phosphorous as P	0.025	mg/L	<0.01	QN	<0.01	<0.01	0.02	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Potassium	NA	mg/L	6	6	8	9	6	8	6	11	7	7	7	8	8	9	9	NR	NR	NR
Selenium	0.011	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	<0.01	<0.01
Silicon as SiO2	NA	mg/L	14.3	14.8	14.7	14.2	14.8	14.8	15.4	15	14.9	15.1	15.7	14.3	15.3	14.3	14	NR	14.3	NR
Silver	0.00005	mg/L	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NR	<0.001	<0.001
Sulfur as S	NA	mg/L	85	113	79	68	85	80	75	72	62	65	68	70	69	54	53	NR	67	NR
Tin	Q	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NR	<0.001	<0.001
Titanium	NA	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	<0.01	<0.01
Vanadium	Q	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	<0.01	<0.01
Zinc	0.008	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	900.0	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NR	<0.005	<0.005
Key	STAN PRO CH	40000	1000																	
ID = Insufficient Data	DIG 5.4.1 ANZ	oo except wil	ele illuicateu																	
NA = Not Applicable																				
ND = No Discharge																				
NR = No Result	20000																			

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b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000)

c Sourced from http://www.environment.nsw.gov.au/feo/LakeMacquarie/report-03.htm#support1 (doj 20161404)

								2015	15									2016	16			
Sample	Guideline Trigger Value	JinU	ղջոսու <u>γ</u>	February	Магсһ	linqA	Way	əunç	July	ÌsuguÁ	September	October	Мочетрег	December	Նեոսեւչ	February	Магсһ	linqA	Way	əunç	Vluly	tsuguA
Aluminium	0.055	೬	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	0.04	<0.01
Ammonia as N	0.02 ^b	mg/L	N.	0.03	0.02	90.0	90.0	0.01	0.01	0.04	N.	0.03	90.0	0.04	N.	ĸ.	N.	N.	A.	N.	N.	NR
Antimony	₽	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.013	mg/L	<0.001	0.001	<0.001	0.008	<0.001	0.002	0.001	<0.001	0.001	<0.001	0.003	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.001	0.001	0.002
Barium	Ā	mg/L	0.032	0.033	0:030	0.029	0.022	0.031	0.030	0.029	0.026	0.027	0.034	0.036	0.026	0.034	0.041	0.045	0.046	0.038	0.039	0.039
Beryllium	₽	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.37	mg/L	0.15	0.16	0.17	0.18	0.14	0.16	0.16	0.21	0.25	0.24	0.18	0.17	0.2	0.15	0.17	0.17	0.14	0.17	0.15	0.18
Cadmium	0.0002	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	e0.0001 <	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002
Calcinm	A	mg/L	χ Ω	43	40	40	36	45	40	54	54	25	49	69	44	42	N.	25	20	47	44	48
Chromium	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.022	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	□	mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.0014	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	₽	mg/L	<0.05	0.07	90.0	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.11	0.25	<0.05	<0.05	90.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	0.0034	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	NA	mg/L	0,034	0.038	0.038	0.042	0.033	0.038	0.042	0.043	0.048	0.048	0.048	0.047	0.036	0.037	0.037	0.031	0.03	980.0	0.031	0.038
Magnesium	NA	mg/L	NR	46	42	45	38	46	39	22	65	65	51	54	43	20	46	52	49	46	45	54
Manganese	1.9	mg/L	0.25	0.277	0.219	0.218	0.189	0.244	0.260	0.246	0.184	0.129	0.376	0.212	0.2	0.361	0.023	0.030	0.043	0.027	0.032	0.075
Mercury	0.0006	mg/L	_		$\overline{}$	٧.	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	□	mg/L	0.001	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.004	0.001	0.003	0.003	0.002	0.003	0.002	0.002
Nickel	0.011	mg/L	0.005	0.005	0.004	0.004	0.003	0.003	0.005	0.005	0.005	0.027	0.005	900.0	0.003	0.007	0.003	0.003	0.002	0.002	0.002	0.003
Phosphorous as P	0.025	mg/L	Ν Ω	N R	N N	N N	N N	ĸ.	N N	χ Ω	χ Ω	N N	R.	A.	N N	R.	χ Ω	χ Ω	N N	N N	N N	N N
Potassium	Ν	mg/L	Z Z	N.	N.	NR.	9	Ä.	N N	N.	N.	N.	8	8	N.	6	7	6	9	9	9	8
Selenium	0.011	mg/L	<0.01	<0,01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silicon as SiO2	NA	mg/L	NR	13.9	14.3	15.4	NR	14.4	5.1	14.6	13.8	14.5	15.4	15.3	16.4	14.4	16.5	18.2	18.6	14.9	16.3	13.4
Silver	0.00005	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur as S	NA	mg/L	NR	20	NR	NR	23	71	NR	NR	115	NR	84	71	78	72	77	70	92	89	99	80
Tin	₽	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	NA	mg/L	<0.01	<001	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	□	mg/L	<0.01	<0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	0.008	mg/L	<0.005	<0.005	900.0	<0.005	0.014	<0.005	<0.005	0.005	0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.007	0.008	0.008	<0.005	<0.005	<0.005
Key																						
*All values sourced from Table 3.4.1 ANZECC except where indicated ID = Incuttions Data	m Table 3.4.1	ANZECC (except where	indicated																		
NA = Not Applicable																						
NR = No Result																						
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a Environment Protection License 536

b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000)

c Sourced from http://www.environment.nsw.gov.au/ieo/LakeMacquarie/report-03.htm#support1 (dot 20161404)

