Central Queensland Coal Project

Appendix 5a – Surface Water and Groundwater Quality Results

Environmental Impact Statement

CENTRAL QUEENSLAND COAL PROJECT
SURFACE WATER RESULTS

Sample ID	Date Measured	Field Measurements						Comments
		pH pH	Electrical Conductivity - (EC) µS/cm	Specific Conductance - (SPC) µS/cm	Dissolved Oxygen (DO) mg/L	Turbidity (NTU) mg/L	Temperature °C	
St1	22/02/2017	8.15	13103	12141	5.07	12.6	29.9	
Ba1	22/02/2017	DRY						
De1	22/02/2017	DRY						
De2	22/02/2017	7.65	271.9	260.8	3.01	XXX	27.1	
De3	22/02/2017	7.48	373.7	365.2	1.3	XXX	26.2	
De4	22/02/2017	7.51	258.8	241.5	2.8	116	28.7	
T01	22/02/2017	8.04	872	842	2.53	14.5	26.6	
T02	22/02/2017	8.1	2737	2521	8.35	3.3	29.5	

Notes:
Turbidity XXX = >880 (probe maximum)

Sample ID	Date Measured	Field Measurements						Comments
		pH pH	Electrical Conductivity - (EC) µS/cm	Specific Conductance - (SPC) µS/cm	Dissolved Oxygen (DO) mg/L	Turbidity (NTU) mg/L	Temperature °C	
St1	1/05/2017	7.09	1127	1154	5.57	12.3	23.7	
Ba1x	4/05/2017	7.57	1293	1366	5.62	6	22.2	
De1	2/05/2017	7.48	380.4	424.1	5.55	23.5	19.7	
De2	2/05/2017	7.2	348.9	385.6	6.03	28.7	20	
De3	1/05/2017	6.98	355.9	393.9	6.22	32.9	20	
De4	2/05/2017	7.6	404.5	445	6.88	14	20.2	
T01	2/05/2017	7.49	713	750	4.85	4	22.3	
T02	2/05/2017	7.88	836	850	5.7	2.5	24.1	

Notes:
Turbidity XXX = >880 (probe maximum)

Sample ID	Date Measured	Field Measurements						Comments
		pH pH	Electrical Conductivity - (EC) µS/cm	Specific Conductance - (SPC) µS/cm	Dissolved Oxygen (DO) mg/L	Turbidity (NTU) mg/L	Temperature °C	
St1	12/06/2017	7.54	122.7	1361	5.96	5.9*	19.9	
Ba1x	15/06/2017	7.38	1288	1407	4.85	6.4	20.1	
De1	13/06/2017	7.41	353.9	427.8	4.6	10.2*	16	
De2	13/06/2017	7.5	357.9	293.8	5.51	17.7*	15.6	
De3	13/06/2017	7.38	318.3	386.2	5.46	18.6*	15.8	
De4	13/06/2017	7.5	382.3	466.2	5.5	14.1*	16.1	
T01	15/06/2017	7.62	742	-	5.57	18.2	20	
T02	13/06/2017	7.68	788	882	6.01	2.2*	19.3	
T03x	13/06/2017	7.58	1133	1299	5.19	3.9*	18.3	

Notes:
*Turbidity was measured in the laboratory
Turbidity XXX = >880 (probe maximum)

			LAB ID	EB1703534001		EB1703534002	EB1703534003			EB1703534005	EB1703534006	EB1703534004
			SAMPLE DATE	22/02/2017		22/02/2017	22/02/2017			22/02/2017	22/02/2017	22/02/2017
			SAMPLE ID	St1	Ba1	To1	To2	To3	De1	De2	De3	De4
ANALYTE	**CAS No.**	**Unit**	**LOR**									
Total Dissolved Solids @180°C		mg/L	10	7810		348	1660			1540	3570	236
Suspended Solids (SS)		mg/L	5	13		-5	-5			1100	161	32
ED037P: Alkalinity by PC Titrator												
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1	-1		-1	-1			-1	-1	-1
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1	-1		-1	-1			-1	-1	-1
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1	194		122	115			74	80	54
Total Alkalinity as CaCO3		mg/L	1	194		122	115			74	80	54
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA												
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1	501		12	22			8	4	12
ED045G: Chloride by Discrete Analyser												
Chloride	16887-00-6	mg/L	1	4510		119	849			34	68	31
ED093F: Dissolved Major Cations												
Calcium	7440-70-2	mg/L	1	128		20	65			4	3	4
Magnesium	7439-95-4	mg/L	1	286		18	76			4	5	5
Sodium	7440-23-5	mg/L	1	2150		72	286			42	66	32
Potassium	7/09/7440	mg/L	1	68		2	3			3	2	4
EG020F: Dissolved Metals by ICP-MS												
Aluminium	7429-90-5	mg/L	0.01	-0.01		-0.01	-0.01			-0.01	0.06	-0.01
Arsenic	7440-38-2	mg/L	0.001	0.004		0.002	0.002			0.003	0.002	0.002
Barium	7440-39-3	mg/L	0.001	0.271		0.028	0.15			0.022	0.034	0.03
Cadmium	7440-43-9	mg/L	0.0001	-0.0001		-0.0001	-0.0001			-0.0001	-0.0001	-0.0001
Chromium	7440-47-3	mg/L	0.001	-0.001		-0.001	-0.001			-0.001	-0.001	-0.001
Cobalt	7440-48-4	mg/L	0.001	-0.001		-0.001	-0.001			-0.001	0.001	-0.001
Copper	7440-50-8	mg/L	0.001	0.002		-0.001	-0.001			0.001	-0.001	-0.001
Lead	7439-92-1	mg/L	0.001	-0.001		-0.001	-0.001			-0.001	-0.001	-0.001
Manganese	7439-96-5	mg/L	0.001	0.006		0.102	0.153			0.382	0.366	0.202
Molybdenum	7439-98-7	mg/L	0.001	0.002		-0.001	-0.001			-0.001	-0.001	-0.001
Nickel	7440-02-0	mg/L	0.001	0.001		-0.001	-0.001			0.003	0.002	0.002
Selenium	7782-49-2	mg/L	0.01	-0.01		-0.01	-0.01			-0.01	-0.01	-0.01
Silver	7440-22-4	mg/L	0.001	-0.001		-0.001	-0.001			-0.001	-0.001	-0.001
Uranium	7440-61-1	mg/L	0.001	-0.001		-0.001	-0.001			-0.001	-0.001	-0.001
Vanadium	7440-62-2	mg/L	0.01	-0.01		-0.01	-0.01			-0.01	-0.01	-0.01
Zinc	7440-66-6	mg/L	0.005	0.025		-0.005	-0.005			-0.005	-0.005	0.012
Iron	7439-89-6	mg/L	0.05	-0.05		-0.05	0.07			0.08	0.08	-0.05
EG035F: Dissolved Mercury by FIMS												
Mercury	7439-97-6	mg/L	0.0001	-0.0001		-0.0001	-0.0001			-0.0001	-0.0001	-0.0001
EK040P: Fluoride by PC Titrator												
Fluoride	16984-48-8	mg/L	0.1	0.4		0.3	0.3			0.2	0.2	0.2
EK055G: Ammonia as N by Discrete Analyser												
Ammonia as N	7664-41-7	mg/L	0.01	0.05		0.05	0.05			0.12	0.25	0.03
EK057G: Nitrite as N by Discrete Analyser												
Nitrite as N	14797-65-0	mg/L	0.01	-0.01		-0.01	-0.01			-0.01	-0.01	-0.01
EK058G: Nitrate as N by Discrete Analyser												
Nitrate as N	14797-55-8	mg/L	0.01	-0.01		0.02	0.05			0.05	0.03	0.02
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser												
Nitrite + Nitrate as N		mg/L	0.01	-0.01		0.02	0.05			0.05	0.03	0.02
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser												
Total Kjeldahl Nitrogen as N		mg/L	0.1	1.2		0.6	0.7			4	5.5	1.5
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser												
Total Nitrogen as N		mg/L	0.1	1.2		0.6	0.8			4	5.5	1.5
EK067G: Total Phosphorus as P by Discrete Analyser												
Total Phosphorus as P		mg/L	0.01	0.16		0.06	0.05			1.38	1.26	0.21
EK071G: Reactive Phosphorus as P by discrete analyser												
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	0.01		-0.01	-0.01			0.01	0.01	-0.01
EN055: Ionic Balance												
Total Anions		meq/L	0.01	142		6.04	26.7			2.6	3.6	2.2
Total Cations		meq/L	0.01	125		5.66	22			2.43	3.48	2.1
Ionic Balance		%	0.01	6.13		3.26	9.62			----	1.65	----
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction		µg/L	20	-20		-20	-20			-20	-20	-20

