



Maxwell Infrastructure
Environmental Monitoring Data
Quarter 4 2020

1 INTRODUCTION

Maxwell Infrastructure (formerly Drayton Mine) is owned by Malabar Resources. 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 October to 31 December 2020. Summaries of historic environmental monitoring data (prior to this report) can be found in the Annual Environmental Management Reports located on the Malabar Resources 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 to 4**.

Table 1: Deposited dust monitoring results for Quarter 4.

Gauge	Insoluble Solids Result (g/m ² /month)			Annual Mean Limit (g/m ² /month)	2020 Annual Mean (g/m ² /month)
	October	November	December		
2175	2.3	2.7	2.9	4	2.3
2230	1.9	2.7	3.2	4	2.1
2235	2.1	2.5	2.6	4	2.0
2247	0.9	2.6	2.7	4	2.2

Comments: Deposited dust results in Q4 were well below the annual mean limit. The year-to-date mean of results recorded at all gauges remain significantly below the annual mean limit.

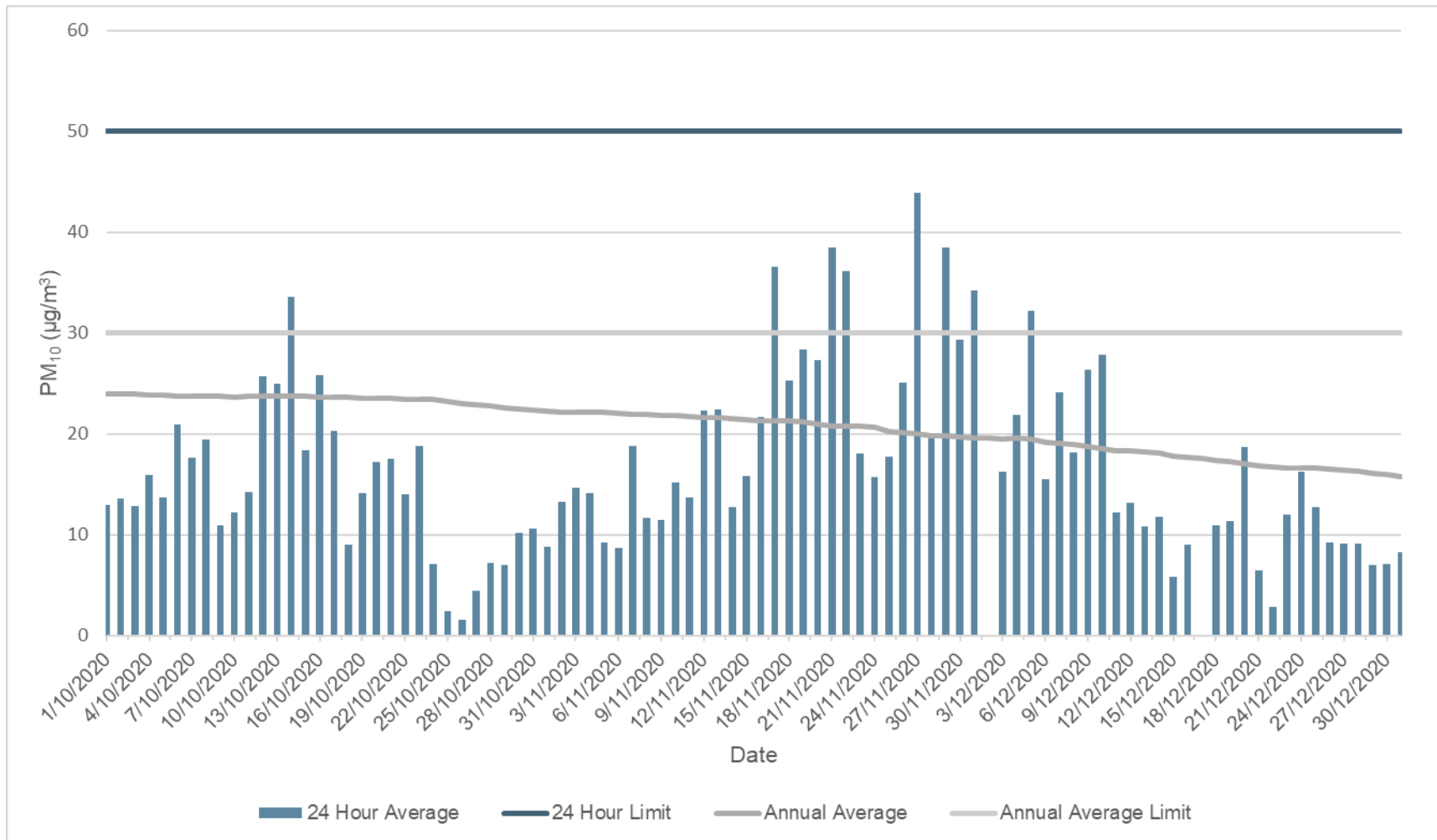


Figure 1: TEOM PM₁₀ monitoring results for Quarter 4.