Table A4 - Water Quality - EPA Point No. 4 (ADIT) - Total (Filtered) Samples

				2013	13								2014	14					•	
Sample	Guideline Trigger Value*	jinU	September	October	И оvеmber	Decemper	Asunsty	February	Магсһ	linqA	May	əunſ	yluU	∱ - †suguA	S - †suguA	€ - JeuguA	September	October	И оvember	Decemper
Aluminium	0.055	mg/L	NR	0.04	0.05	0.11	0.14	0.04	0.08	0.07	0.07	0.07	0.01	0.27	0.10	0.03	0.15	0.02	0.04	0.14
Ammonia as N	0.02 ^b	mg/L	0.03	NR	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	NR	<0.01	0.03	0.05	<0.01	<0.01	NR	NR	0.02	NR
Antimony	ID	mg/L	NR	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.013	mg/L	NR	0.002	0.001	0.002	0.003	0.002	0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.001	0.002	<0.001	0.002	0.001
Barium	NA	mg/L	NR	0.025	0.029	0:030	0.031	0.029	0.027	0.028	0.032	0.028	0.034	0.029	0.025	0.028	0.027	0:030	0.028	0.030
Beryllium	QI	mg/L	NR	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.37	mg/L	NR	0.21	0.23	0.17	0.18	0.22	0.19	0.2	0.17	0.14	0.17	0.16	0.16	0.15	0.13	0.12	0.17	0.17
Cadmium	0.0002	mg/L	A.R	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium	NA	mg/L	52	09	99	43	47	48	45	46	44	40	46	44	44	N.	36	Ä	41	N.
Chromium	0.001	mg/L	NR.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	900.0	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.002
Cobalt	QI	mg/L	NR	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.001	0.001	0.001	0.001
Copper	0.0014	mg/L	N.	0.003	<0.001	<0.001	<0.001	0.001	0.001	<0.001	0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	QI	mg/L	NR	90'0	0.07	0.45	0.33	0.32	0.29		0.42	0.26	0.16	0.73	0.27	0.14	0.5	0.11	0.29	0.29
Lead	0.0034	mg/L	Ä	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	NA	mg/L	NR	0.044	0.042	0.048	0.038	0.042	0.036	0.04	0.039	0.035	960.0	0.034	0.034	0.039	0.038	0.038	0.037	0.036
Magnesium	NA	mg/L	NR.	71	99	46	46	22	26	52	45	46	47	20	51	45	39	45	46	N.
Manganese	1.9	mg/L	NR	0.054	0.12	0.303	0.223	0.234	0.194	0.161	0.269	0.252	0.273	0.285	0.177	0.214	0.231	0.162	0.229	0.221
Mercury	0.0006	mg/L	NR	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	ID	mg/L	NR	0.003	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.002	0.003	0.002	0.002	0.003	0.003	NR	0.003	0.003
Nickel	0.011	mg/L	0.006	0.005	0.004	0.004	0.005	0.004	0.005	0.005	0.005	0.004	0.002	900.0	0.004	0.005	0.004	NR	0.004	0.005
Phosphorous as P	0.025	mg/L	<0.01	NR	<0.01	<0.01	0.02	NR	<0.01	0.02	<0.01	<0.01	<0.01	90.0	0.02	<0.01	<0.01	NR	0.05	<0.01
Potassium	NA	mg/L	6	11	10	7	8	6	10	6	8	7	8	8	8		9	NR	8	N.
Selenium	0.011	mg/L	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	<0.01	<0.01
Silicon as SiO2	NA	mg/L	14.1	14.4	15.3	14.5	16.7	14.5	15	16	15.7	15	15.5	16.4	12.0	14.6	14.7	NR.	14.8	N.
Silver	0.00005	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	N.	<0.001	<0.001
Sulfur as S	NA	mg/L	82	101	94	92	75	80	84	85	99	68	99	69	89	61	26	N N	68	N N
Tin	□	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NR	<0.001	<0.001
Titanium	NA	mg/L	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR	<0.01	<0.01
Vanadium	О	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR.	<0.01	<0.01
Zinc	0.008	mg/L	<0.005	<0.005	<0.005	<0.005	900.0	<0.005	<0.005	900.0	600.0	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	NR	<0.005	<0.005
Key																				
ND = No Discharge																				
NA = Not Applicable NR = No Result																				
a Based on ANZECC Guidelines for Fresh and Marine Water Quality - Recreational Water Quality (ANZECC 2000) except where indicated	telines for Fresh	and Marine ∿	Vater Quality	r - Recreation	કો Water Qual	ity (ANZECC	2000) except	where indical	ted											
b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000) Reserving the NAZECC CONDITION of Preserving the ANZECC 2000)	delines slightly a	isturbed lowla	and river ecos	systems in sou	uth-east Austr	alia (ANZECO	2 2000)													
d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)	lelines for Fresh	and Marine V	Vater Quality	-Irrigation Wa	ater Quality (A	NZECC 2000	î													
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Table A4 - Water Quality - EPA Point No. 4 (ADIT) - Total (Filtered) Samples (Cont'd)