C10 - C14 Fraction		µg/L	50	-50		-50	-50			-50	-50	50
C15 - C28 Fraction		µg/L	100	-100		-100	-100			200	180	150
C29 - C36 Fraction		µg/L	50	-50		-50	-50			150	200	70
C10 - C36 Fraction (sum)		µg/L	50	-50		-50	-50			350	380	270
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction	C6_C10	µg/L	20	-20		-20	-20			-20	-20	-20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20	-20		-20	-20			-20	-20	-20
>C10 - C16 Fraction		µg/L	100	-100		-100	-100			-100	-100	-100
>C16 - C34 Fraction		µg/L	100	-100		-100	-100			280	330	180
>C34 - C40 Fraction		µg/L	100	-100		-100	-100			-100	-100	-100
>C10 - C40 Fraction (sum)		µg/L	100	-100		-100	-100			280	330	180
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100	-100		-100	-100			-100	-100	-100
EP080: BTEXN												
Benzene	71-43-2	µg/L	1	-1		-1	-1			-1	-1	-1
Toluene	108-88-3	µg/L	2	-2		-2	-2			3	-2	-2
Ethylbenzene	100-41-4	µg/L	2	-2		-2	-2			-2	-2	-2
meta- & para-Xylene	108-38-3 106-42-3	µg/L	2	-2		-2	-2			-2	-2	-2
ortho-Xylene	95-47-6	µg/L	2	-2		-2	-2			-2	-2	-2
Total Xylenes	1330-20-7	µg/L	2	-2		-2	-2			-2	-2	-2
Sum of BTEX		µg/L	1	-1		-1	-1			3	-1	-1
Naphthalene	91-20-3	µg/L	5	-5		-5	-5			-5	-5	-5

			LAB ID	EB1708799004	EB1709053005	EB1708799003	EB1708799006		EB1708799007	EB1708799008	EB1708799009	EB1708799005
			SAMPLE DATE	01/04/2017	4/05/2017	02/05/2017	02/05/2017		02/05/2017	02/05/2017	02/05/2017	02/05/2017
			SAMPLE ID	St1	Ba1x	T01	T02	T03	De1	De2	De3	De4
ANALYTE	**CAS No.**	**Unit**	**LOR**									
Total Dissolved Solids @180°C		mg/L	10	687.00	906.00	432.00	615.00		298.00	274.00	290.00	318.00
Suspended Solids (SS)		mg/L	5	10.00	6.00	6.00	8.00		6.00	<5	15.00	6.00
ED037P: Alkalinity by PC Titrator												
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1	<1	<1	<1	<1		<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1	<1	<1	<1	<1		<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1	148.00	60.00	141.00	140.00		86.00	81.00	83.00	87.00
Total Alkalinity as CaCO3		mg/L	1	148.00	60.00	141.00	140.00		86.00	81.00	83.00	87.00
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA												
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1	40	41	32	33		17	15	16	16
ED045G: Chloride by Discrete Analyser												
Chloride	16887-00-6	mg/L	1	318	434	167	210		88	76	76	91
ED093F: Dissolved Major Cations												
Calcium	7440-70-2	mg/L	1	34	25	35	39		14	12	13	13
Magnesium	7439-95-4	mg/L	1	33	48	26	30		12	11	11	13
Sodium	7440-23-5	mg/L	1	169	197	85	96		55	51	52	60
Potassium	7/09/7440	mg/L	1	4	4	3	3		3	3	3	3
EG020F: Dissolved Metals by ICP-MS												
Aluminium	7429-90-5	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Arsenic	7440-38-2	mg/L	0.001	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Barium	7440-39-3	mg/L	0.001	0.112	0.201	0.074	0.082		0.057	0.052	0.058	0.072
Cadmium	7440-43-9	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001	0.002	<0.001	0.018	<0.001		0.002	0.002	0.003	<0.001
Lead	7439-92-1	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001	0.43	0.055	0.009	0.035		0.078	0.04	0.201	0.169
Molybdenum	7439-98-7	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	mg/L	0.001	0.001	0.001	0.002	<0.001		0.001	0.001	0.002	0.001
Selenium	7782-49-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	mg/L	0.001	<0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	mg/L	0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05
EG035F: Dissolved Mercury by FIMS												
Mercury	7439-97-6	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator												
Fluoride	16984-48-8	mg/L	0.1	0.2	0.1	0.2	0.2		<0.1	<0.1	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser												
Ammonia as N	7664-41-7	mg/L	0.01	0.06	0.03	0.02	0.02		0.02	<0.01	<0.01	0.01
EK057G: Nitrite as N by Discrete Analyser												
Nitrite as N	14797-65-0	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser												
Nitrate as N	14797-55-8	mg/L	0.01	0.06	<0.01	<0.01	<0.01		<0.01	<0.01	0.02	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser												
Nitrite + Nitrate as N		mg/L	0.01	0.06	<0.01	<0.01	<0.01		<0.01	<0.01	0.02	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser												
Total Kjeldahl Nitrogen as N		mg/L	0.1	0.6	0.1	0.2	0.2		0.2	0.2	0.3	0.2
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser												
Total Nitrogen as N		mg/L	0.1	0.7	0.1	0.2	0.2		0.2	0.2	0.3	0.2
EK067G: Total Phosphorus as P by Discrete Analyser												
Total Phosphorus as P		mg/L	0.01	0.03	0.02	0.22	0.08		0.16	0.15	0.15	0.02
EK071G: Reactive Phosphorus as P by discrete analyser												
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance												
Total Anions		meq/L	0.01	12.8	14.3	8.19	9.41		4.55	4.07	4.14	4.64
Total Cations		meq/L	0.01	11.9	13.9	7.66	8.67		4.16	3.8	3.89	4.4
Ionic Balance		%	0.01	3.63	1.51	3.37	4.1		4.58	3.5	3.02	2.58
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction		µg/L	20	<20	<20	<20	<20		<20	<20	<20	<20

