



Maxwell Infrastructure
Environmental Monitoring Data
Quarter 3 2019

1 INTRODUCTION

Maxwell Infrastructure (formerly Drayton Mine) is owned by Malabar Coal. This report has been compiled to present environmental monitoring data for Maxwell Infrastructure in accordance with Schedule 5, Condition 11 (b) and (c) of Project Approval 06_0202.

This report covers the reporting period 1 July to 30 September 2019. Summaries of historic environmental monitoring data (prior to 2019) can be found in the Annual Environmental Management Reports located on the Malabar Coal website.

2 MONITORING RESULTS

Deposited dust monitoring results are provided in **Table 1**.

Continuous TEOM PM₁₀ monitoring results are provided in **Figure 1**.

Surface water quality monitoring results are provided in **Table 2**.

Groundwater quality results are provided in **Table 3**.

Groundwater level results are provided in **Table 4**.

Noise monitoring results are provided in **Table 5**.

Locations of monitoring sites are shown in **Appendix 1**.

Table 1: Deposited dust monitoring results for Quarter 3.

Gauge	Insoluble Solids Result (g/m ² /month)			Annual Mean (YTD) (g/m ² /month)	Annual Mean Limit (g/m ² /month)
	July	August	September		
2175	1.0	2.5	2.2	2.4	4.0
2230	1.3	2.7	2.5	2.3	4.0
2235	5.8	2.9	2.3	3.1	4.0
2247	1.4	3.0	2.6	2.3	4.0

Note: An elevated result of 5.8 g/m²/month was recorded at Gauge 2335 in July 2019. Ash content analysis indicated that only 1.4 g/m²/month of this was mineral content (i.e. soil dust). The field sheet also indicated that insects and bird droppings were present in the sample. The year-to-date mean of results recorded at Gauge 2335 remains below the annual mean limit.

