

EPL20350 WATER MONITORING RESULTS 2018/2019 - QUARTER 2

LICENCE HOLDER	Santos NSW (Eastern) Pty Ltd
PREMISES	Narrabri Gas Field X Line Road, NARRABRI NSW 2390
LICENCE NUMBER	Environment Protection Licence 20350
EPL LINK (EPA SITE)	http://www.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=33816&SYSUID=1&LICID=20350
SCHEDULED ACTIVITY	Coal seam gas exploration, assessment and production
EPL PERIOD	May 1 st 2018 to April 30 th 2019
REPORTING PERIOD	Quarter 2 – August 18 / October 18
PUBLISHED DATE	November 2018
MONITORING BY	Santos
ANALYSIS BY	Australian Laboratory Services Pty Ltd

Table 1: EPL20350 WATER MONITORING LOCATIONS

Spatial reference: GDA94 MGA Zone 55

EPA Identification No.	Monitoring type	Location	Easting	Northing
7	Groundwater quality monitoring	BWD27PRORA01	755429.176	6604670.682
8	Groundwater quality monitoring	BWD27PRUPS02	755433.048	6604684.807
9	Groundwater quality monitoring	BWD26PRUPS01	749372.750	6609376.690
10	Groundwater quality monitoring	BWD26PRLPS02	749364.450	6609363.350
11	Groundwater quality monitoring	DWH14PRUPS01	764703.313	6617145.443
12	Groundwater quality monitoring	DWH14PRLPS02	764689.147	6617119.109
13	Groundwater quality monitoring	DWH14PRPUR03	764696.211	6617132.298
14	Groundwater quality monitoring	DWH3PRUPS01	762239.680	6605589.320
15	Groundwater quality monitoring	DWH3PRLPS02	762251.050	6605598.980
16	Groundwater quality monitoring	NYOPRORA01	736293.460	6643110.400
17	Groundwater quality monitoring	NYOPRUPS02	736308.800	6643107.840
18	Groundwater quality monitoring	BWD27PRLPS03	755436.361	6604699.035
20	Groundwater quality monitoring	BHN14PRORA01	747158.130	6626109.120
21	Groundwater quality monitoring	BHN14PRUPS02	747152.710	6626123.910
22	Groundwater quality monitoring	TULPRNAP01	774464.070	6612048.130
23	Groundwater quality monitoring	TULPRDGY02	774466.480	6612032.980
24	Groundwater quality monitoring	BWDMW13D	753863.300	6608108.510
25	Groundwater quality monitoring	BWDMW13S	753864.820	6608109.300
26	Groundwater quality monitoring	BWDMW12S	753830.650	6608202.740
27	Groundwater quality monitoring	BWDMW12D	753831.910	6608203.710
28	Groundwater quality monitoring	BWDMW12I	753832.680	6608202.250
29	Groundwater quality monitoring	BWDMW2	753912.830	6608241.350
30	Groundwater quality monitoring	BWDMW3	753935.870	6608254.020
31	Groundwater quality monitoring	BWDMW4D	753980.810	6608285.740
32	Groundwater quality monitoring	BWDMW4	753984.140	6608288.040
33	Groundwater quality monitoring	BWDMW15S	753868.090	6608258.340
34	Groundwater quality monitoring	BWDMW15D	753867.100	6608256.750
35	Groundwater quality monitoring	BWDMW16S	753858.950	6608316.490
36	Groundwater quality monitoring	BWDMW16D	753856.980	6608315.570
37	Groundwater quality monitoring	LWDMW1D	751387.930	6623862.960
38	Groundwater quality monitoring	LWDMW1S	751388.920	6623862.460
39	Groundwater quality monitoring	LWDMW1I	751390.640	6623861.850
40	Groundwater quality monitoring	LWDMW2S	751102.840	6622293.020
41	Groundwater quality monitoring	LWDMW2D	751101.810	6622293.150
42	Groundwater quality monitoring	LWDMW3D	751876.160	6622163.760
43	Groundwater quality monitoring	LWDMW3S	751876.470	6622164.930
44	Groundwater level monitoring	DWH8AGMB1	765546.740	6616987.990
45	Groundwater level monitoring	DWH8AGMB2	765546.740	6616987.990
46	Groundwater level monitoring	DWH8AGMB3	765546.740	6616987.990
47	Groundwater level monitoring	BWD28QGUPS01	752949.898	6604219.732