C10 - C14 Fraction		µg/L	50	<50	<50	<50	<50		<50	<50	<50	<50
C15 - C28 Fraction		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
C29 - C36 Fraction		µg/L	50	<50	<50	<50	<50		<50	<50	<50	<50
C10 - C36 Fraction (sum)		µg/L	50	<50	<50	<50	<50		<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction	C6_C10	µg/L	20	<20	<20	<20	<20		<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20	<20	<20	<20	<20		<20	<20	<20	<20
>C10 - C16 Fraction		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
>C16 - C34 Fraction		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
>C34 - C40 Fraction		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
>C10 - C40 Fraction (sum)		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100	<100	<100	<100	<100		<100	<100	<100	<100
EP080: BTEXN												
Benzene	71-43-2	µg/L	1	<1	<1	<1	<1		<1	<1	<1	<1
Toluene	108-88-3	µg/L	2	<2	<2	<2	<2		<2	<2	<2	<2
Ethylbenzene	100-41-4	µg/L	2	<2	<2	<2	<2		<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	µg/L	2	<2	<2	<2	<2		<2	<2	<2	<2
ortho-Xylene	95-47-6	µg/L	2	<2	<2	<2	<2		<2	<2	<2	<2
Total Xylenes	1330-20-7	µg/L	2	<2	<2	<2	<2		<2	<2	<2	<2
Sum of BTEX		µg/L	1	<1	<1	<1	<1		<1	<1	<1	<1
Naphthalene	91-20-3	µg/L	5	<5	<5	<5	<5		<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates												
1.2-Dichloroethane-D4	17060-07-0	%	2	100	104	101	102		100	102	99.2	101
Toluene-D8	2037-26-5	%	2	102	102	99.4	101		101	102	102	101
4-Bromofluorobenzene	460-00-4	%	2	95.3	93.6	91.5	93.5		93.7	95.3	93.8	92.5

			LAB ID	EB1712259003	EB1712405006	EB1712405007	EB1712259008	EB1712259009	EB1712259004	EB1712259005	EB1712259006	EB1712259007
			SAMPLE DATE	12/06/2017	16/06/2017	15/06/2017	13/06/2017	13/06/2017	13/06/2017	13/06/2017	13/06/2017	13/06/2017
			SAMPLE ID	St1	Ba1x	T01	T02	T03	De1	De2	De3	De4
ANALYTE	**CAS No.**	**Unit**	**LOR**									
Total Dissolved Solids @180°C		mg/L	10	869.00	1010	620	576.00	889.00	261.00	233.00	267.00	295.00
Suspended Solids (SS)		mg/L	5	6.00	<5	<5	<5	16.00	<5	9.00	<5	7.00
ED037P: Alkalinity by PC Titrator												
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1	179.00	56	161	142.00	167.00	98.00	92.00	104.00	105.00
Total Alkalinity as CaCO3		mg/L	1	179.00	56	161	142.00	167.00	98.00	92.00	104.00	105.00
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA												
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1	48	41	36	35	47	14	12	12	13
ED045G: Chloride by Discrete Analyser												
Chloride	16887-00-6	mg/L	1	420	455	227	251	404	88	75	85	112
ED093F: Dissolved Major Cations												
Calcium	7440-70-2	mg/L	1	35	26	41	43	62	16	9	8	13
Magnesium	7439-95-4	mg/L	1	36	48	22	35	49	13	9	10	14
Sodium	7440-23-5	mg/L	1	209	187	106	110	163	62	60	73	74
Potassium	7/09/7440	mg/L	1	3	4	3	3	2	2	3	2	3
EG020F: Dissolved Metals by ICP-MS												
Aluminium	7429-90-5	mg/L	0.01	0.030	<0.01	<0.01	0.010	<0.01	<0.01	<0.01	0.550	<0.01
Arsenic	7440-38-2	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Barium	7440-39-3	mg/L	0.001	0.094	0.198	0.072	0.087	0.125	0.055	0.048	0.057	0.056
Cadmium	7440-43-9	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	7440-48-4	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	mg/L	0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Lead	7439-92-1	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	mg/L	0.001	0.122	0.044	0.064	0.040	0.085	0.034	0.008	0.081	0.144
Molybdenum	7439-98-7	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	7440-02-0	mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.001
Selenium	7782-49-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	7440-61-1	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	7440-62-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	mg/L	0.005	0.006	<0.005	<0.005	<0.005	0.027	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.370	<0.05
EG035F: Dissolved Mercury by FIMS												
Mercury	7439-97-6	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator												
Fluoride	16984-48-8	mg/L	0.1	0.2	<0.1	0.2	0.2	0.2	<0.1	<0.1	0.1	0.1
EK055G: Ammonia as N by Discrete Analyser												
Ammonia as N	7664-41-7	mg/L	0.01	0.03	0.02	0.04	0.02	0.02	0.06	0.02	0.02	0.02
EK057G: Nitrite as N by Discrete Analyser												
Nitrite as N	14797-65-0	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser												
Nitrate as N	14797-55-8	mg/L	0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser												
Nitrite + Nitrate as N		mg/L	0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.03
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser												
Total Kjeldahl Nitrogen as N		mg/L	0.1	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.2	0.2
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser												
Total Nitrogen as N		mg/L	0.1	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.2	0.2
EK067G: Total Phosphorus as P by Discrete Analyser												
Total Phosphorus as P		mg/L	0.01	<0.01	0.02	0.01	0.01	0.02	0.02	0.04	0.02	0.02
EK071G: Reactive Phosphorus as P by discrete analyser												
Reactive Phosphorus as P	14265-44-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EN055: Ionic Balance												
Total Anions		meq/L	0.01	16.4	14.8	10.4	10.6	15.7	4.73	4.2	4.72	5.53
Total Cations		meq/L	0.01	13.9	13.5	8.54	9.89	14.3	4.62	3.88	4.45	5.1
Ionic Balance		%	0.01	8.4	4.68	9.65	3.69	4.82	1.24	4.05	3.02	4.06
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction		µg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20