Notes:

- All 24-hour averages during Quarter 4 were below the 24-Hour Limit. Any future exceedances will be provided in Maxwell Infrastructure's Annual Environmental Management Report.
- The rolling annual average is trending downwards, which reflects lower recorded concentrations following the dust storms and bush fires of late 2019 and early 2020.
- An invalid 24-hour PM₁₀ result was recorded on 2 and 17 December 2020 due to very large negative values commencing at approximately 06:00 hours on each of those days. It is suspected that these are due to very high relative humidity levels following the sun heating of the ground surface first thing in the morning following periods of rain, the high humidity causing condensation on the TEOM inlet. The values became positive later in the day, however the 24-hour rolling average was negative for that day and hence invalid and not reported.

Table 2. Surface water quality monitoring results for Quarter 4 (2020 average shown)

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)
Access Rd Dam (2081)	Nov	79	538	1120	9440	686	8.4	86	852	3440	5.0	9490
	<i>Average</i>	83	612	1182	9922	781	8.7	96	955	4618	8.0	9894
DC2 Dam (2109)	Nov	47	84	626	3470	123	6.5	6	483	727	23.0	2650
	<i>Average</i>	82	110	1043	5762	223	7.0	9	896	1589	62.8	4402
Rail Loop Dam (2114)	Nov	105	86	140	1410	60	7.2	6	125	426	21.0	1150
	<i>Average</i>	124	117	272	2426	116	7.8	11	254	885	16.0	1805
Industrial Dam (1969)	Nov	104	303	645	5300	335	7.6	42	462	2350	10.0	4920
	<i>Average</i>	85	348	751	6298	437	8.5	52	590	2958	11.8	5704
OPC Dam	Nov	78	55	50	847	39	8.0	4	52	294	10.0	688
	<i>Average</i>	98	112	188	1915	104	8	14	154	750	16	1485
V Notch	Nov	356	412	1400	9520	372	7.8	13	1360	2920	7.0	8250
	<i>Average</i>	303	494	2299	14071	641	8	22	2460	5608	6	13157
ES Void	Nov	245	514	862	7550	540	7.9	72	592	2960	8.0	7440
	<i>Average</i>	231	546	856	7624	578	8	75	626	3678	23	7296

Notes:

As was reported for Q2 and Q3, the February 2020 revision of the Water Management Plan (approved 19 February 2020) included a reduction in the frequency of surface water monitoring from monthly to quarterly to align with the post-closure monitoring program summary in the 2016 Mining Operations Plan (incorporating the Mine Closure and Final Void Management Plans).

The averages presented for 2020 consist of samples taken in January, February, June, September and November. Samples in March were not taken due to COVID-19 restrictions; the sampling frequency then reverted to quarterly as per the revised Water Management Plan. The exception is for the V Notch dam, where samples are taken monthly as is required by the EPL.

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

Table 3: Groundwater quality monitoring results for Quarter 4 compared to the 2020 average. See notes for further details.