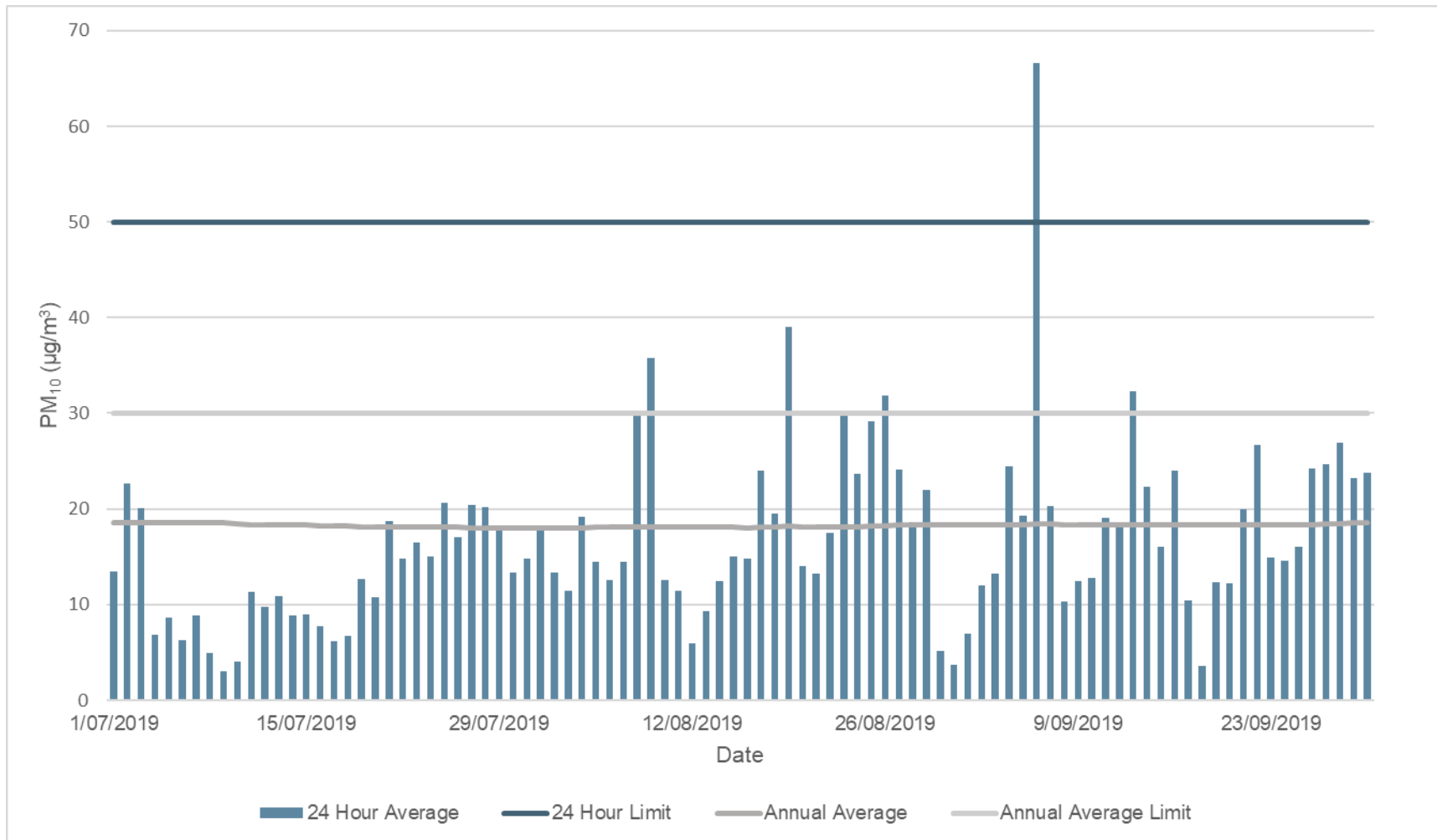


Figure 1: TEOM PM₁₀ monitoring results for Quarter 3.

Notes:

- On 4 September 2019 an invalid 24-hour average PM₁₀ result was recorded due to an instrument malfunction. Valid 1-hour average results were recorded for 88 percent of this day. These were utilised to calculate a valid 24-hour average PM₁₀ result.
- On 6 September 2019 an elevated 24-hour average PM₁₀ result of 66.7 µg/m³ was recorded. This monitor is located to the north east of the operation. Wind direction during the 24-hour period on 6 September 2019 was predominantly from the west to north west. This monitor was located downwind of Maxwell Infrastructure's operations for 6 percent of the day. Maxwell Infrastructure's contribution was assigned when the wind direction was between 179 and 256 degrees. Calculated based on five-minute TEOM data and wind direction, it is inferred that Maxwell Infrastructure made a contribution of 0.93 µg/m³.

A number of air quality control measures are implemented at Maxwell Infrastructure as outlined in the Air Quality and Greenhouse Gas Management Plan. Weather and dust conditions are constantly monitored, and operations are altered as required. During the morning of 6 September 2019 equipment was relocated from high dust risk areas to low dust risk areas for the remainder of the day in response to increasing wind speeds. One-hour average PM₁₀ results were consistently recorded below 50 µg/m³ throughout the day with the exception of results ranging from 160 µg/m³ to 470 µg/m³ that were recorded from 5 pm to 9 pm. No operations were undertaken at Maxwell Infrastructure during this period.

Data from the Upper Hunter Air Quality Monitoring Network (UHAQMN) was reviewed to assess regional PM₁₀ levels. The 24-hour average PM₁₀ result recorded on 6 September 2019 was 73.4 µg/m³ at the UHAQMN Muswellbrook unit and 114.5 µg/m³ at the Camberwell unit. This indicates elevated PM₁₀ levels in the region.

Table 2. Surface water quality monitoring results for Quarter 3

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
Antiene Dam (2221)	Jul	-	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-	-
	Average	1	205	220	3550	158	3.0	35	194	1950	13	2800
Access Rd Dam* (2081)	Jul	93	644	1120	10900	731	8.4	112	982	4690	5	9060
	Aug	78	527	1150	9940	746	8.4	94	909	4620	34	9210
	Sep	75	620	1260	10200	733	8.9	104	956	4600	5	8870
	Average	101	597	1057	9786	723	8.1	96	900	4661	10	8962
DC2 Dam* (2109)	Jul	271	154	1300	8290	287	8.1	17	1270	1490	5	5080
	Aug	316	170	1430	8650	331	7.9	15	1360	2580	12	6080
	Sep	110	84	832	4510	144	7.7	10	677	862	20	2680
	Average	225	148	1116	7009	256	7.8	13	1069	1769	14	4714
Rail Loop Dam* (2114)	Jul	145	116	284	2760	116	8.2	12	302	713	5	1630
	Aug	139	113	312	2690	130	8.1	12	296	652	5	1750
	Sep	87	101	252	2260	93	8.0	11	217	593	5	1340
	Average	127	117	245	2346	107	8.1	11	238	674	9	1612
Far East Tip* (1895)	Jul	-	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-	-