Attunione M. 10.000 mode of the control of the cont									2015	15									2016	16			
Main	Sample	Guideline Trigger Value	jinU	Vaeunery	February	Магсһ	linqA	Way	əunç	Vluly	ÌsuguA	September	October	November	December	January	February	March	linqA	May	əunç	Vluly	tsuguA
No. Color	Aluminium	0.055	mg/L	0.14	0.04	0.08	0.07	0.07	0.07	0.01	0.27	0.10	0.03	0.15	0.02	0.42	1.28	90.0	0.05	0.01	4.88	0.05	90.0
Main	Ammonia as N	0.02 ^b	mg/L	<0.01	<0.01	0.03	<0.01	NR.	<0.01	0.03	0.05	<0.01	<0.01	N.	N.	<0.01	0.04	N.	0.07	90.0	0.04	0.12	0.02
10 10 10 10 10 10 10 10	Antimony	□	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
Mail	Arsenic	0.013	mg/L	0.003	0.002	0.001	-	<0.001	0.002	<0.001	<0.001	<0.001	0.001	0.002	<0.001	0.002	0.004	0.001	<0.001	<0.001	0.002	<0.001	0.002
1	Barium	ΑĀ	mg/L	0.031	0.029	0.027	0.028	0.032	0.028	0.034	0.029	0.025	0.028	0.027	0.030	0.031	0.054	0.041	0.048	0.051	0.157	0.041	0.044
March Marc	Beryllium	□	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Main	Boron	0.37	mg/L	0.18	0.22	0.19	0.2	0.17	0.14	0.17	0.16	0.16	0.15	0.13	0.12	0.18	0.22	0.17	0.22	0.16	0.19	0.15	0.18
Main	Cadmium	0.0002	mg/L	-	-	-	_	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Main	Calcium	NA	mg/L	47	48	45	46	44	40	46	44	44	N.	36	N.	NR.	N.	N.	NR	N.	N.	NR.	NR.
1	Chromium	0.001	mg/L	<0.001	<0.001	<0.001	900.0	<0.001	<0.001	<0.001	<0.001	0.001			<0.001	<0.001	0.002	<0.001	<0.001	<0.001	900.0	0.001	<0.001
10014 mg/L cond mg/L cond	Cobalt	QI	mg/L	<0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.002	<0.001		0.001	0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mail	Copper	0.0014	mg/L	<0.001	0.001	0.001	<0.001	0.015	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	0.003	<0.001	<0.001	<0.001	0.047	<0.001	<0.001
Mail Control Mail	Iron		mg/L	0.33	0.32	0.29		0.42	0.26	0.16	0.73	0.27	0.14	0.5	0.11	0.49	2.84	0.11	0.11	0.13	0.11	0.23	0.14
Mail mark Mail	Lead	0.0034	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.024	<0.001	<0.001
Mail	Lithium	NA	mg/L	0.038	0.042	0.036	0.04	0.039	0.035	0.036	0.034	0.034	0.039	0.038	0.038	0.036	0.04	0.039	0.032	0.031	0.042	0.029	0.041
989 13 mg/L 0.223 0.234 0.143 0.164 0.163 0.285 0.177 0.214 0.231 0.128 0.046 0.023 0.046 0.050 0.050 0.000	Magnesium	NA	mg/L	46	55	99	52	45	46	47	20	51	45	39	45	50	44	48	53	52	47	46	55
March Marc	Manganese	1.9	mg/L	0.223	0.234	0.194	0.161		0.252	0.273	0.285	0.177	0.214	0.231	0.162	0.228	0.408	0.035	0.046	0.052	0.034	0.068	0.092
umm ID mg/L 0.002 0.002 0.003 0.004 0.003 0.004 0.003 0.004 0.003 0.004 0.003 0.004 0.003 0.004 0.003 0.004	Mercury	0.0006	mg/L	-		-	<0.0001	<0.0001	<0.0001		-	-	-		-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
0.011 mg/L 0.005 NNA mg/L 0.005 NNA 0.004 0.004 NNA 0.004 0.005 0.004 NNA NNA 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.004	Molybdenum	□	mg/L	0.002	0.002	0.002	0.003		0.002	0.003	0.002	0.002		0.003	N N	0.003	0.003	0.003	0.003	0.002	0.003		0.003
NA MGL GLOZ NA GLOZ CLOZ GLOZ CLOZ	Nickel	0.011	mg/L	0.005	0.004	0.005	0.005		0.004	0.002	900.0	0.004	0.005	0.004	ĸ.	0.004	0.01	0.004	0.002	0.003	0.032	0.002	0.004
NA MAGA (201 (201 (201 (201 (201 (201 (201 (201	Phosphorous as P	0.025°	mg/L	0.02	NR	<0.01	0.02	<0.01	<0.01	<0.01	90.0	0.02	<0.01	<0.01	N N	<0.01	0.04	0.02	0.02	0.02	<0.01	<0.01	R
Sig 2 NA mg/L 6.001 6.00	Potassium	NA	mg/L	8	6	10	6	8	7	8	8	8	N.	9	N.	8	N.	N.	NR	NR	NR	NR	N N
SiQ2 NA mg/L 16.7 14.5 15.5 16.4 12.0 14.6 14.7 NR 16.4 19.2 16.4 19.2 16.4 19.2 16.4 19.2 16.4 18.5 16.4 18.5 16.4 18.5 16.4 18.5 16.4 18.5 16.4 18.5 16.4 18.5 18.6 18.	Selenium	0.011	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR.	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
S NA MgA C C C C C C C C C C C C C C C C C C C	Silicon as SiO2	NA	mg/L	16.7	14.5	15	16	15.7	15	15.5	16.4	12.0	14.6	14.7	N.	16.4	19.2	16	18.5	18.6	70.8	13.9	13.7
S NA mg/L 75 80 84 85 66 68 65 69 68 61 56 NR	Silver	0.00005		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
ID mg/L <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.002 <0.002	Sulfur as S	NA	mg/L	75	80	84	85	99	89	65	69	89	61	99	N.	NR	N.	NR	NR	NR	NR	NR	NR
itium NA mg/L c _{0.001} c _{0.002}	Tin	П	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
addum ID mg/L <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.	Titanium	NA	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NR.	<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
0.006 mg/L 0.006 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005 <0.005	Vanadium	O	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	N.	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
KEY ND = No Discharge NA = Not Applicable NP = M Pacentt	Zinc	0.008	mg/L	900.0	<0.005	<0.005	900.0		<0.005	<0.005	<0.005	<0.005		<0.005	N.	900'0	0.014	0.007	900'0	0.007	0.261	900.0	<0.005
NO - NO Joseph Security of the No Security of No - NO Security of NO Security of NO - NO Security of NO Security of NO - NO Security of	Key																						
NA - INVARIAN	NA - Not Applicable																						
	NP = No Result																						

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a Based on ANZECC Guidelines for Fresh and Marine Water Ouality - Recreational Water Quality (ANZECC 2000) except where indicated b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestock Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)