Site	Arsenic	Barium	Beryllium	Bicarbonate Alkalinity as CaCO3	Boron	Cadmium	Calcium	Chloride	Chromium	Cobalt	Copper	Electrical conductivity	Lead	Magnesium	Manganese	Nickel	pH value
DS1	0.0020	0.010	0.0010	294	0.080	0.00020	515	816	0.0010	0.0070	0.0010	7680	0.0010	334	1.7	0.021	6.6
<i>DS1 2020 avg</i>	<i>0.0013</i>	<i>0.015</i>	<i>0.0010</i>	<i>294</i>	<i>0.067</i>	<i>0.00020</i>	<i>507</i>	<i>846</i>	<i>0.0013</i>	<i>0.0077</i>	<i>0.0013</i>	<i>7484</i>	<i>0.0010</i>	<i>314</i>	<i>1.8</i>	<i>0.022</i>	<i>6.5</i>
R4241	0.0030	0.061	0.0010	594	0.20	0.00010	194	880	0.0040	0.0020	0.014	5170	0.019	288	0.18	0.011	7.0
<i>R4241 2020 avg</i>	<i>0.0023</i>	<i>0.058</i>	<i>0.0010</i>	<i>678</i>	<i>0.15</i>	<i>0.00010</i>	<i>184</i>	<i>852</i>	<i>0.0043</i>	<i>0.0040</i>	<i>0.010</i>	<i>4770</i>	<i>0.017</i>	<i>267</i>	<i>0.16</i>	<i>0.018</i>	<i>7.0</i>
F1162	Too low to sample																
F1164	Too low to sample																
GW01D	0.0020	0.063	0.0010	520	0.35	0.00010	427	1190	0.0010	0.0060	0.0010	5600	0.0010	180	0.28	0.018	6.9
<i>GW01D 2020 avg</i>	<i>0.0017</i>	<i>0.074</i>	<i>0.0010</i>	<i>563</i>	<i>0.32</i>	<i>0.00010</i>	<i>410</i>	<i>1257</i>	<i>0.0017</i>	<i>0.0073</i>	<i>0.0030</i>	<i>5377</i>	<i>0.0013</i>	<i>167</i>	<i>0.28</i>	<i>0.019</i>	<i>6.9</i>
GW01S	Too low to sample																
GW02D	0.010	0.11	0.0010	1420	0.25	0.00010	84	856	0.0060	0.015	0.011	10500	0.0080	19	1.7	0.023	7.3
<i>GW02 D 2020 avg</i>	<i>0.017</i>	<i>0.27</i>	<i>0.0013</i>	<i>1284</i>	<i>0.24</i>	<i>0.00020</i>	<i>157</i>	<i>880</i>	<i>0.015</i>	<i>0.014</i>	<i>0.027</i>	<i>8853</i>	<i>0.020</i>	<i>156</i>	<i>0.84</i>	<i>0.036</i>	<i>7.1</i>
GW02S	0.0020	0.018	0.0010	894	0.13	0.00010	364	913	0.0010	0.0020	0.0010	8120	0.0010	445	0.94	0.013	6.8
<i>GW02 S 2020 avg</i>	<i>0.0023</i>	<i>0.032</i>	<i>0.0010</i>	<i>1211</i>	<i>0.15</i>	<i>0.00010</i>	<i>276</i>	<i>952</i>	<i>0.0017</i>	<i>0.0047</i>	<i>0.0017</i>	<i>8420</i>	<i>0.0013</i>	<i>324</i>	<i>0.74</i>	<i>0.015</i>	<i>7.0</i>

Table 3 continued

Site	Potassium	Selenium	Sodium	Sulfate as SO4 - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Vanadium	Zinc	Nitrite as N	Nitrate as N	Mercury	Ammonia as N	Total Kjeldahl Nitrogen as N	Total Nitrogen as N	Total Phosphorus as P	Reactive Phosphorus as P
DS1	23	0.010	1020	3070	10	6340	0.010	0.032	0.010	0.040	0.00010	0.040	0.10	0.10	0.010	0.010
DS1 2020 average	22	0.010	1004	3342	164	6311	0.010	0.029	0.010	0.020	0.00010	0.057	0.13	0.13	0.037	0.013
R4241	14	0.010	532	1110	74	3520	0.010	0.16	0.030	0.040	0.00010	0.88	1.1	1.2	0.11	0.010
R4241 2020 avg	14	0.010	496	998	86	3370	0.010	0.14	0.017	0.40	0.00010	0.82	1.4	1.8	0.19	0.010
F1162	Too low to sample															
F1164	Too low to sample															
GW01D	25	0.010	614	596	7.0	3730	0.010	0.023	0.010	0.46	0.00010	0.40	0.40	0.90	0.010	0.010
GW01D 2020 avg	22	0.010	562	613	65	3807	0.010	0.087	0.010	0.27	0.00010	0.52	0.73	1.0	0.050	0.010
GW01S	Too low to sample															
GW02D	21	0.010	2680	2840	511	7620	0.010	0.060	0.050	0.050	0.00010	3.9	3.7	3.8	0.13	0.010
GW02D 2020 avg	21	0.010	1957	2743	799	6783	0.023	0.11	0.053	0.060	0.00010	2.8	4.3	4.4	1.1	0.010
GW02S	24	0.010	1060	2710	69	6440	0.010	0.036	0.010	0.010	0.00010	0.20	0.90	0.90	0.14	0.010
GW02S 2020 avg	26	0.010	1470	2887	1088	6927	0.010	0.022	0.010	0.053	0.00013	1.1	1.9	1.9	0.42	0.010

Notes:

Due to electrical storms in December that presented a safety risk, the sampling scheduled for December was postponed and scheduled for early January.