EPA Identification No.	Monitoring type	Location	Easting	Northing
48	Groundwater level monitoring	BWD28QGLPS01	752949.898	6604219.732
49	Groundwater level monitoring	BWD28QGPUR01	752949.898	6604219.732
50	Groundwater quality monitoring	WPKMW01	755684.140	6638105.310
51	Groundwater quality monitoring	WPKMW01D	755689.750	6638097.350
52	Groundwater quality monitoring	WPKMW02	755671.200	6638034.290
53	Groundwater quality monitoring	WPKMW04	755632.500	6637993.070
54	Groundwater quality monitoring	WPKMW07	755501.160	6638207.530
55	Groundwater quality monitoring	WPKMW08	755634.110	6638166.870
56	Groundwater quality monitoring	WPKMW09D	755663.980	6637988.200
57	Groundwater quality monitoring	WPKMW09S	755664.400	6637990.540
58	Groundwater quality monitoring	WPKMW12S	755456.180	6638228.910
59	Groundwater quality monitoring	WPKMW13I	755552.650	6638189.560
60	Groundwater quality monitoring	WPKMW13S	755554.880	6638189.050
61	Groundwater quality monitoring	WPKMW14D	755364.510	6638049.060
62	Groundwater quality monitoring	WPKMW14S	755364.770	6638048.260
63	Groundwater quality monitoring	WPKMW15D	755365.480	6638233.360
64	Groundwater quality monitoring	WPKMW15S	755365.500	6638230.740
65	Groundwater quality monitoring	WPKMW16D	755051.030	6637988.500
66	Groundwater quality monitoring	WPKMW16S	755050.530	6637986.640
67	Groundwater quality monitoring	WPKMW17D	756151.060	6638128.320
68	Groundwater quality monitoring	WPKMW17S	756149.540	6638128.050
69	Produced water storage dam	BWDPD2	753875.870	6607995.060
70	Produced water storage dam	BWDPD3	753992.170	6608125.970
71	Produced water storage dam	LWDPD1CELL4	751473.349	6623513.252
72	Produced water storage dam	LWDPD1CELL3	751460.723	6623323.850
73	Produced water storage dam	LWDPD1CELL2	751428.103	6623124.978
74	Produced water storage dam	LWDPD1CELL1	751390.223	6622935.575
75	Produced water storage dam	TFDPD1	755611.600	6638072.850
76	Produced water storage dam	TFDPD2	755480.110	6638099.040
77	Treated water quality monitoring	LWWTTPDM1	751648.020	6622508.310
78	Groundwater quality monitoring	WPKMW18S	755944.010	6638100.840
79	Groundwater quality monitoring	WPKMW18I	755945.070	6638105.040
80	Groundwater quality monitoring	LWDMW4	752080.540	6623038.940
81	Groundwater quality monitoring	LWDMW5	752491.080	6623301.160
82	Groundwater quality monitoring	LWDMW6	752667.550	6623165.030
83	Soil quality monitoring	LWDSMP1	751942.34	6622941.21
84	Soil quality monitoring	LWDSMP2	752164.06	6623143.83
85	Soil quality monitoring	LWDSMP3	752572.60	6623126.32
86	Soil quality monitoring	LWDSMP4	752457.14	6622764.26

Table 2: Water Monitoring Results 2nd Quarter – August / October 2018

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	7	8	9	10	11	12	13	14
			BWD27PRUPS02 24/10/2018 Yes In situ RESULT	BWD27PRLPS03 24/10/2018 Yes In situ RESULT	BWD26PRUPS01 23/10/2018 Yes In situ RESULT	BWD26PRLPS02 23/10/2018 Yes In situ RESULT	DWH14PRUPS01 17/10/2018 Yes In situ RESULT	DWH14PRLPS02 17/10/2018 Yes In situ RESULT	DWH14PRPUR03 17/10/2018 Yes In situ RESULT	DWH3PRUPS01 17/10/2018 Yes In situ RESULT
Aluminium	mg/L	0.01								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-	3.64	0.48	0.09	<0.01	0.67	0.83	0.74	1.98
Electrical Conductivity	µS/cm	-	139	216	75	142	209	188	588	125
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	µg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	5.5	5.93	5.68	6.13	5.61	5.49	7.37	5.24
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	53	-72	-32	-90	155	-51	-264	196
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	38.83	38.37	29.00	29.59	53.32	54.05	53.69	67.38
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	15	16	17	18	20	21	22	23
			DWH3PRLPS02 17/10/2018 Yes In situ RESULT	NYOPRORA01 16/10/2018 Yes In situ RESULT	NYOPRUPS02 16/10/2018 Yes In situ RESULT	BWD27PRORA01 24/10/2018 No Dry well* RESULT	BHN14PRORA01 15/10/2018 Yes In situ RESULT	BHN14PRUPS02 15/10/2018 Yes In situ RESULT	TULPRNAP01 9/10/2018 Yes In situ RESULT	TULPRDGY02 9/10/2018 Yes In situ RESULT
Aluminium	mg/L	0.01								
Ammonia	mg/L	0.01								
Arsenic	mg/L	0.001								
Barium	mg/L	0.001								
Beryllium	mg/L	0.001								
Bicarbonate	mg/L	1								
Boron	mg/L	0.05								
Bromide	mg/L	0.01								
Cadmium	mg/L	0.0001								
Calcium	mg/L	1								
Carbonate	mg/L	1								
Chloride	mg/L	1								
Chromium	mg/L	0.001								
Cobalt	mg/L	0.001								
Copper	mg/L	0.001								
Dissolved Oxygen	mg/L	-	1.21	<0.01	3.21		0.54	0.01	2.22	2.45
Electrical Conductivity	µS/cm	-	131	1287	1238		488	473	7293	8434
Fluoride	mg/L	0.1								
Iron	mg/L	0.05								
Lead	mg/L	0.001								
Magnesium	mg/L	1								
Manganese	mg/L	0.001								
Mercury	mg/L	0.0001								
Methane	µg/L	10								
Molybdenum	mg/L	0.001								
Nickel	mg/L	0.001								
Nitrate	mg/L	0.01								
Nitrite	mg/L	0.01								
pH	pH Unit	-	5.47	8.18	8.12		7.24	7.17	6.92	6.75
Potassium	mg/L	1								
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-	181	-313	-181		-165	-191	-150	-207
Selenium	mg/L	0.01								
Silica	mg/L									
Sodium	mg/L	1								
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	67.59	8.5	10.5		26.44	15.22	90.27	73.96
Strontium	mg/L	0.001								
Sulfate	mg/L	1								
Total Alkalinity (as CaCO3)	mg/L	1								
Total Dissolved Solids	mg/L	10								
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001								
Vanadium	mg/L	0.01								
Zinc	mg/L	0.005								