Table A5 - Water Quality - EPA Point No. 5 (Dam B) - Dissolved (Filtered) Samples

				20	2013							2014	14					
Sample	Guideline Trigger Value*	jinU	September	October	November	December	January	Гергиагу	Магсһ	linqA	Way	əunç	VluC	ţsuguĄ	September	October	November	Decemper
Aluminium	0.055	mg/L	QN	ND	0.02	<0.01	ND	ND	<0.01	0.01	<0.01	<0.01	96.0	<0.01	0.01	<0.01	<0.01	<0.01
Ammonia as N	0.02b	mg/L	QN	QN	<0.01	<0.01	ND	QN	<0.001	<0.01	0.02	<0.01	<0.01	0.03	<0.01	<0.01	0.01	N.
Antimony	□	mg/L	QN	QN	0.002	0.002	Q	QN	N R	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.013	mg/L	QN	QN	0.005	0.005	QN	QN	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0.002	0.001	0.002	0.003
Barium	NA	mg/L	QN	QN	0.023	0.032	QN	QN	0.031	0.020	0.028	0.028	0.017	0.026	0.025	0.025	0.019	0.022
Beryllium	□	mg/L	QN	QN	<0.001	<0.001	QN	QN	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	0.37	mg/L	Ð	Q	0.10	0.12	9	Ð	0.18	0.07	0.10	90.0	<0.05	60.0	0.07	0.11	0.07	0.10
Cadmium	0.0002	mg/L	QV	QN	<0.0001	<0.0001	Q	Q	0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Calcium	ΑĀ	mg/L	Q	Q	27	34	Ð	Q	N.	21	26	30	42	34	29	32	R.	N.
Chromium	0.001	mg/L	Q	Q	<0.001	<0.001	Q	Q	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	□	mg/L	QN	QN	<0.001	<0.001	QN	QN	600.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.0014	mg/L	QN	QN	<0.001	0.001	Q	QN	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	□	mg/L	Q	QN	<0.05	90.0	Q	QN	90.0	<0.05	<0.05	<0.05	1.06	<0.05	<0.05	0.09	<0.05	60.0
Lead	0.0034	mg/L	9	Q	<0.001	<0.001	Ð	Q	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	¥	mg/L	2	QN	0.026	0.028	Q	Q	0.026	0.012	0.013	0.011	<0.001	0.016	0.013	0.015	0.014	0.015
Magnesium	¥	mg/L	Ð	Q	41	46	9	Ð	48	23	29	32	49	42	32	33	23	N.
Manganese	1.9	mg/L	QN	ND	<0.001	0.151	ND	ND	1.67	0.024	0.231	0.090	0.008	0.019	0.111	0.326	0.027	0.171
Mercury	0.0006	mg/L	ND	ND	<0.001	<0.001	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum	QI	mg/L	QN	QN	600:0	900.0	ND	QN	0.002	0.005	0.002	0.002	<0.001	0.002	0.003	0.002	0.004	0.001
Nickel	0.011	mg/L	QN	ND	900.0	0.004	ND	ND	NR	0.003	0.004	0.002	0.005	0.004	0.004	0.003	0.004	0.003
Phosphorous as P	0.025c	mg/L	QN	QN	<0.01	<0.01	QN	QN	NR	NR	NR	NR	NR	NR.	NR	NR.	NR	N.
Potassium	NA	mg/L	QN	QN	10	7	QN	QN	NR	7	9	9	11	7	5	2	NR	N.
Selenium	0.011	mg/L	QN	ND	<0.01	<0.01	ND	ND	NR	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silicon as SiO2	NA	mg/L	ND	ND	6.5	8.2	ND	ND	NR	7.4	15.2	15.2	13.0	9.8	12.5	14.3	7.1	NR
Silver	0.00005	mg/L	Q	QN	<0.001	<0.001	Q	QN	NR.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sulfur as S	AN	mg/L	ND	ND	71	89	ND	ND	NR	39	47	46	71	58	44	58	48	NR
Tin	Q	mg/L	ND	ND	ND	ND	ND	ND	NR	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.001	<0.001
Titanium	NA	mg/L	ND	ND	<0.001	<0.001	ND	ND	NR	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	□	mg/L	Q	QN	<0.01	<0.01	Q	Q	NR	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	0.007	<0.01	<0.01
Zinc	0.008	mg/L	ND	ND	<0.01	<0.01	ND	ND	NR	0.006	0.005	NR	NR	NR	NR	NR	<0.005	<0.005
Key ND = No Discharge																		
NA = Not Applicable																		
NK = NO KESUIT a Based on ANZECC Guidelines for Fresh and Marine Water Chalify - Recreational Water Chalify (ANZECC 2001) evoent where indicated	Plines for Fresh	and Marine	Nater Origity -	Recreational V	Vater Onality (A	NZECC 2000)	excent where	ndicated										
b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000)	telines slightly o	listurbed lowla	ind river ecosys	stems in south-	east Australia (ANZECC 2000	ا محصور ساماد											
c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestock Water Quality (ANZECC 2000)	telines for Frest	and Marine	Nater Quality -I	ivestock Wate	or Quality (ANZI	ECC 2000)												
d based oil Aivzecc Guid	relities for Lies	aud Maille	vater Quality -	IIIgalloli vvate	duality (ANZE	(2000)												



Table A5 - Water Quality - EPA Point No. 5 (Dam B) - Dissolved (Filtered) Samples (Cont'd)