Sites GW01D, GW01S, GW02D and GW02S were added in February 2020 to provide further data to monitor groundwater surrounding the pit, further details are provided in the Water Management Plan (revised in February 2020).

In addition, nutrients and total and dissolved metals were added to the suite of parameters analysed for all sites to provide further data on groundwater quality. These included:

- Total and dissolved metals (Arsenic, Boron, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Manganese, Nickel, Lead, Selenium, Vanadium, Zinc, Mercury); and
- Total nitrogen, nitrate, nitrite, ammonia, total Kjeldahl nitrogen, reactive phosphorus and total phosphorus).

Averages shown are for 2020 (January–September 2020), however given that monitoring only commenced in June, this is an average of samples taken from June onwards. The exception is for DS1 for which monthly samples are taken, and hence the average presented is the average of all samples taken during each month of 2020.

All results are in mg/L except Conductivity ($\mu\text{S}/\text{cm}$) and pH (in pH units).

Table 4. Reduced standing groundwater levels (mAHD) for Quarter 4 compared to the 2020 average

Site	December 2020	2020 Average
DS1	223.28	223.24
R4241	175.18	174.79
F1162	130.29	124.27
F1164	129.25	122.61
GW01D	198.85	198.59
GW01S	197.48	197.26
GW02D	136.29	138.90
GW02S	189.72	188.55

Table 5. Noise monitoring results for Quarter 4

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	36	-	36	-	36	-	47	-	No	
R13	36	-	36	-	35	-	45	-	No	
R14	40	-	39	-	38	-	47	-	No	
R16*	41	-	41	-	39	-	47	-	No	
R17	37	-	38	-	36	-	47	-	No	
R18	38	-	39	-	38	-	47	-	No	
R19	40	-	40	-	39	-	47	-	No	
R20	39	-	40	-	39	-	45	-	No	
R21	38	-	38	-	38	-	45	-	No	
R22	38	-	38	-	38	-	45	-	No	
R23	35	-	35	-	35	-	47	-	No	
R25	36	-	37	-	37	-	47	-	No	
R26	36	-	37	-	38	-	47	-	No	
R27	36	-	37	-	39	-	47	-	No	
R28	35	-	37	-	40	-	47	-	No	
R29	35	-	35	-	36	-	47	-	No	
R31	35	-	35	-	37	-	47	-	No	
R32	35	-	35	-	40	-	47	-	No	
R33	35	-	35	-	38	-	45	-	No	
R34	35	-	35	-	36	-	45	-	No	
R35	35	-	35	-	35	-	45	-	No	

R37	35	-	35	-	35	-	45	-	No	
R42	35	-	35	-	35	-	45	-	No	
R61*	39	-	40	-	39	-	45	-	No	
R69	35	-	37	-	41	-	47	-	No	
R70	35	-	36	-	41	-	47	-	No	
R71	35	-	35	-	41	-	47	-	No	
R72*	36	-	37	-	42	-	47	-	No	
R75*	35	-	35	-	41	-	47	-	No	
R76*	35	-	36	-	42	-	47	-	No	
R86	35	-	35	-	38	-	45	-	No	
All Other Privately-Owned Land	35	-	35	-	35	-	45	-	No	
Additional Information										
Date of Final Report	N/A									
Date Sampled	N/A									
Weather Conditions	N/A									
Notes	<p>Attended noise monitoring is conducted 6-monthly in March and September; therefore no results are available for Q4 2020.</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 – AIR QUALITY MONITORING LOCATIONS



Source: Esri, DigitalGlobe, GeoEye, IGN, GeoEye, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

<p>0 0.38 0.75 1.5 Kilometers</p>	<p>Legend</p> <ul style="list-style-type: none"> ● Depositional Dust Gauge ● TEOM ● Meteorological Station ● E Sampler 	<p>Figure 1: Maxwell Infrastructure Air Quality Monitoring Locations</p> <p>Drawn by: DM Checked by: GC Date: 15/5/18</p>
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APPENDIX 2 – BLAST MONITORING LOCATIONS



APPENDIX 3 – SURFACE & GROUNDWATER MONITORING LOCATIONS



APPENDIX 4 – NOISE MONITORING LOCATIONS