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
	Average	-	-	-	-	-	-	-	-	-	-	-
Savoy Dam* (1609)	Jul	-	-	-	-	-	-	-	-	-	-	-
	Aug	148	644	1740	18500	1780	8.4	239	1880	11600	9	19100
	Sep	-	-	-	-	-	-	-	-	-	-	-
	Average	107	693	1920	16214	1529	8.4	208	1640	8400	14	16229
SW 13	Jul	-	-	-	-	-	-	-	-	-	-	-
	Aug	-	-	-	-	-	-	-	-	-	-	-
	Sep	-	-	-	-	-	-	-	-	-	-	-
	Average	219	518	697	7533	526	8.0	61	636	3603	15	6535
Industrial Dam* (1969)	Jul	91	401	830	7830	511	8.1	57	686	2500	5	6110
	Aug	95	366	702	7100	513	8.0	61	662	3280	14	6280
	Sep	94	425	927	7410	518	8.3	64	723	3280	11	5920
	Average	84	394	763	7158	488	8.1	58	666	3161	14	6018
OPC Dam*	Jul	178	595	1090	10300	689	8.4	98	936	3800	11	6850
	Aug	264	610	1070	11400	895	8.1	106	1100	5460	5	10800
	Sep	109	311	688	5490	348	8.4	45	491	2320	16	3810
	Average	154	517	907	8743	636	8.3	80	807	3874	17	7621
V Notch*	Jul	353	582	2180	15200	603	7.9	26	2210	5070	5	11000
	Aug	433	508	1680	15400	653	7.9	19	2510	6570	5	13200
	Sep	354	552	1790	13200	550	7.9	28	2020	4490	5	9920
	Average	372	513	2447	15867	683	8.0	26	2678	5860	6	12718

Notes:

Site 2221 (Antiene Dam) was too low to sample in the reporting period.

Site 1895 (Far East Tip) was not accessible in the reporting period.

Site SW13 was not accessible in the reporting period.

Site 1609 (Savoy Dam) was not accessible in July and September 2019.

Average is the year-to-date mean for 2019 (January – September 2019).

Maxwell Infrastructure is a closed water management system with all water maintained on-site for use in operational activities.

* Indicates mine water storage.

Table 3: Groundwater quality monitoring results for Quarter 3.

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TDS (mg/L)	TSS (mg/L)
DS1	Jul	245	559	821	8820	6.6	27	1120	4390	112	5060	245
	Aug	251	463	738	7960	6.7	22	1040	3750	859	6350	251
	Sep	259	556	962	7860	6.4	26	1120	3430	421	6210	259
	Average	262	517	824	8001	6.7	23	1052	3538	509	6169	262
DS2	Sep	878	531	5050	22200	7.3	45	3450	6790	19	19200	878
	Average	959	515	4645	21700	7.2	41	3610	7185	19	19150	959
DS3	Sep	958	541	1460	14400	7.0	43	2130	6300	730	12700	958
	Average	979	520	1345	14200	7.1	40	2145	6575	713	13300	979
R4241	Sep	631	223	1120	5560	7.0	16	632	937	45	3910	631
	Average	631	228	1085	5800	7.1	15	611	1024	53	3925	631
F1162	-	-	-	-	-	-	-	-	-	-	-	-
F1167	-	-	-	-	-	-	-	-	-	-	-	-
F1024	-	-	-	-	-	-	-	-	-	-	-	-
F1164	-	-	-	-	-	-	-	-	-	-	-	-
F1163	-	-	-	-	-	-	-	-	-	-	-	-
F1168	-	-	-	-	-	-	-	-	-	-	-	-
W1102	-	-	-	-	-	-	-	-	-	-	-	-

Table 4. Reduced standing groundwater levels (mAHD) for Quarter 3

Site	July	August	September	Average (YTD)
DS1	223.5	223.37	223.6	223.48
DS2	239.09	239.03	238.86	238.76
DS3	235.68	235.75	235.81	235.67
R4241	175.08	175.13	175.21	174.91
F1162	121.27	121.26	-	121.29
F1167	159.9	159.88	-	159.89
F1024	178.67	178.68	-	178.68
F1164	119.27	119.28	119.28	119.27
F1163	-	-	-	-
F1168	-	-	-	-
W1102	-	-	-	-

Notes:

Water quality is analysed monthly at DS1 and twice annually at other monitoring sites (in March and September).