C10 - C14 Fraction		µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction		µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)		µg/L	50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction	C6_C10	µg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
EP080: BTEXN													
Benzene	71-43-2	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes	1330-20-7	µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX		µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	µg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates													
1.2-Dichloroethane-D4	17060-07-0	%	2	94.8	106	110	94.6	95.1	95.2	95.3	95.4	96.9	
Toluene-D8	2037-26-5	%	2	101	96.5	94	99.4	96.6	97.9	96.8	97.3	95.6	
4-Bromofluorobenzene	460-00-4	%	2	99.7	112	108	98.8	97.8	95.9	95.6	95.4	96.8	

	Feb-17						May-17								Jun-17								
	St1	To1	To2	De2	De3	De4	St1	Ba1	To1	To2	De1	De2	De3	De4	St1	Ba1x	T01	T02	T03	De1	De2	De3	De4
Temperature	29.9	26.6	29.5	27.1	26.2	28.7	23.7	22.2	22.3	24.1	19.7	20	20	20.2	19.9	20.1	20	19.3	18.3	16	15.6	15.8	16.1
pH	8.15	8.04	8.1	7.65	7.48	7.51	7.09	7.57	7.49	7.88	7.48	7.2	6.98	7.6	7.54	7.38	7.62	7.68	7.58	7.41	7.5	7.38	7.5
EC (us/cm)	13103	872	2737	271.9	373.7	258.8	1127	1293	713	839	380.4	348.9	355.9	404.5	122.7	1288	742	788	1133	353.9	357.9	318.3	382.3
SPC (us/cm)	12141	842	2521	260.8	365.2	241.5	1154	1336	750	850	424.1	385.6	393.9	445	1361	1407	-	882	1299	427.8	293.8	386.2	466.2
DO (mg/L)	5.07	14.5	3.3	3.01	1.3	2.8	5.57	5.62	4.85	5.7	5.55	6.03	6.22	6.88	5.96	4.85	5.57	6.01	5.19	4.6	5.51	5.46	5.5
NTU	12.6	14.5	3.3	888	888	116	12.3	6	4	2.5	23.5	28.7	32.9	14	5.9	6.4	18.2	2.2	3.9	10.2	17.7	18.6	14.1
TDS	7810	348	1660	1540	3570	236	687	906	432	615	298	274	290	318	869	1010	620	576	889	261	233	267	295
SS	13	5	5	1100	161	32	10	6	6	8	6	5.00	15	6	6	5	5	5	16	5	9	5	7
Total Alkalinity (mg/l	194	122	115	74	80	54	148	60	141	140	86	81	83	87	179	56	161	142	167	98	92	104	105
Sulphate (mg/L)	501	12	22	8	4	12	40	41	32	33	17	15	16	16	48	41	36	35	47	14	12	12	13
Chloride (mg/L)	4510	119	849	34	68	31	318	434	167	210	88	76	76	91	420	455	227	251	404	88	75	85	112
Ammonia (mg/L)	0.05	0.05	0.05	0.12	0.25	0.03	0.06	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.03	0.02	0.04	0.02	0.02	0.06	0.02	0.02	0.02
Nitrite (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
Nitrate (mg/L)	0.01	0.02	0.05	0.05	0.03	0.02	0.06	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.03
Total Nitrogen (mg/L	1.2	0.6	0.8	4	5.5	1.5	0.7	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.5	0.2	0.2
Total P (mg/L)	0.16	0.06	0.05	1.38	1.26	0.21	0.03	0.02	0.22	0.08	0.16	0.15	0.15	0.02	0.01	0.02	0.01	0.01	0.02	0.02	0.04	0.02	0.02
Reactive Phosphorou	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
Fluoride	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.01	0.2	0.2	0.2	0.01	0.01	0.1	0.1
Aluminmum (mg/L)	0.01	0.01	0.01	0.01	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.55	0.01
Arsenic	0.004	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Barium	0.271	0.028	0.15	0.022	0.034	0.03	0.112	0.201	0.074	0.082	0.057	0.052	0.058	0.072	0.094	0.198	0.072	0.087	0.125	0.055	0.048	0.057	0.056
Cadmium	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	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Chromium	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	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	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	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	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.018	0.001	0.002	0.002	0.003	0.001	0.003	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
Lead	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Manganese	0.006	0.102	0.153	0.382	0.366	0.202	0.43	0.055	0.009	0.035	0.078	0.04	0.201	0.169	0.122	0.044	0.064	0.04	0.085	0.034	0.008	0.081	0.144
Molybdenum	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Nickel	0.001	0.001	0.001	0.003	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001
Selenium	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
Silver	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Uranium	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	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
Zinc	0.025	0.005	0.005	0.005	0.005	0.012	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.005	0.005	0.005	0.027	0.005	0.005	0.005	0.005
Iron	0.05	0.05	0.07	0.08	0.08	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.37	0.05
Mercury	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	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Paramater	Number of Samples	Mean	Median	80th %	20th %	Max	Min
Temperature	23	21.80	20.10	26.70	17.86	29.90	15.60
pH	23	7.56	7.51	7.72	7.38	8.15	6.98
EC (us/cm)	23	1241.92	404.50	1164.00	342.78	13103.00	122.70
SPC (us/cm)	22	1301.50	608.10	1346.00	377.44	12141.00	241.50
DO (mg/L)	23	5.44	5.51	6.01	4.34	14.50	1.30
NTU	23	93.20	14.00	29.54	3.98	888.00	2.20
TDS	23	1043.65	576.00	1116.00	272.60	7810.00	233.00
SS	23	62.65	6.00	15.20	5.00	1100.00	5.00
Total Alkalinity (mg/L)	23	111.70	104.00	150.60	78.80	194.00	54.00
Sulphate (mg/L)	23	44.65	17.00	41.00	12.00	501.00	4.00
Chloride (mg/L)	23	399.48	119.00	422.80	75.80	4510.00	31.00
Ammonia (mg/L)	23	0.04	0.02	0.05	0.02	0.25	0.01
Nitrite (mg/L)	23	0.01	0.01	0.01	0.01	0.01	0.01
Nitrate (mg/L)	23	0.02	0.01	0.05	0.01	0.06	0.01
Total Nitrogen (mg/L)	23	0.79	0.30	0.88	0.20	5.50	0.10
Total P (mg/L)	23	0.18	0.04	0.17	0.02	1.38	0.01
Reactive Phosphorous	23	0.01	0.01	0.01	0.01	0.01	0.01
Fluoride	23	0.162	0.200	0.200	0.100	0.4	0.01
Aluminmum (mg/L)	23	0.037	0.010	0.010	0.010	0.55	0.01
Arsenic	23	0.001	0.001	0.002	0.001	0.004	0.001
Barium	23	0.088	0.072	0.130	0.045	0.271	0.022
Cadmium	23	0.0005	0.0001	0.0010	0.0001	0.001	0.0001
Chromium	23	0.001	0.001	0.001	0.001	0.001	0.001
Cobalt	23	0.001	0.001	0.001	0.001	0.001	0.001
Copper	23	0.002	0.001	0.002	0.001	0.018	0.001
Lead	23	0.001	0.001	0.001	0.001	0.001	0.001
Manganese	23	0.124	0.081	0.201	0.035	0.43	0.006
Molybdenum	23	0.001	0.001	0.001	0.001	0.002	0.001
Nickel	23	0.001	0.001	0.002	0.001	0.003	0.001
Selenium	23	0.010	0.010	0.010	0.010	0.01	0.01
Silver	23	0.001	0.001	0.001	0.001	0.001	0.001
Uranium	23	0.001	0.001	0.001	0.001	0.001	0.001
Vanadium	23	0.010	0.010	0.010	0.010	0.01	0.01
Zinc	23	0.007	0.005	0.005	0.005	0.027	0.005
Iron	23	0.067	0.050	0.054	0.050	0.37	0.05
Mercury	23	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