								CLUZ						-				2010				
Sample	Guideline Trigger Value	jinU	ղջութւչ	February	Магсһ	linqA	Мау	əunç	July	jsuguA	September	October	иолешрег	December	January February	Магсћ	linqA	Мау	nne	July		tsuguA
Aluminium	0.055	mg/L	Q.	QN	<0.01	0.01	<0.01	<0.01	96.0	_		-	_	_	_							
Ammonia as N	0.02 ^b	mg/L	Q	Q	<0.001	<0.01	0.02	<0.01	<0.01	0.03	<0.01	<0.01	0.01	A.	NR ND	QN O	QN O	Q O	QN O	9		Q.
Antimony	₽	mg/L	Q	Q	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	<0.001 <0.	<0.001 ND	QN O	QN a	Q Q	QN Q	QN O		9
Arsenic	0.013	mg/L	QN	QN	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0.002 0	0.001 0	0.002 0.	0.003 <0.	<0.001 ND	QN Q	QN Q	QN	QN Q	QN		QN
Barium	ΝΑ	mg/L	Q	Q	0.031	0.020	0.028	0.028	0.017	0.026	0.025 0	0.025 0	0.019 0.	0.022 0.0	0.035 ND	QN O	QN O	QN O	QN Q	QN C		Q.
Beryllium	□	mg/L	Q	Q	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	<0.001 <0.	<0.001 ND	QN Q	QN Q	QV O	Q.	Q O		Q.
Boron	0.37	mg/L	Q.	Q	0.18	70.0	0.10	90.0	<0.05	60.0	0.07	0.11 0	0.07	0.10 0.	0.08 ND	QN Q	QN O	QN O	QN Q	QV C		Q.
Cadmium	0.0002	mg/L	Ð	Q	0.0001	<0.001	<0.0001	<0.0001	<0.0001 <	<0.0001 <(<0.0001 <0	<0.0001 <0	<0.0001 <0.	<0.0001 <0.0	<0.0001 ND	Q Q	QN O	Q O	Q Q	9		9
Calcium	NA	mg/L	QN	QN	N.	21	26	30	42	34	29	32	NR	NR	33 ND	QN	QN Q		QN	QN		Q.
Chromium	0.001	mg/L	QN	QN	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	<0.001 <0.	<0.001 ND	QN	QN Q	QN	QN	QN		N Q
Cobalt	QI	mg/L	ON	QN	600.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	\vdash	<0.001 ND	QN Q	QN Q		QN Q	QN C		ND
Copper	0.0014	mg/L	Q	QN	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	<0.001 0.0	0.001 ND	QN	QN a	QV	QN O	QN		Q.
Iron	□	mg/L	Q	Q	90.0	<0.05	<0.05	<0.05	1.06	<0.05	<0.05	0.09	<0.05	0.09	<0.05 ND	QN Q	QN O	Q O	QV Q	9		Q.
Lead	0.0034	mg/L	Q	QN	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001 <(<0.001 <0	<0.001 <0	<0.001 <0.	<0.001 ND	QN Q	QN Q	QN	QN	QN		□
Lithium	NA	mg/L	QN	QN	0.026	0.012	0.013	0.011	<0.001	0.016	0.013 0	0.015 0	0.014 0.	0.015 0.0	0.013 ND	QN	QN a		QN	QN		QN Q
Magnesium	NA	mg/L	ND	ND	48	23	29	32	49	42	32	39	23	NR	35 ND	D ND			D ND	ON C		ND
Manganese	1.9	mg/L	ON	ND	1.67	0.024	0.231	0.090	0.008	0.019 (0.111 0	0.326 0	0.027 0.	0.171 0.0	0.078 ND	QN Q	ON O	ON C	ON O	ON C		ND
Mercury	0.0006	mg/L	ND	ND	_	<0.0001	$\overline{}$	_	<0.0001 <	$\overline{}$	<0.0001 <0	<0.0001 <0	_	<0.0001 <0.0	<0.0001 ND		ND ON					Q
Molybdenum	О	mg/L	QN	ND	0.002	0.005	0.002	0.002	<0.001	0.002	0.003 0	0.002 0	0.004 0.	0.001 0.0	0.001 ND	QN Q	QN O	QN O	QN O	QN		ND
Nickel	0.011	mg/L	QN	ND	N.R.	0.003	0.004	0.002	0.005	0.004	0.004 0	0.003 0	0.004 0.	0.003	0.004 ND	QN Q	QN Q	QN	QN Q	QN C		ND
Phosphorous as P	0.025°	mg/L	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR N	NR ND	QN Q	ON O	ON O	ON O	QN C		ND
Potassium	NA	mg/L	ND	ND	NR	7	9	9	11	7	5	7	NR	NR		QN Q						ND
Selenium	0.011	mg/L	Q	Q	ĸ.	<0.01	<0.01	<0.01	<0.01	<0.01	\dashv	<0.01	<0.01	<0.01 <0	<0.01 ND	2	\dashv	\dashv	2	Q 0		Q.
Silicon as SiO2	NA	mg/L	Q	Q	R.	7.4	15.2	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	-	
Silver	0.00005	mg/L	Q	Q	Ä	<0.001	<0.001	<0.001	5	<0.001	<0.001 <	Ξ	<0.001 <0	Ξ	<0.001 ND	9	\dashv	\dashv	\dashv	\dashv		
Sulfur as S	NA	mg/L	Q	Q	ĸ.	33	47	46	7.1	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv	\dashv		\dashv	\dashv	\dashv	\dashv	Q
Tin	□	mg/L	Q	Q	N.	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	\dashv	<0.001 <0	<0.001 <0.	<0.001 ND	Q O			Q a	Q O		Q.
Titanium	NA	mg/L	ND	ND	NR	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 <0	<0.01 ND	QN Q	DN O	ON O	QN O	ON C		ND
Vanadium		mg/L	QN	ND	NR	<0.005	<0.005	<0.005		5	5											ND
Zinc	0.008	mg/L	QN	QN	NR R	900.0	0.005	NR R	NR R	NR R	NR R	NR <0	<0.005 <c< td=""><td><0.005 0.0</td><td>0.006 ND</td><td>QN O</td><td>QN O</td><td>Q O</td><td>QN O</td><td>Q C</td><td></td><td>N</td></c<>	<0.005 0.0	0.006 ND	QN O	QN O	Q O	QN O	Q C		N
$\frac{Key}{ND} = No Discharge$																						
NA = Not Applicable																						
nn – no nesun. a Based on ANZECC Guidelines for Fresh and Marine Water Quality - Recreational Water Quality	idelines for	Fresh and I	Varine Water	r Quality - R	ecreational V	Vater Quality	(ANZECC 2	(ANZECC 2000) except where indicated	where indicat	eq												
b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC : c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestock Water Quality -Livestock Water Quality -Livestock Water Outling -Livestock	uidelines slig iidelines for F	htly disturb Fresh and N	ed lowland ri Varine Water	iver ecosyste	ems in south- estock Water	east Austral r Quality (AN	ia (ANZECC 2000) VZECC 2000)	2000)														
d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)	idelines for	Fresh and	Marine Wate	r Quality -In.	igation Water	Quality (AN	ZECC 2000,															