Sites W1102 and F1163 were not accessible in the reporting period.

Site F1168 was unable to be sampled in the reporting period as it was blocked.

Sites F1162, F1167 and F1024 were dry in September 2019.

Site F1164 had insufficient water to collect a sample for water quality analysis in September 2019.

Average is the year-to-date mean for 2019 (January – September 2019).

Table 5. Noise monitoring results for Quarter 3

Sampling point	Day (LA eq (15 minute))		Evening (LA eq (15 minute))		Night (LA eq (15 minute))		Night (LA1 (1 minute))		Exceedance (yes/no)	Observations
	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level	Criteria	Noise Level		
R12	35	IA	35	IA	39	IA	47	IA	No	
R13	35	IA	35	IA	36	IA	45	IA	No	
R14	35	IA	35	IA	37	IA	47	IA	No	
R16*	35	IA	35	IA	38	IA	47	IA	No	
R17	35	IA	35	IA	38	IA	47	IA	No	
R18	35	IA	35	IA	40	IA	47	IA	No	
R19	35	IA	35	IA	41	IA	47	IA	No	
R20	35	IA	35	IA	41	IA	45	IA	No	
R21	35	IA	36	IA	41	IA	45	IA	No	
R22	35	IA	36	IA	42	IA	45	IA	No	
R23	35	IA	37	IA	40	IA	47	IA	No	
R25	35	IA	37	IA	41	IA	47	IA	No	
R26	36	IA	36	IA	35	IA	47	IA	No	
R27	36	IA	36	IA	36	IA	47	IA	No	
R28	36	IA	37	IA	37	IA	47	IA	No	
R29	36	IA	37	IA	38	IA	47	IA	No	
R31	36	IA	37	IA	39	IA	47	IA	No	
R32	36	IA	37	IA	42	IA	47	IA	No	
R33	37	IA	38	IA	36	IA	45	IA	No	
R34	38	IA	38	IA	38	IA	45	IA	No	
R35	38	IA	38	IA	38	IA	45	IA	No	

R37	38	IA	39	IA	38	IA	45	IA	No	
R42	39	IA	40	IA	39	IA	45	IA	No	
R61*	39	IA	40	IA	39	IA	45	IA	No	
R69	40	IA	39	IA	39	IA	47	IA	No	
R70	40	IA	40	IA	39	IA	47	IA	No	
R71	41	IA	41	IA	39	IA	47	IA	No	
R72*	35	IA	35	IA	35	IA	47	IA	No	
R75*	35	IA	35	IA	35	IA	47	IA	No	
R76*	35	IA	35	IA	35	IA	47	IA	No	
R86	35	IA	35	IA	35	IA	45	IA	No	
All Other Privately-Owned Land	35	IA	35	IA	35	IA	45	IA	No	
Additional Information										
Date of Final Report						30 October 2019				
Date Sampled						30 September 2019				
Weather Conditions						Wind speed 2.9 – 6.0 m/s. No rain.				
Notes						<p>Noise monitoring is conducted 6-monthly in March and September</p> <p>IA - Inaudible</p> <p>* Measured: R16 (Doherty), R35 (Wilson), R61 (Skinner), R72 (Robertson), R75 (Shaman), and R76 (Holder). The noise levels at all other locations are determined by noise modelling or extrapolation.</p>				

APPENDIX 1 – MONITORING LOCATIONS



 <p>0 0.5 1 1.5 km</p> 	<p>Legend</p> <ul style="list-style-type: none"> ● TEOM Monitoring ● Deposited Dust Monitoring ● Surface Water Monitoring ● Groundwater Monitoring ● Attended Noise Monitoring — Project Approval Boundary 		<p style="text-align: center;">Monitoring Sites</p> <hr/> <p>Drawn by: RH Checked by: DM Date: [29/04/2019]</p>
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