CENTRAL QUEENSLAND COAL PROJECT GROUNDWATER RESULTS

Sample ID	Date Measured	Field Measurements					
		Purge Volume	SWL	pH	Electrical Conductivity - (EC) µS/cm	Specific Conductance - (SPC) µS/cm	Temperature °C
BH5X	24/02/2017	1	6.569	7.36	6967	6948	25.2
		60	6.565	7.24	11736	11587	25.7
BH5X	3/05/2017	DAMAGED FOLLOWING CYCLONE DEBBIE					
BH32	23/02/2017	1	2.245	7.19	649	610	28.4
		80	2.251	6.44	463.7	436.8	28.4
BH32	15/06/2017	1	4.73	7.02	3601	3722	23.4
		160	5.17	6.86	3677	3790	23.4
BH34	23/02/2017	1	5.431	7.9	3190	3019	26.3
		120	5.665	7.019	5132		25.2
BH34	3/05/2017	1	4.63	7.07	3767	3688	25.9
		150	4.94	6.86	3887	3954	24
BH7	21/02/2017	GRAB	N/A	6.68	5419	5284	26
BH16	1/05/2017	1	2.9	7.14	222.8	215	25.9
		75	2.9	6.1	341.3	340.4	25.2
BH16	12/06/2017	1	3.29	6.73	356.1	361	24.6
		80	3.3	6.47	297.7	299.7	24.6
BH1x	1/05/2017	1	4.53	6.04	68.4	67.1	26
		75	4.5	6.26	142.5	143	24.8
BH1X	12/06/2017	1	5.23	6.7	388.1	382.4	25.7
		80	5.26	6.7	663	668	24.5
BH6X	3/05/2017	1	6.38	8.4	2344	2324	25.5
		35	6.59	7.83	2156	2150	25.2
BH6X	15/06/2017	1	6.61	8.03	1753	1792	23.9
		40	6.7	7.35	1412	1434	24.1
BH29	3/05/2017	1	2.1	7	379.8	374.6	25.9
		85	2.1	6.56	320.2	317.9	25.7
BH29	15/06/2017	1	2.13	6.53	478.2	486.2	24.3
		90	2.15	6.3	244.2	247.8	24.2
BH30	3/05/2017	1	4.47	7.3	122.8	121.1	25.2
		270	5.33	7.7	12311	12313	24.8
BH30	15/06/2017	1	4.56	6.25	3251	3344	23.7
		320	5.59	6.44	12507	12808	23.8
BH13	4/05/2017	1	12.8	6.76	3439	3410	25.5
		150	16.45	7	3103	3052	25.8
BH13	16/06/2017	1	12.83	6.59	4600	4659	24.4
		160	15.16	6.68	5563	5355	26.5
BH37	3/05/2017	DRY					

Notes:
SWL = surface water level
EC - Electrical Conductivity
SPC - Specific Conductance