Table A6 - Water Quality - EPA Point No. 5 (Dam B) - Total (Filtered) Samples

Charles Char					2013	13							2014	14					
1. 1. 1. 1. 1. 1. 1. 1.	Sample	Guideline Trigger Value*	JinU	September	October	November	December	January	February	Магсһ	linqA	May	əunç	Նյոլ	tsuguA	September	October	November	Decemper
No.	Aluminium	0.055	mg/L	QN	QN	0.67	0.10	ND	ND	<0.01	98.0	0.48	0.19	6.46	0.05	0.22	0.07	0.72	0.36
10. mgt ND ND ND ND ND ND CDD	Ammonia as N	0.02 ^b	mg/L	QN	QN	<0.01	<0.01	ND	QN	<0.001	<0.01	0.02	<0.01	<0.01	0.03	<0.01	<0.01	0.01	NR
0 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.	Antimony	OI	mg/L	QN	ND	0.002	0.001	ND	ND	NR	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Main Mage Mage Mage Name	Arsenic	0.013	mg/L	QN	ON	900.0	0.004	ΔN	ND	0.002	0.003	0.001	<0.001	0.003	<0.001	0.003	0.002	0.003	0.004
The control of the co	Barium	ΝΑ	mg/L	Q.	Q	0.027	0.034	Q	QN	0.033	0.025	0.032	0:030	990.0	0.029	0.028	0.025	0.026	0.026
1	Beryllium		mg/L	QN	QN	<0.001	<0.001	QN	QN	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
numin bilono bi	Boron	0.37	mg/L	Q.	Q	0.15	0.13	Q.	Q.	0.14	90.0	0.11	90.0	<0.05	0.1	90.0	0.12	0.08	0.10
mm M M M mgt, ND	Cadmium	0.0002	mg/L	Q.	Q.	<0.0001	<0.0001	Q.	Q	0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
th the control of th	Calcium	ΑΝ	mg/L	QN	Q	33	35	Q.	QN	Ä.	24	31	34	44	37	31	32	22	A.
1	Chromium	0.001	mg/L	Q	Q	<0.001	<0.001	Q.	QN	<0.001	0.004	0.001	0.001	0.007	0.001		<0.001	0.001	0.001
year 0.0044 mg/L ND ND 0.002 0.003	Cobalt	۵	mg/L	QN	QN	0.001	<0.001	ND	QN	0.010	<0.001	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
10 10 10 10 10 10 10 10	Copper	0.0014	mg/L	QN	Q	0.002	0.002	Q.	QN	0.001	0.002	0.002	0.001	0.005	<0.001	0.002	<0.001	0.002	0.001
10,0034 10,0034 10,004 10,004 10,005	Iron	□	mg/L	Q.	Q	0.76	0.21	Q.	QN	0.29	0.92	0.78	0.26	7.28	0.19	0.34	0.48	92'0	0.63
NA Mg/L ND N	Lead	0.0034	mg/L	Q.	Q	<0.001	<0.001	Q	QN	<0.001	<0.001	<0.001	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001
Significant M.	Lithium	ΝΑ	mg/L	QN	Q.	0.026	0.031	Q	Q	0.028	0.013	0.014	0.012	0.002	0.016	0.016	0.013	0.016	0.014
19 mg/L ND 0.073 0.184 ND 180 0.051 0.055 0.057 0.059 0.059 0.059 0.059 0.059 0.059 0.059 0.059 0.050 0.050 0.000	Magnesium	ΑM	mg/L	Q.	Q	47	45	Q.	Q.	48	25	32	35	51	41	33	37	25	N.
type 0000b mg/L ND 40001 AD001 4000	Manganese	1.9	mg/L	Q.	Q.	0.079	0.184	QN	Q	1.80	0.051	0.255	0.097	0.094	0.029	0.116	0.341	0.064	0.228
Classified Digitary Digitar	Mercury	0.0006	mg/L	QN	ND	<0.001	<0.001	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
thorous as P 0.001 mg/L ND 0.006 0.007	Molybdenum	QI	mg/L	QN	ND	600.0	900.0	ND	ND	0.003	900.0	0.002	0.002	<0.001	0.004	0.004	0.002	0.004	0.002
bitum NA mg/L ND AOD ND NB ND ND ND AOD ND NB ND NB ND ND ND ND NB ND	Nickel	0.011	mg/L	QN	ON	0.008	0.004	ΩN	ND	NR	0.004	900.0	0.003	900.0	0.005	0.005	0.004	0.005	0.004
sium NA mg/L ND 10 RD ND ND <th< td=""><td></td><td>0.025</td><td>mg/L</td><td>QN</td><td>QN</td><td><0.01</td><td><0.01</td><td>QN</td><td>QN</td><td>N.</td><td>0.05</td><td>0.07</td><td>0.03</td><td><0.01</td><td>0.05</td><td><0.01</td><td>0.02</td><td>0.04</td><td>0.02</td></th<>		0.025	mg/L	QN	QN	<0.01	<0.01	QN	QN	N.	0.05	0.07	0.03	<0.01	0.05	<0.01	0.02	0.04	0.02
umm mg/L ND C001 C0	Potassium	ΝΑ	mg/L	QN	Q.	10	œ	Q	Q	N.	9	9	9	11	9	5	7	9	N.
as SiO2 Ma mg/L ND ND ND 10.1 SiO ND ND ND ND ND ND ND ND ND 10.1 10.0 10.0 10.0 10.0 10.0 10.0 10.	Selenium	0.011	mg/L	QN	ND	<0.01	<0.01	ND	ND	NR	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
as S NA	Silicon as SiO2	NA	mg/L	QN	ND	10.1	9.8	ND	ND	NR	11.4	18.5	11.4	14.0	10.2	12.8	14	10.2	NR
NR	Silver	0.00005	mg/L	QN	QN	<0.001	<0.001	Q	QN	N.	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NR <0.01		NA	mg/L	ND	ND	9/	09	QN	QN	N N	49	54	20	73	22	42	54	45	NR
NR	Tin	OI	mg/L	ND	ND	ND	ND	ND	ND	NR	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.001	<0.001
NR 0.006 0.007 <0.005 0.028 <0.005 <0.005 <0.005 <0.001	Titanium	NA	mg/L	QN	QN	<0.001	<0.001	QN	QN	N.	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
NR 0.006 0.009 NR NR NR NR < 0.005	Vanadium	Q	mg/L	QN	QN	0.01	<0.01	ΩN	QN	N.	900'0	0.007	<0.005	0.028	<0.005	<0.005	<0.005	<0.01	<0.01
ND = No Discharge ND = No Discharge NA = Not Applicable NR = Not Applicable Read on ANZECC Guidelines for Fresh and Marine Water Quality (ANZECC 2000) except where indicated b Based on ANZECC Guidelines for Fresh and Marine Water Quality (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality (ANZECC 2000)	Zinc	0.008	mg/L	ND	ND	<0.01	<0.01	ND	ND	N.	900.0	0.009	NR	NR	NR	NR	NR.	<0.005	<0.005
NA = Not Applicable NR = No Result a Based on ANZECC Guidelines for Fresh and Marine Water Quality - Recreational Water Quality (ANZECC 2000) except where indicated b Based on ANZECC Guidelines for Fresh and Marine Water Quality - Livestock Water Quality (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality - Livestock Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality - Ingation Water Quality (ANZECC 2000)	Key ND = No Discharge																		
a Based on ANZECC Guidelines for Fresh and Marine Water Quality. Recreational Water Quality (ANZECC 2000) except where indicated b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestock Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)	NA = Not Applicable NR = No Result																		
b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestock Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)	a Based on ANZECC Guid	delines for Fresh	and Marine	Water Quality -	· Recreational V	Vater Quality (A	NZECC 2000)	except where i	ndicated										
d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)	b Based on ANZECC Guid	delines slightly a felines for Fresh	listurbed lowla and Marine \	and river ecosy Water Quality -	stems in south. Livestock Wate	east Australia (r Quality (ANZE	(ANZECC 2000 ECC 2000)	<u> </u>											
	d Based on ANZECC Guid	delines for Fresh	and Marine	Water Quality -	-Irrigation Water	r Quality (ANZE	ECC 2000)												