*Monitoring event was completed but no water was available for sampling in BWD27PRORA01

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	24	25	26	27	28	29	30	31
			BWDMW13D 06/11/2018 Yes Grab Sample RESULT	BWDMW13S 24/09/2018 No Dry well* RESULT	BWDMW12S 24/09/2018 No Dry well* RESULT	BWDMW12D 24/09/2018 Yes Grab Sample RESULT	BWDMW121 24/09/2018 Yes Grab Sample RESULT	BWDMW2 24/09/2018 No Dry well* RESULT	BWDMW3 24/09/2018 Yes Grab Sample RESULT	BWDMW4D 24/09/2018 Yes Grab Sample RESULT
Aluminium	mg/L	0.01	<0.01			<0.01	<0.10**		0.02	0.02
Ammonia	mg/L	0.01	0.01			0.02	0.04		0.24	0.02
Arsenic	mg/L	0.001	<0.001			<0.001	<0.010**		0.002	<0.001
Barium	mg/L	0.001	0.431			2.39	7.25**		0.154	0.050
Beryllium	mg/L	0.001	<0.001			<0.001	<0.010**		<0.001	<0.001
Bicarbonate	mg/L	1	64			3880	6780		38	26
Boron	mg/L	0.05	<0.05			<0.05	<0.10**		<0.05	<0.05
Bromide	mg/L	0.01	0.959			5.50	9.29		0.777	0.129
Cadmium	mg/L	0.0001	<0.0001			<0.0001	<0.0010**		<0.0001	<0.0001
Calcium	mg/L	1	9			19	5		6	1
Carbonate	mg/L	1	<1.0			<1	<1		<1	<1
Chloride	mg/L	1	347			1190	1890		268	40
Chromium	mg/L	0.001	<0.001			<0.001	<0.010**		<0.001	<0.001
Cobalt	mg/L	0.001	0.016			0.001	<0.010**		0.009	<0.001
Copper	mg/L	0.001	<0.001			<0.001	<0.010**		<0.001	<0.001
Dissolved Oxygen	mg/L	-	3.36			2.87	2.42		1.05	1.89
Electrical Conductivity	µS/cm	-	1295			9213	16200		1022	239
Fluoride	mg/L	0.1	<0.1			0.7	1.0		<0.1	<0.1
Iron	mg/L	0.05	0.33			<0.05	<0.10**		11.8	0.12
Lead	mg/L	0.001	<0.001			<0.001	<0.010**		<0.001	<0.001
Magnesium	mg/L	1	28			344	584		14	3
Manganese	mg/L	0.001	0.160			0.004	<0.010		0.556	0.007
Mercury	mg/L	0.0001	<0.0001			<0.0001	<0.0001		<0.0001	<0.0001
Methane	µg/L	10	0.031			<0.01	<0.01		0.438	<0.01
Molybdenum	mg/L	0.001	<0.0010			0.002	<0.010**		<0.001	<0.001
Nickel	mg/L	0.001	0.014			0.003	<0.010**		0.008	0.006
Nitrate	mg/L	0.01	0.1			0.11	0.30		0.04	0.23
Nitrite	mg/L	0.01	<0.01			0.01	0.04		0.02	<0.01
pH	pH Unit	-	5.63			7.08	7.08		5.65	5.66
Potassium	mg/L	1	15			43	46		11	6
Reactive Phosphorus	mg/L	0.01	<0.01			0.01	0.10		<0.01	<0.01
Redox Potential	mV	-	15.3			82.5	36.6		5.7	74
Selenium	mg/L	0.01	<0.01			<0.01	<0.10**		<0.01	<0.01
Silica	mg/L									
Sodium	mg/L	1	145			1850	3110		147	40
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	30.64			30.93	21.16	20.22	30.89	30.30
Strontium	mg/L	0.001	0.125			0.800	0.248**		0.087	0.008
Sulfate	mg/L	1	16			44	15**		42	8
Total Alkalinity (as CaCO3)	mg/L	1	64			3880	6780		38	26
Total Dissolved Solids	mg/L	10	791			6400	10900		1090	201
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001	<0.001			0.052	0.118**		<0.001	<0.001
Vanadium	mg/L	0.01	<0.01			<0.01	<0.10**		<0.01	<0.01
Zinc	mg/L	0.005	1.99			<0.005	<0.050**		0.017	0.007

*Monitoring event was completed but insufficient water was available for sampling in BWDMW13S, BWDMW12S and BWDMW2.