		LAB ID	ANZECC Protection of Auquatic Ecoystems (2000) Water - Freshwater 95% protection level	ADWG	EB1709053-001	EB1709053-002	EB1709053-003	EB1709053-004	EB1708799-001	EB1708799-002	EB1709053-006	
		SAMPLE DATE			3/05/2017	3/05/2017	3/05/2017	3/05/2017	1/05/2017	1/05/2017	4/05/2017	
		SAMPLE ID			BH6X	BH29	BH30	BH32	BH16	BH1X	BH13	
ANALYTE	Unit	LOR										
Field Parameters (Laboratory)												
Total Dissolved Solids @180°C	mg/L	1			832	216	6530	2640	286	270	210	
Suspended Solids (SS)	mg/L	5			115	19	18	36	32	63	167	
ED037P: Alkalinity by PC Titrator												
Hydroxide Alkalinity as CaCO3	mg/L	1			<1	<1	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	mg/L	1			<1	<1	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	mg/L	1			719	41	301	594	123	107	354	
Total Alkalinity as CaCO3	mg/L	1			719	41	301	594	123	107	354	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA												
Sulfate as SO4 - Turbidimetric	mg/L	1			42	36	729	178	18	15	62	
ED045G: Chloride by Discrete Analyser												
Chloride	mg/L	1			264	52	4470	999	45	67	874	
ED093F: Dissolved Major Cations												
Calcium	mg/L	1			86	4	616	270	23	16	111	
Magnesium	mg/L	1			47	9	740	178	14	11	168	
Sodium	mg/L	1			177	57	1280	424	46	43	331	
Potassium	mg/L	1			15	<1	6	4	3	3	3	
EG020F: Dissolved Metals by ICP-MS												
Aluminium	mg/L	0.01	0.0055	0.2	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	
Arsenic	mg/L	0.001	0.0024	0.01	0.004	<0.001	0.003	<0.001	<0.001	0.052	0.001	
Barium	mg/L	0.001		2	0.08	0.01	0.166	0.04	0.052	0.077	0.045	
Cadmium	mg/L	0.0001	0.002	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	mg/L	0.001		0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	mg/L	0.001	0.0014	2	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.002	
Cobalt	mg/L	0.001			<0.001	<0.001	0.002	<0.001	0.003	<0.001	0.003	
Nickel	mg/L	0.001	0.011	0.02	<0.001	<0.001	0.002	<0.001	0.002	0.002	0.003	
Lead	mg/L	0.001	0.0034	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	mg/L	0.005	0.008	3	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	
Manganese	mg/L	0.001	0.19	0.1	0.12	0.006	2.98	0.386	0.895	1.28	1.13	
Molybdenum	mg/L	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	
Selenium	mg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	mg/L	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Uranium	mg/L	0.001			<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	
Vanadium	mg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Iron	mg/L	0.05		0.3	0.54	<0.05	3.95	<0.05	0.55	10	0.15	
EG035F: Dissolved Mercury by FIMS												
Mercury	mg/L	0.0001	0.0006	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator												
Fluoride	mg/L	0.1			0.6	0.1	0.2	0.7	0.2	0.1	0.4	
EK055G: Ammonia as N by Discrete Analyser												
Ammonia as N	mg/L	0.01			125	0.1	0.94	10.7	0.05	0.92	0.18	
EK057G: Nitrite as N by Discrete Analyser												
Nitrite as N	mg/L	0.01			0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser												
Nitrate as N	mg/L	0.01			<0.01	3.94	<0.01	<0.01	0.03	0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser												
Nitrite + Nitrate as N	mg/L	0.01			<0.01	3.94	<0.01	<0.01	0.03	0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser												
Total Kjeldahl Nitrogen as N	mg/L	0.1			110	0.6	1.1	9.9	0.6	2	1.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser												
Total Nitrogen as N	mg/L	0.1			110	4.5	1.1	9.9	0.6	2	1.2	
EK067G: Total Phosphorus as P by Discrete Analyser												
Total Phosphorus as P	mg/L	0.01			3.71	0.09	0.13	0.66	0.12	0.93	0.24	
EK071G: Reactive Phosphorus as P by discrete analyser												
Reactive Phosphorus as P	mg/L	0.01			1.55	0.04	<0.01	0.55	0.04	0.02	0.02	
EN055: Ionic Balance												
Total Anions	meq/L	0.01			22.7	3.32	147	43.8	4.1	4.34	33	
Total Cations	meq/L	0.01			25.1	3.42	147	46.7	4.38	4.28	33.8	

Ionic Balance	%	0.01			5.02	1.48	0.06	3.22	3.25	0.7	1.23	
EP080/071: Total Petroleum Hydrocarbons													
C6 - C9 Fraction	µg/L	20			<20	<20	<20	<20	<20	<20	<20	
C10 - C14 Fraction	µg/L	50			<50	<50	<50	<50	<50	<50	<50	
C15 - C28 Fraction	µg/L	100			190	<100	<100	<100	<100	<100	<100	
C29 - C36 Fraction	µg/L	50			280	<50	<50	<50	<50	60	<50	
C10 - C36 Fraction (sum)	µg/L	50			470	<50	<50	<50	<50	60	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction	µg/L	20			<20	<20	<20	<20	<20	<20	<20	
C6 - C10 Fraction minus BTEX (F1)	µg/L	20			<20	<20	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	µg/L	100			<100	<100	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	µg/L	100			450	<100	<100	<100	<100	120	110	
>C34 - C40 Fraction	µg/L	100			<100	<100	<100	<100	<100	<100	<100	
>C10 - C40 Fraction (sum)	µg/L	100			450	<100	<100	<100	<100	120	110	
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100			<100	<100	<100	<100	<100	<100	<100	
EP080: BTEXN													
Benzene	µg/L	1			<1	<1	<1	<1	<1	<1	<1	
Toluene	µg/L	2			<2	<2	<2	<2	<2	<2	<2	
Ethylbenzene	µg/L	2			<2	<2	<2	<2	<2	<2	<2	
meta- & para-Xylene	µg/L	2			<2	<2	<2	<2	<2	<2	<2	
ortho-Xylene	µg/L	2			<2	<2	<2	<2	<2	<2	<2	
Total Xylenes	µg/L	2			<2	<2	<2	<2	<2	<2	<2	
Sum of BTEX	µg/L	1			<1	<1	<1	<1	<1	<1	<1	
Naphthalene	µg/L	5			<5	<5	<5	<5	<5	<5	<5	

ANZECC exceedance

ADWG exceedance

		LAB ID	ANZECC Protection of Auquatic Ecoystems (2000) Water - Freshwater 95% protection level	ADWG	EB1703752003	EB1703752001	EB1703752002
		SAMPLE DATE			42790	42789	42789
		SAMPLE ID			BH5X	BH32	BH34
ANALYTE	**Unit**	**LOR**					
Field Parameters (Laboratory)							
Total Dissolved Solids @180°C	mg/L	1			300	3960	8920
Suspended Solids (SS)	mg/L	5			14	16	51
ED037P: Alkalinity by PC Titrator							
Hydroxide Alkalinity as CaCO3	mg/L	1			<1	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	1			<1	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	1			34	532	488
Total Alkalinity as CaCO3	mg/L	1			34	532	488
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Sulfate as SO4 - Turbidimetric	mg/L	1			46	324	468
ED045G: Chloride by Discrete Analyser							
Chloride	mg/L	1			77	1420	4100
ED093F: Dissolved Major Cations							
Calcium	mg/L	1			5	314	345
Magnesium	mg/L	1			11	220	338
Sodium	mg/L	1			63	503	1770
Potassium	mg/L	1			1	4	37
EG020F: Dissolved Metals by ICP-MS							
Aluminium	mg/L	0.01	0.0055	0.2	<0.01	<0.01	<0.01
Arsenic	mg/L	0.001	0.0024	0.01	<0.001	<0.001	0.007
Barium	mg/L	0.001		2	0.013	0.053	0.065
Cadmium	mg/L	0.0001	0.002	0.002	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001		0.05	<0.001	<0.001	<0.001
Copper	mg/L	0.001	0.0014	2	<0.001	<0.001	0.001
Cobalt	mg/L	0.001			<0.001	<0.001	<0.001
Nickel	mg/L	0.001	0.011	0.02	0.002	<0.001	<0.001
Lead	mg/L	0.001	0.0034	0.01	0.011	0.642	1.27
Zinc	mg/L	0.005	0.008	3	<0.001	<0.001	<0.001
Manganese	mg/L	0.001	0.19	0.1	<0.001	<0.001	<0.001
Molybdenum	mg/L	0.001			<0.01	<0.01	<0.01
Selenium	mg/L	0.01			<0.001	<0.001	<0.001
Silver	mg/L	0.001			<0.001	0.001	0.002
Uranium	mg/L	0.001			<0.01	<0.01	<0.01
Vanadium	mg/L	0.01			0.005	<0.005	0.101
Iron	mg/L	0.05		0.3	<0.05	<0.05	3.96
EG035F: Dissolved Mercury by FIMS							
Mercury	mg/L	0.0001	0.0006	0.001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator							