Table A6 - Water Quality - EPA Point No. 5 (Dam B) - Total (Filtered) Sa

Mathematical Color in the Color									2015	10									2016	16			
Marie Concert marker No. Concert C	Sample	Guideline Trigger Value	jinU	Vanuary	February	Магсһ	linqA	VeM	nue	VluU	jsuguA	September	October	November	December	January	Гергиагу	Магсһ	linqA	VeM	June	Vluly	tsuguA
Mail	Aluminium	0.055	mg/L	Q.	0.79	0.4	0.78	0,48	0.12	0.02	9	Q Q	P.	Q.	9	0.05	9	Q.	Q.	Ð	Ð	Q.	Q.
1	Ammonia as N	0.02 ^b	mg/L	Q.	0.01	<0.01	0.02	90.0	0.02	0.02	Q.	Q.	Q.	Q.	9	0.03	Ð	Q.	Q.	9	Ð	Q.	ND
10 10 10 10 10 10 10 10	Antimony	□	mg/L	Q.	<0.001	0.001		<0.001		<0.001	Q	Q.	Q.	Q.		<0.001	Q	Q	QN N	Q	Q	Q.	ND
Main mark Main	Arsenic	0.013	mg/L	Q.	0.004	0,002	\vdash	0.002		0.001	Q.	Q.	Q.	Q.		<0.001	2	Q.	Q.	Ð	Ð	Q.	QN
10 mg/L 10 m	Barium	NA	mg/L	Q.	0.033	0.029		0.032	0:030	0.028	Q.	2	Q.	Q.	9	0.037	9	Q.	Q.	Q	Q	Q.	ND
1	Beryllium	₽	mg/L	Q.	<0.001	<0.001		901	<0.001	<0.001	Q.	Q.	Q.	Q.	₂	<0.001	2	Q.	Q.	Ð	Ð	Q.	QN
Main	Boron	0.37	mg/L	QN	0.07	60.0	0.07	90.0	0.10	0.10	Q	Q	Q.	QN	Q.	0.11	Q	Q	QN	QN	QN	QN	QN
1	Cadmium	0.0002	mg/L		_	-		_	-	:0.0001	Q.	Q.	QN Q	Q		:0.0001	Q	QN	QN	QN	QN	Q.	ND
Mail	Calcium	NA	mg/L	ND	23	24	N.	N.		30	ND	ND	ND	QN		NR R	Q	ND	ND	ND	ND	QN	ND
10 mg/L ND calcot ca	Chromium	0.001	mg/L	QN	0.001	<0.001		100		<0.001	QN	Q.	QN Q	QN		<0.001	Q	QN	QN	QN	QN	QN	QN
10014 mg4, ND 0.002 0.002 0.002 0.003 0.001 0.001 ND ND ND ND ND ND ND N	Cobalt	QI	mg/L	QN	<0.001	<0.001		100	<0.001	<0.001	QN	QN	ND	QN	QN	<0.001	QN	QN	QN	QN	QN	QN	ΠN
10 10 10 10 10 10 10 10	Copper	0.0014	mg/L	QN	0.002	0.002		0.002	0.001	<0.001	Q.	Q.	Q.	QN	9	0.001	Q	Q	Q	Q	Q	Q.	ND
1	Iron		mg/L	QN	1.00	0.43	Н	0.71	0.14	0.34	QN Q	QN	QN	QN	Q.	0.15	Q	QN	QN	QN	QN	QN	ND
Significant MA mg/L MD 0011 00011 00012 00021 00021 00022 00022 00021 ND MD ND	Lead	0.0034	mg/L	QN						<0.001	QN	QN	QN	QN		<0.001	QN	QN	ND	QN	ND	QN	ND
Seitum MA mg/L MD 24	Lithium	NA	mg/L	ON	0.011	0.018		-	0.023	0.012	ND	ND	ND	ND	QN	0.014	ND	ND	ND	ON	ND	ND	ND
Total mode 13 mod. L ND 0.11 OLD ND 0.02 0.212 ND ND<	Magnesium	NA	mg/L	ND	24	28		28	46	33	ND	ND	ND	ND		35	Q	QN	ND	ND	ND	ND	ND
yy 00006 mg/L ND 40,0001 c0,0001 c0,0001 c0,0001 ND ND <t< td=""><td>Manganese</td><td>1.9</td><td>mg/L</td><td></td><td></td><td>_</td><td></td><td>0.209</td><td></td><td>0.212</td><td>Q</td><td>Q</td><td>QN</td><td>Q</td><td></td><td>0.086</td><td>Q</td><td>Q</td><td>ND</td><td>Q</td><td>Q</td><td>ND</td><td>ND</td></t<>	Manganese	1.9	mg/L			_		0.209		0.212	Q	Q	QN	Q		0.086	Q	Q	ND	Q	Q	ND	ND