**Limit of Reporting raised

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	32	33	34	35	36	37	38	39
			BWDMW4 24/09/2018 No Insufficient water* RESULT	BWDMW15S 24/09/2018 No Dry well* RESULT	BWDMW15D 24/09/2018 Yes Grab Sample RESULT	BWDMW16S 24/09/2018 No Insufficient water* RESULT	BWDMW16D 24/09/2018 Yes Grab Sample RESULT	LWDMW1D 13/09/2018 Yes Grab Sample RESULT	LWDMW1S 13/09/2018 No Dry well* RESULT	LWDMW1I 13/09/2018 No Dry well* RESULT
Aluminium	mg/L	0.01			0.01		0.02	<0.01		
Ammonia	mg/L	0.01			0.04		0.03	0.07		
Arsenic	mg/L	0.001			<0.001		<0.001	<0.001		
Barium	mg/L	0.001			0.044		0.068	0.377		
Beryllium	mg/L	0.001			<0.001		<0.001	<0.001		
Bicarbonate	mg/L	1			16		3	202		
Boron	mg/L	0.05			<0.05		<0.05	0.12		
Bromide	mg/L	0.01			0.222		0.212	1.18		
Cadmium	mg/L	0.0001			<0.0001		<0.0001	<0.0001		
Calcium	mg/L	1			1		<1	6		
Carbonate	mg/L	1			<1		<1	<1		
Chloride	mg/L	1			82		89	651		
Chromium	mg/L	0.001			<0.001		<0.001	<0.001		
Cobalt	mg/L	0.001			<0.001		0.001	<0.001		
Copper	mg/L	0.001			<0.001		<0.001	<0.001		
Dissolved Oxygen	mg/L	-			1.76		4.03	0.82		
Electrical Conductivity	µS/cm	-			414		351	2211		
Fluoride	mg/L	0.1			<0.1		<0.1	0.2		
Iron	mg/L	0.05			1.58		<0.05	<0.05		
Lead	mg/L	0.001			<0.001		<0.001	<0.001		
Magnesium	mg/L	1			3		2	12		
Manganese	mg/L	0.001			0.018		0.013	0.003		
Mercury	mg/L	0.0001			<0.0001		<0.0001	<0.0001		
Methane	µg/L	10			<0.01		<0.01	<0.01		
Molybdenum	mg/L	0.001			<0.001		<0.001	0.001		
Nickel	mg/L	0.001			0.001		0.002	0.001		
Nitrate	mg/L	0.01			0.41		0.19	0.13		
Nitrite	mg/L	0.01			<0.01		<0.01	<0.01		
pH	pH Unit	-			6.41		5.59	6.34		
Potassium	mg/L	1			6		6	11		
Reactive Phosphorus	mg/L	0.01			<0.01		<0.01	0.08		
Redox Potential	mV	-			-86		160	95.1		
Selenium	mg/L	0.01			<0.01		<0.01	<0.01		
Silica	mg/L									
Sodium	mg/L	1			65		55	392		
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	20.55		30.34	22.43	30.15	29.94		
Strontium	mg/L	0.001			0.010		0.008	0.100		
Sulfate	mg/L	1			23		2	16		
Total Alkalinity (as CaCO3)	mg/L	1			16		3	202		
Total Dissolved Solids	mg/L	10			239		260	1180		
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001			<0.001		<0.001	<0.001		
Vanadium	mg/L	0.01			<0.01		<0.01	<0.01		
Zinc	mg/L	0.005			0.010		0.011	<0.005		

*Monitoring event was completed because insufficient water was available for sampling in BWDMW4, BWDMW15S, BWDMW16S, LWDMW1S and LWDMW1I