Fluoride	mg/L	0.1			<0.1	0.8	0.6
EK055G: Ammonia as N by Discrete Analyser							
Ammonia as N	mg/L	0.01			0.09	1.5	0.21
EK057G: Nitrite as N by Discrete Analyser							
Nitrite as N	mg/L	0.01			<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser							
Nitrate as N	mg/L	0.01			0.11	0.14	0.05
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Nitrite + Nitrate as N	mg/L	0.01			0.11	0.14	0.05
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Total Kjeldahl Nitrogen as N	mg/L	0.1			0.3	1.8	<0.5
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser							
Total Nitrogen as N	mg/L	0.1			0.4	1.9	<0.5
EK067G: Total Phosphorus as P by Discrete Analyser							
Total Phosphorus as P	mg/L	0.01			0.06	0.15	0.26
EK071G: Reactive Phosphorus as P by discrete analyser							
Reactive Phosphorus as P	mg/L	0.01			0.04	0.16	<0.01
EN055: Ionic Balance							
Total Anions	meq/L	0.01			3.81	57.4	135
Total Cations	meq/L	0.01			3.92	55.8	123
Ionic Balance	%	0.01			1.44	1.48	4.72
EP080/071: Total Petroleum Hydrocarbons							
C6 - C9 Fraction	µg/L	20			<20	<20	<20
C10 - C14 Fraction	µg/L	50			<50	<50	<50
C15 - C28 Fraction	µg/L	100			<100	<100	130
C29 - C36 Fraction	µg/L	50			<50	<50	100
C10 - C36 Fraction (sum)	µg/L	50			<50	<50	230
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
C6 - C10 Fraction	µg/L	20			<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20			<20	<20	<20
>C10 - C16 Fraction	µg/L	100			<100	<100	<100
>C16 - C34 Fraction	µg/L	100			<100	<100	200
>C34 - C40 Fraction	µg/L	100			<100	<100	<100
>C10 - C40 Fraction (sum)	µg/L	100			<100	<100	200
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100			<100	<100	<100
EP080: BTEXN							
Benzene	µg/L	1			<1	<1	<1
Toluene	µg/L	2			<2	<2	<2
Ethylbenzene	µg/L	2			<2	<2	<2
meta- & para-Xylene	µg/L	2			<2	<2	<2
ortho-Xylene	µg/L	2			<2	<2	<2
Total Xylenes	µg/L	2			<2	<2	<2
Sum of BTEX	µg/L	1			<1	<1	<1

Naphthalene	µg/L	5			<5	<5	<5

ANZECC exceedance

ADWG exceedance

		LAB ID	ANZECC Protection of Auquatic Ecoystems (2000) Water - Freshwater 95% protection level	ADWG	EB1712405001	EB1712405002	EB1712405003	EB1712405004	EB1712259001	EB1712259002	EB1712405005
		SAMPLE DATE			15/06/2017	15/06/2017	15/06/2017	15/06/2017	12/06/2017	42898	16/06/2017
		SAMPLE ID			BH6X	BH29	BH30	BH32	BH16	BH1X	BH13
ANALYTE	**Unit**	**LOR**									
Field Parameters (Laboratory)											
Total Dissolved Solids @180°C	mg/L	1			962	196	11400	2780	221	408	4020
Suspended Solids (SS)	mg/L	5			332	45	20	<5	32	253	44
ED037P: Alkalinity by PC Titrator											
Hydroxide Alkalinity as CaCO3	mg/L	1			<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	mg/L	1			<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	mg/L	1			523	52	331	527	151	200	511
Total Alkalinity as CaCO3	mg/L	1			523	52	331	527	151	200	511
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA											
Sulfate as SO4 - Turbidimetric	mg/L	1			46	35	873	228	8	22	98
ED045G: Chloride by Discrete Analyser											
Chloride	mg/L	1			250	34	5040	1040	25	122	1560
ED093F: Dissolved Major Cations											
Calcium	mg/L	1			89	3	709	278	17	31	213
Magnesium	mg/L	1			48	6	818	177	11	21	333
Sodium	mg/L	1			143	44	1360	422	43	87	508
Potassium	mg/L	1			8	<1	6	3	2	4	4
EG020F: Dissolved Metals by ICP-MS											
Aluminium	mg/L	0.01	0.0055	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	mg/L	0.001	0.0024	0.01	0.004	<0.001	0.002	<0.001	<0.001	0.032	0.002
Barium	mg/L	0.001		2	0.067	0.006	0.132	0.03	0.058	0.162	0.119
Cadmium	mg/L	0.0001	0.002	0.002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.001		0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	0.001	0.0014	2	<0.001	<0.001	0.001	<0.001	0.002	0.001	0.001
Cobalt	mg/L	0.001			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L	0.001	0.011	0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	mg/L	0.001	0.0034	0.01	0.129	0.006	3.41	0.345	0.468	0.803	1.98
Zinc	mg/L	0.005	0.008	3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Manganese	mg/L	0.001	0.19	0.1	<0.001	<0.001	0.002	<0.001	0.002	0.002	0.001
Molybdenum	mg/L	0.001			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium	mg/L	0.01			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver	mg/L	0.001			<0.001	<0.001	0.001	0.001	<0.001	<0.001	0.002
Uranium	mg/L	0.001			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Vanadium	mg/L	0.01			0.058	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	mg/L	0.05		0.3	0.43	<0.05	4.4	<0.05	0.25	8.91	1.31
EG035F: Dissolved Mercury by FIMS											
Mercury	mg/L	0.0001	0.0006	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator											
Fluoride	mg/L	0.1			0.7	0.1	0.2	0.7	0.2	0.2	0.3
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	mg/L	0.01			26.1	0.04	0.85	1.77	0.06	0.47	0.67
EK057G: Nitrite as N by Discrete Analyser											
Nitrite as N	mg/L	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	mg/L	0.01			<0.01	0.41	<0.01	<0.01	0.01	0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser											
Nitrite + Nitrate as N	mg/L	0.01			<0.01	0.41	<0.01	<0.01	0.01	0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser											
Total Kjeldahl Nitrogen as N	mg/L	0.1			35.4	0.4	0.9	2	0.3	1.1	0.9
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser											
Total Nitrogen as N	mg/L	0.1			35.4	0.4	0.9	2	0.3	1.1	0.9
EK067G: Total Phosphorus as P by Discrete Analyser											
Total Phosphorus as P	mg/L	0.01			4.29	0.14	0.14	0.13	0.07	0.55	0.06
EK071G: Reactive Phosphorus as P by discrete analyser											
Reactive Phosphorus as P	mg/L	0.01			0.46	0.04	<0.01	0.1	0.04	0.04	<0.01