Figure Dig Might No. Concol	Mercury	0.0006	mg/L			-		:0.0001		:0,0001	ND	ND	ND	ND		:0.0001	QN	ND	ND	ND	ND	ND	ND
0014 mg/L ND 0.004 ND	Molybdenum	OI	mg/L	ND	0.003	0.004		0.002	0.003	0.001	ND	ND	ND	ND		0.002	ND	ND	ND	ND	ND	ND	ND
lum NA mod ND N	Nickel	0.011	mg/L	QN	0.004	900.0		0.003	0.004	0.003	ND	ND	ND	ND	QN	0.004	ND	ND	ND	ND	ND	ND	ND
liam NA mg/L ND coord ND	Phosphorous as P	0.025	mg/L	QN	0.03	0.02	0.02	0.03	<0.01	<0.01	Q	QN	QN	Q	Q	<0.01	Q	Q	ND	Q	Q	Q	ND
as SiO2 NA mg/L ND 22.8 10.4 13.9 14.0 6.001 6.001 6.001 0.001 0.001 0.001 ND	Potassium	NA	mg/L	ND	7	7	NR		8	5	ND	ND	ND	ND	QN	NR	QN	QN	ND	ON	ND	ND	ND
as SiO2 NA mg/L ND 22.8 10.4 13.9 14.0 9.3 14.0 ND	Selenium	0.011	mg/L	QN	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	QN	QN	ND	ND	Q	<0.01	Q	QN	ND	QN	ND	ND	ND
10.00005 mg/L ND 32 NR 32 NR NR NR ND	Silicon as SiO2	NA	mg/L	ND	22.8	10.4	13.9	14.0	9.3	19.2	ND	ND	ND	ND	ND	14.2	QN	ND	ND	ND	ND	ND	ND
as S NA mg/L ND 32 NR 32 NR NR NR NR ND	Silver	0.00005	mg/L	ND	0.001	<0.001		001	<0.001	<0.001	ND	ND	ND	ND		<0.001	QN	ND	ND	ND	ND	ND	ND
ium NA mg/L ND <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <	as	NA	mg/L	QN	32	N.	32		N.	N.	QN Q	QN	QN	QN	QN	N.	QN	QN	ND	QN	ND	ND	ND
iulim NA mg/L ND co.01 c	Tin	QI	mg/L	ND	<0.001	<0.001		100	<0.001	<0.001	ND	ND	ND	QN	QN	<0.001	QN	ND	ND	QN	ND	ND	ND
And begand the more of the mor	Titanium	NA	mg/L	ON	<0.01	<0.01	_		<0.01	<0.01	QN	QN	ND	QN	QN	<0.01	QN	QN	QN	QN	ND	QN	ND
0.008 mg/L ND 0.008 <0.01 <0.006 0.012 <0.005 0.005 ND ND ND ND ND ND ND N	Vanadium		mg/L	QN	<0.01	<0.01		<0.01	<0.01	<0.01	QN	QN	ND	QN	Q	<0.01	Q	QN	ND	QN	ND	ND	ND
Key ND No Discharge NA = Not Applicable NR = Not Result	Zinc	0.008	mg/L	QN	0.008	<0.01		900.0		<0.005	ND	ND	ND	QN		<0.005	QN	QN	ND	QN	ND	ND	ND
TO INCOME BY A PARTICIPATION OF THE PARTICIPATION O	Key																						
NR NO Result	NA = Not Applicable																						
	NR = No Result																						



a Based on ANZECC Guidelines for Fresh and Marine Water Quality - Recreational Water Quality (ANZECC 2000) except where indicated b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000) c Based on ANZECC Guidelines for Fresh and Marine Water Quality -Livestook Water Quality (ANZECC 2000) d Based on ANZECC Guidelines for Fresh and Marine Water Quality -Irrigation Water Quality (ANZECC 2000)

Report No. 559/54