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	40	41	42	43	50	51	52	53
			LWDMW2S 13/09/2018 No Dry well* RESULT	LWDMW2D 13/09/2018 Yes Grab Sample RESULT	LWDMW3D 13/09/2018 Yes Grab Sample RESULT	LWDMW3S 13/09/2018 No Dry well* RESULT	WPKMW1 26/09/2018 Yes Grab Sample RESULT	WPKMW1D 26/09/2018 Yes Grab Sample RESULT	WPKMW2 26/09/2018 Yes Grab Sample RESULT	WPKMW4 26/09/2018 Yes Grab Sample RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	0.01	<0.01	<0.01
Ammonia	mg/L	0.01	0.06	0.07		0.04	0.17	0.03	0.03	
Arsenic	mg/L	0.001	0.001	0.002		0.003	0.003	0.003	0.004	
Barium	mg/L	0.001	0.435	0.070		0.021	0.111	0.052	0.016	
Beryllium	mg/L	0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	
Bicarbonate	mg/L	1	421	105		587	530	1240	864	
Boron	mg/L	0.05	0.10	0.08		0.23	0.24	0.30	0.31	
Bromide	mg/L	0.01	0.7	0.425		0.289	0.177	1.31	0.594	
Cadmium	mg/L	0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	
Calcium	mg/L	1	17	1		2	7	4	1	
Carbonate	mg/L	1	<1	<1		122	<1	<1	<1	
Chloride	mg/L	1	458	263		121	76	517	236	
Chromium	mg/L	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	
Copper	mg/L	0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	
Dissolved Oxygen	mg/L	-	1.15	0.36		1.98	0.05	0.93	0.75	
Electrical Conductivity	µS/cm	-	2041	948		1411	1184	3519	2220	
Fluoride	mg/L	0.1	0.4	0.2		0.8	0.8	0.8	1.1	
Iron	mg/L	0.05	<0.05	0.65		<0.05	<0.05	<0.05	<0.05	
Lead	mg/L	0.001	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	
Magnesium	mg/L	1	23	4		<1	2	2	<1	
Manganese	mg/L	0.001	0.056	0.009		<0.001	0.109	0.002	<0.001	
Mercury	mg/L	0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	
Methane	µg/L	10	<0.01	0.017		<0.01	0.062	<0.01	<0.01	
Molybdenum	mg/L	0.001	0.004	0.002		<0.001	<0.001	0.002	0.001	
Nickel	mg/L	0.001	0.007	0.009		<0.001	<0.001	<0.001	<0.001	
Nitrate	mg/L	0.01	0.01	<0.01		0.13	<0.01	0.02	0.14	
Nitrite	mg/L	0.01	<0.01	<0.01		<0.01	0.01	<0.01	<0.01	
pH	pH Unit	-	6.76	6.32		7.82	8.01	7.83	7.90	
Potassium	mg/L	1	23	8		3	3	8	6	
Reactive Phosphorus	mg/L	0.01	0.13	0.08		0.45	0.10	0.60	0.62	
Redox Potential	mV	-	-4.3	-121.9		50.9	-156	-2.2	-49.1	
Selenium	mg/L	0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Silica	mg/L									
Sodium	mg/L	1	347	174		328	304	839	522	
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-								
Strontium	mg/L	0.001	25.94	21.03		16.29	16.04	15.38	16.12	
Sulfate	mg/L	1	0.234	0.022		0.028	0.062	0.074	0.030	
Total Alkalinity (as CaCO3)	mg/L	1	18	5		<1	23	<1	1	
Total Dissolved Solids	mg/L	10	421	105		587	530	1240	864	
Total Hardness (as CaCO3)	mg/L	1	1050	508		988	776	1960	1500	
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001	0.002	<0.001		<0.001	<0.001	0.003	0.001	
Vanadium	mg/L	0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Zinc	mg/L	0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	

*Monitoring event was completed but no water was available for sampling in LWDMW2S and LWDMW3S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	55	56	57	58	59	60	61	62
			WPKMW8 26/09/2018 Yes Grab Sample RESULT	WPKMW9D 26/09/2018 Yes Grab Sample RESULT	WPKMW9S 26/09/2018 Yes Grab Sample RESULT	WPKMW12S 26/09/2018 No Dry well* RESULT	WPKMW13I 26/09/2018 Yes Grab Sample RESULT	WPKMW13S 26/09/2018 Yes Grab Sample RESULT	WPKMW14D 26/09/2018 Yes Grab Sample RESULT	WPKMW14S 26/09/2018 no Dry well* RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01		0.01	<0.01	<0.01	
Ammonia	mg/L	0.01	0.03	0.10	0.09		0.04	0.03	0.11	
Arsenic	mg/L	0.001	0.001	0.004	0.001		0.001	<0.001	0.002	
Barium	mg/L	0.001	0.032	0.099	0.275		0.036	0.095	0.292	
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	
Bicarbonate	mg/L	1	833	520	1710		534	1100	516	
Boron	mg/L	0.05	0.28	0.22	0.42		0.22	0.35	0.22	
Bromide	mg/L	0.01	0.776	0.166	1.17		0.197	1.20	0.163	
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	
Calcium	mg/L	1	3	4	11		3	4	7	
Carbonate	mg/L	1	<1	<1	<1		<1	<1	<1	
Chloride	mg/L	1	318	61	458		69	458	60	
Chromium	mg/L	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	
Copper	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	
Dissolved Oxygen	mg/L	-	1.7	0.49	0.63		0.43	0.57	0.57	
Electrical Conductivity	µS/cm	-	2448	1173	4355		1253	3211	1153	
Fluoride	mg/L	0.1	0.7	0.9	1.0		0.8	0.6	0.7	
Iron	mg/L	0.05	<0.05	<0.05	0.08		<0.05	<0.05	<0.05	
Lead	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001	<0.001	
Magnesium	mg/L	1	1	<1	4		<1	2	2	
Manganese	mg/L	0.001	0.002	0.202	0.079		0.010	0.020	0.028	
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	
Methane	µg/L	10	<0.01	0.087	<0.01		<0.01	<0.01	<0.01	
Molybdenum	mg/L	0.001	0.001	0.002	0.002		<0.001	0.003	<0.001	
Nickel	mg/L	0.001	<0.001	0.002	<0.001		0.001	<0.001	0.002	
Nitrate	mg/L	0.01	0.41	<0.01	0.02		1.01	<0.01	0.01	
Nitrite	mg/L	0.01	<0.01	<0.01	<0.01		0.19	<0.01	<0.01	
pH	pH Unit	-	7.61	8.12	7.71		8.14	7.37	7.93	
Potassium	mg/L	1	7	3	10		4	9	4	
Reactive Phosphorus	mg/L	0.01	0.38	0.29	0.37		0.27	0.29	0.21	
Redox Potential	mV	-	20.1	-168	-146.1		19.7	33.8	-60.3	
Selenium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	
Silica	mg/L									
Sodium	mg/L	1	556	282	1090		302	751	272	
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	16.71	15.59	15.79		16.91	17	21.01	
Strontium	mg/L	0.001	0.042	0.058	0.136		0.016	0.043	0.041	
Sulfate	mg/L	1	1	1	128		3	<1	<1	
Total Alkalinity (as CaCO3)	mg/L	1	833	520	1710		534	1100	516	
Total Dissolved Solids	mg/L	10	1320	780	3070		808	2100	778	
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001	0.001	<0.001	0.009		<0.001	0.002	<0.001	
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	
Zinc	mg/L	0.005	<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	