EN055: Ionic Balance												
Total Anions	meq/L	0.01			18.4	2.73	167	44.6	3.89	7.9	56.2
Total Cations	meq/L	0.01			16.7	2.56	162	46.9	3.68	7.16	60.2
Ionic Balance	%	0.01			4.84		1.5	2.47	2.82	4.87	3.42
EP080/071: Total Petroleum Hydrocarbons												
C6 - C9 Fraction	µg/L	20			<20	<20	<20	<20	<20	<20	<20
C10 - C14 Fraction	µg/L	50			<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	µg/L	100			110	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	µg/L	50			580	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	µg/L	50			690	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions												
C6 - C10 Fraction	µg/L	20			<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	µg/L	20			<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	µg/L	100			<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	µg/L	100			640	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	µg/L	100			<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	µg/L	100			640	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100			<100	<100	<100	<100	<100	<100	<100
EP080: BTEXN												
Benzene	µg/L	1			<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	2			<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	2			<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	µg/L	2			<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	µg/L	2			<2	<2	<2	<2	<2	<2	<2
Total Xylenes	µg/L	2			<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	µg/L	1			<1	<1	<1	<1	<1	<1	<1
Naphthalene	µg/L	5			<5	<5	<5	<5	<5	<5	<5

ANZECC exceedance

ADWG exceedance

Site Location (ID)	RN	Easting	Northing	Elevation (m AHD)	Casing stick up (m ags)	Casing Diameter (m)	Total depth (m btoc)	Depth to water (m btoc)	Date	Field Parameter	Water Sampled	Condition	Comment
BH16	67652??	773592	7494520	17	0.26	0.147	9.405	5.371	20/02/2017	No	No	Poor	One well open to air (no cap)
BH20	57794??	773592	7494520	17					20/02/2017	No	No	Fair	Pump infrastructure installed
BH01X	Unknown	773561	7494524	17	0.3	0.124	10.826	6.75	20/02/2017	No	No	Poor	Open well - no cap
BH01	161292?	761920	7482423	67					21/02/2017	No	No	Poor	Mangled headworks
BH28 (BH05??)	97864??/Windmill 10	771053	7485988	47	0.2	0.125	Unknown	Obstruction at 1.716	21/01/2017	No	No	Poor	Obstruction at 1.716m
BH28A (BH05??)	97864??/Windmill 10	771056	7485987	45					21/01/2017	No	No	Fair	Pump infrastructure installed
BH08	91715											Unknown	Access NOT approved.
BH23	88146	765068	7485360		0.2				21/02/2017			Poor	Totally overgrown, unused, pump infrastructure installed
BH22	88145											Abandoned/destroyed	No longer exists
BH17	97829??	762574	7482280						21/01/2017	No	No	Fair	Pump infrastructure installed - not accessible
BH07	97562	765346	7475831	198	0.38	0.16	NA	NA	21/02/2017	No	Yes	Good	Solar pump installed and functional.
BH06	97866/88144??	769036	7475802	76	0.367	0.125	20.847	9.256	21/02/2017	No	No	Fair	Pump infrastructure installed
BH21	97866/88144??	769040	7475799	87	0.72	0.135	15.164	9.116	21/02/2017	No	No	Fair	Pump infrastructure installed (windmill)
BH02X	Unknown	769932	7477272	66	0.366	0.125	13.659	2.264	21/02/2017	No	No	Poor	Open well - disconnected pump infrastructure in well
BH03X	Unknown	766972	7479111	64	0.38	0.15	NA	NA	21/02/2017	No	No	Good	Solar pump installed and functional.
BH04X	Unknown	765542	7482007	55	0.35	0.155	NA	NA	21/02/2017	No	No	Good	Pump infrastructure installed. Domestic use
BH18	88891??	777605	7476010	75	0.13	0.14	14.185	5.95	23/02/2017	No	No	Poor	Cement headworks, pump not in use
BH04	111418??	772246	7496509	19	0.15	0.125	10.376	6.183	20/02/2017	No	No	Poor	No cap (bailer does not fit), possible surface ingress, well infrastructure (windmill) pump installed, pumps to tank approx 5 m away, not operating, used for stock watering
BH05X	Unknown	770918	7499541	14	0.16	0.14	10.746	6.569	24/02/2017	Yes	Yes	Fair	Although infrastructure installed, bailer could fit down alongside pump and did not encounter obstruction and/or get stuck. Dipping also possible
BH38												Abandoned/destroyed	Could not find/may not exist
BH14												Abandoned/destroyed	Coul not find/may not exist
BH36												Abandoned/destroyed	Coul not find/may not exist
BH37	Riverside 1	770505	7499287	12	0.17	0.14	6.954	Dry	24/02/2017	No	No		PVC casing, not used, broken stick up, cement headworks
BH6X	Unknown	770732	7499500	13	0.24	0.14	9.151	6.361	24/02/2017	No	No	Poor	Pvc casing. No cap, PVC with metal monument and concrete block, 12000ppm (anecdotal from landowner), not in use, used to have mill but blew over, formerly used to mix for concrete batching
BH33	Neerim 2??	774175	7475211	73	0.369	0.14	30.356	5.191	23/02/2017	No	No	Poor	PVC casing, no cap, not used, no headworks
BH32	Neerim 1??	775322	7477562	60	0.14	0.14	9.177	2.245	23/02/2017	Yes	Yes	Poor	PVC, not used, no cap
BH34	Neerim 3??	774433	7470634	109	0.36	0.13	17.118	5.431	23/02/2017	Yes	Yes	Poor	Not used, no well cap, good condition, strong sulphurous odour
BH35	Neerim 4??	774560	7470829	103	0.295	0.14	12.136	2.566	23/02/2017	No	No	Poor	Steel headworks, PVC casing, cement well seal, not in use, headworks rusted, strong sulphurous odour
BH19	New Bore 2??	772863	7474143	84	0.15	0.14	17.433	5.414	23/02/2017	No	No	Poor	PVC casing, not used, cement headworks, headworks rusted/broken