*Monitoring event was completed but no water was available for sampling in WPKMW12S and WPKMW14S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method	63	64	65	66	67	68	78	79
			WPKMW15D 26/09/2018 Yes Grab Sample RESULT	WPKMW15S 26/09/2018 Yes Grab Sample RESULT	WPKMW16D 26/09/2018 Yes Grab Sample RESULT	WPKMW16S 26/09/2018 No Dry well* RESULT	WPKMW17D 26/09/2018 Yes Grab Sample RESULT	WPKMW17S 26/09/2018 Yes Grab Sample RESULT	WPKMW18S 26/09/2018 No Dry well* RESULT	WPKMW18I 26/09/2018 Yes Grab Sample RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01		<0.01
Ammonia	mg/L	0.01	0.13	0.02	0.04		0.10	0.04		0.04
Arsenic	mg/L	0.001	0.002	0.003	0.002		0.001	0.001		<0.001
Barium	mg/L	0.001	0.262	1.90	0.189		0.125	0.268		0.076
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001
Bicarbonate	mg/L	1	585	3330	530		491	868		489
Boron	mg/L	0.05	0.18	0.58	0.08		<0.05	0.23		0.21
Bromide	mg/L	0.01	0.200	2.82	0.182		0.17	0.323		0.132
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001
Calcium	mg/L	1	6	7	6		3	5		1
Carbonate	mg/L	1	<1	<1	<1		<1	<1		<1
Chloride	mg/L	1	63	1030	69		61	121		66
Chromium	mg/L	0.001	<0.001	0.006	<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
Copper	mg/L	0.001	<0.001	<0.001	0.001		<0.001	<0.001		<0.001
Dissolved Oxygen	mg/L	-	0.75	2.09	1.02		0.3	0.84		1.15
Electrical Conductivity	µS/cm	-	1282	8633	1211		1116	1979		1109
Fluoride	mg/L	0.1	0.5	1.2	0.5		0.8	0.6		0.6
Iron	mg/L	0.05	0.28	<0.05	<0.05		<0.05	0.06		<0.05
Lead	mg/L	0.001	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001
Magnesium	mg/L	1	2	12	2		1	2		<1
Manganese	mg/L	0.001	0.083	<0.001	<0.001		0.038	0.056		<0.001
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001
Methane	µg/L	10	0.111	<0.01	<0.01		<0.01	<0.01		<0.01
Molybdenum	mg/L	0.001	0.014	0.005	0.006		0.007	0.005		0.003
Nickel	mg/L	0.001	0.002	0.001	<0.001		<0.001	<0.001		<0.001
Nitrate	mg/L	0.01	<0.01	0.56	0.01		<0.01	<0.01		2.39
Nitrite	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01		<0.01
pH	pH Unit	-	7.89	7.76	7.84		7.44	7.52		7.92
Potassium	mg/L	1	7	29	10		6	10		4
Reactive Phosphorus	mg/L	0.01	0.31	0.65	0.30		0.06	0.37		0.36
Redox Potential	mV	-	-199	62.3	66.2		33.4	-49.4		68.3
Selenium	mg/L	0.01	<0.01	<0.01	<0.01		<0.01	<0.01		<0.01
Silica	mg/L									
Sodium	mg/L	1	288	2040	284		261	473		261
Sodium Adsorption Ratio (Storages)	-	0.01								
Standing Water Level	mTOC	-	22.24	22.5	26.58		18.78	21.77	16.85	16.24
Strontium	mg/L	0.001	0.054	0.241	0.053		0.018	0.038		0.010
Sulfate	mg/L	1	12	<1	11		<1	11		7
Total Alkalinity (as CaCO3)	mg/L	1	585	3330	530		491	868		489
Total Dissolved Solids	mg/L	10	853	6130	806		774	1370		729
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1								
Total Phosphorus (as P)	mg/L	0.01								
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001	<0.001	0.011	0.005		0.002	0.003		<0.001
Vanadium	mg/L	0.01	<0.01	0.02	0.01		<0.01	<0.01		<0.01
Zinc	mg/L	0.005	<0.005	<0.005	<0.005		<0.005	<0.005		<0.005

*Monitoring event was completed but insufficient water was available for sampling in WPKMW16S and WPKMW18S

	Units	EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	80	81	82	77	77	77
			LWDMW4 25/09/2018 Yes Grab Sample RESULT	LWDMW5 25/09/2018 Yes Grab Sample RESULT	LWDMW6 25/09/2018 Yes Grab Sample RESULT	LWWTPDM1 15/08/2018 No No Irrigation RESULT	LWWTPDM1 15/09/2018 No No Irrigation RESULT	LWWTPDM1 15/10/2018 No No Irrigation RESULT
Aluminium	mg/L	0.01	<0.01	<0.01	<0.01			
Ammonia	mg/L	0.01	0.02	0.02	0.03			
Arsenic	mg/L	0.001	0.001	0.002	0.002			
Barium	mg/L	0.001	0.367	0.314	0.250			
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001			
Bicarbonate	mg/L	1	208	170	75			
Boron	mg/L	0.05	0.09	0.13	0.08			
Bromide	mg/L	0.01	0.673	0.853	0.912			
Cadmium	mg/L	0.0001	<0.0001	<0.0001	<0.0001			
Calcium	mg/L	1	6	3	4			
Carbonate	mg/L	1	<1	<1	<1			
Chloride	mg/L	1	404	390	370			
Chromium	mg/L	0.001	<0.001	<0.001	<0.001			
Cobalt	mg/L	0.001	<0.001	<0.001	<0.001			
Copper	mg/L	0.001	<0.001	<0.001	<0.001			
Dissolved Oxygen	mg/L	-	1.02	1.07	1.49			
Electrical Conductivity	µS/cm	-	1619	1534	1330			
Fluoride	mg/L	0.1	0.2	0.3	0.1			
Iron	mg/L	0.05	4.15	4.61	4.73			
Lead	mg/L	0.001	<0.001	<0.001	<0.001			
Magnesium	mg/L	1	11	5	6			
Manganese	mg/L	0.001	0.200	0.320	0.131			
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001			
Methane	µg/L	10	1.11	0.526	0.106			
Molybdenum	mg/L	0.001	<0.001	<0.001	<0.001			
Nickel	mg/L	0.001	<0.001	<0.001	<0.001			
Nitrate	mg/L	0.01	0.04	0.08	0.08			
Nitrite	mg/L	0.01	<0.01	<0.01	<0.01			
pH	pH Unit	-	6.72	6.67	7.17			
Potassium	mg/L	1	17	13	14			
Reactive Phosphorus	mg/L	0.01	<0.01	<0.01	<0.01			
Redox Potential	mV	-	-208.1	-166	153			
Selenium	mg/L	0.01	<0.01	<0.01	<0.01			
Silica	mg/L							
Sodium	mg/L	1	318	314	248			
Sodium Adsorption Ratio	-	0.01						
Standing Water Level	mTOC	-	23.53	25.24	20.28			
Strontium	mg/L	0.001	0.081	0.039	0.052			
Sulfate	mg/L	1	3	4	12			
Total Alkalinity (as CaCO3)	mg/L	1	208	170	75			
Total Dissolved Solids	mg/L	10	925	822	692			
Total Hardness (as CaCO3)	mg/L	1						
Total Nitrogen (as N)	mg/L	0.1						
Total Organic Carbon (Storages)	mg/L	1						
Total Phosphorus (as P)	mg/L	0.01						
Total Residual Chlorine	mg/L							
Turbidity	NTU	0.1						
Uranium	mg/L	0.001	<0.001	<0.001	<0.001			
Vanadium	mg/L	0.01	<0.01	<0.01	<0.01			
Zinc	mg/L	0.005	<0.005	<0.005	<0.005			

* Monitoring event was completed but no water was available for sampling due to no irrigation at LWWTPDM1

		EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	69 BWDPD2 n/a n/a Not operational RESULT	70 BWDPD3 n/a n/a Not operational RESULT	71 LWDPD1CELL4 25/09/2018 Yes Grab Sample RESULT	72 LWDPD1CELL3 25/09/2018 Yes Grab Sample RESULT	73 LWDPD1CELL2 25/09/2018 Yes Grab Sample RESULT	74 LWDPD1CELL1 25/09/2018 Yes Grab Sample RESULT	75 TFDPD1 26/09/2018 Yes No sample RESULT	76 TFDPD2 26/09/2018 Yes Grab Sample RESULT
Aluminium	mg/L	0.01			<0.10	<0.10	<0.10	<0.10		<0.10**
Ammonia	mg/L	0.01			<0.10	2.62	<0.10	<0.10		<0.10**
Arsenic	mg/L	0.001			0.01	<0.01	<0.01	<0.01		<0.010**
Barium	mg/L	0.001			13.7	7.93	7.85	8.20		2.91
Beryllium	mg/L	0.001			<0.001	<0.001	<0.001	<0.001		<0.010**
Bicarbonate	mg/L	1			26800	6520	9980	16800		7890
Boron	mg/L	0.05			4.14	0.93	2.23	5.05		1.43
Bromide	mg/L	0.01			40.4	3.33	10.2	57.8		14.7
Cadmium	mg/L	0.0001			<0.0010**	<0.0001	<0.0001	<0.0010**		<0.0010**
Calcium	mg/L	1			17	11	17	21		16
Carbonate	mg/L	1			38200	3300	13300	44600		22700
Chloride	mg/L	1			11000	1330	3530	10700		5570
Chromium	mg/L	0.001			<0.010**	<0.001	<0.001	<0.010**		<0.010**
Cobalt	mg/L	0.001			<0.010**	<0.001	<0.001	<0.010**		<0.010**
Copper	mg/L	0.001			<0.010**	<0.010**	<0.010**	<0.010**		<0.010**
Dissolved Oxygen	mg/L	-			6.36	6.48	9.20	8.28		11.11
Electrical Conductivity	µS/cm	-			85378	18395	39041	80138		50118
Fluoride	mg/L	0.1			49.5	9.0	18.1	42.0		27.4
Iron	mg/L	0.05			0.55	<0.10**	0.15	0.16		0.41
Lead	mg/L	0.001			<0.001	<0.001	<0.001	<0.010**		<0.010**
Magnesium	mg/L	1			36	<10	17	34		11
Manganese	mg/L	0.001			0.067	<0.001	0.012	0.022		0.058
Mercury	mg/L	0.0001			<0.0001	<0.0001	<0.0001	<0.0001		<0.0001
Methane	µg/L	10			<10	50	103	72		0.410
Molybdenum	mg/L	0.001			<0.010**	<0.010**	<0.010**	<0.010**		<0.010**
Nickel	mg/L	0.001			<0.001	<0.001	<0.001	<0.010**		<0.010**
Nitrate	mg/L	0.01			<0.10**	0.48	<0.10**	<0.10**		0.03
Nitrite	mg/L	0.01			<0.01	<0.01	<0.01	<0.01		<0.01
pH	pH Unit	-			9.44	9.18	9.5	9.63		9.79
Potassium	mg/L	1			619	52	176	1010		166
Reactive Phosphorus	mg/L	0.01								
Redox Potential	mV	-			15.9	10.3	42	72.3		-5.5
Selenium	mg/L	0.01			<0.10**	<0.10**	<0.10**	<0.10**		<0.10**
Silica	mg/L									
Sodium	mg/L	1			32400	5960	14100	39500		16900
Sodium Adsorption Ratio (Storages)	-	0.01			1020	477	578	1240		796
Standing Water Level	mTOC	-								
Strontium	mg/L	0.001			3.85	1.59	2.12	3.03		2.75
Sulfate	mg/L	1			<20**	<10**	100	187		150
Total Alkalinity (as CaCO3)	mg/L	1			65000	9810	23300	61400		30600
Total Dissolved Solids	mg/L	10			138000	16600	47000	123000		38000
Total Hardness (as CaCO3)	mg/L	1								
Total Nitrogen (as N)	mg/L	0.1								
Total Organic Carbon (Storages)	mg/L	1			98	30	73	119		96
Total Phosphorus (as P)	mg/L	0.01			3.87	0.03	1.16	6.38		0.58
Total Residual Chlorine	mg/L									
Turbidity	NTU	0.1								
Uranium	mg/L	0.001			<0.010**	<0.010**	<0.010**	<0.010**		<0.010**
Vanadium	mg/L	0.01			<0.10**	<0.10**	<0.10**	<0.10**		<0.10**
Zinc	mg/L	0.005			<0.005	<0.005	<0.005	<0.050**		<0.050

No monitoring was required at sample point BWDPD2 and BWDPD3 in accordance with EPL20350 Condition M2.6

*No water was available at TFDPD1 at time of monitoring event.

** Limit of Reporting raised

		EPA Identification No Location Date Sampled Sample obtained Sample Method LOR	83 LWDSMP1 n/a n/a Grab Sample RESULT	84 LWDSMP2 n/a n/a Grab Sample RESULT	85 LWDSMP3 n/a n/a Grab Sample RESULT	86 LWDSMP4 n/a n/a Grab Sample RESULT
	Units					
Aluminium	mg/kg	0.01				
Boron	mg/kg	0.05				
Calcium	mg/kg	1				
Cation Exchange Capacity (CEC)	cmol(+)/kg					
Chloride	mg/kg	1				
Copper	mg/kg	0.001				
Electrical Conductivity	µS/cm	-				
Hydraulic Conductivity	m/sec ⁻¹					
Iron	mg/kg	0.05				
Magnesium	mg/kg	1				
Manganese	mg/kg	0.001				
Nitrogen (nitrate)	mg/kg					
Organic Carbon	%					
pH	pH Unit	-				
Phosphorus	mg/kg					
Phosphorus (Available)	mg/kg					
Potassium	mg/kg	1				
Sodium	mg/kg	0.01				
Sodium Adsorption Ratio	-	0.01				
Sodium (Exchangeable Percentage)	%					
Sulfate	mg/kg	1				
Zinc	mg/kg	0.005				

LWDSMP1, LWDSMP2, LWDSMP3 and LWDSMP4 not due for report period.

Table 3: GROUNDWATER LEVEL RESULTS FOR 2nd QUARTER – August / October 2018

EPA Identification No	44	45	46	47	48	49
Location	Dewhurst 8A-1 (DWH8AQGDGY01)	Dewhurst 8A-2 (DWH8AQGARK)	Dewhurst 8A-3 (DWH8AQGPOR03)	Biblewindi 28A (BWD28QGUPS01)	Biblewindi 28B (BWD28QGLPS01)	Biblewindi 28C (BWD28QGPUR01)
Date Sampled	August – October 2018	August – October 2018	August – October 2018	August – October 2018	August – October 2018	August – October 2018
Sample Obtained	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level	Standing Water Level
Number of Samples Required	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
Lowest sample value	-36	17	-64.4	11.8	4.5	15.4
Mean of sample	-35.75	17.17	-64.15	11.8	4.5	15.4
Highest sample value	-35.5	17.3	-63.8	11.8	4.5	15.4