



ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

2018

MAXWELL INFRASTRUCTURE

Annual Environmental Management Report 2018


Name of operation	Maxwell Infrastructure
Name of operator	Maxwell Ventures (Management) Pty Ltd
Development consent / project approvals	PA 06_0202, DA 106-04-00
Name of holder of development consent / project approval	Maxwell Ventures (Management) Pty Ltd
Mining leases	CL229, CL395, ML1531, A173
Name of holder of mining leases	Malabar Coal (Drayton) Pty Ltd
Water licences	20BL171953, 20BL171954, 20BL171955, 20BL171956, 20BL171957, WAL 41559, WAL 41491
Name of holder of water licences	Maxwell Ventures (Management) Pty Ltd
MOP start date	1 July 2015
MOP end date	30 June 2020
Annual Review start date	1 January 2018
Annual Review end date	31 December 2018
<p>I, Robert Hayes, certify that this audit report is a true and accurate record of the compliance status of Maxwell Infrastructure for the period 1 January 2018 to 31 December 2018 and that I am authorised to make this statement on behalf of Maxwell Ventures (Management) Pty Ltd.</p> <p><i>Note.</i></p> <p><i>a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p><i>b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Robert Hayes
Title of authorised reporting officer	Operations Manager
Signature of authorised reporting officer	
Date	27 March 2019

Table of Contents

1	Statement of Compliance	6
2	Acronyms	8
3	Introduction	10
4	Approvals	13
5	Operations Summary	14
5.1	Mining Operations	14
5.2	Other Operations.....	14
5.3	Next Reporting Period	15
6	Actions Required from Previous Annual Review	15
7	Environmental Performance	15
7.1	Meteorological Monitoring	15
7.2	Noise.....	17
7.3	Blasting	18
7.4	Air Quality.....	19
7.5	Aboriginal Cultural Heritage.....	23
7.6	Non-Aboriginal Heritage	23
7.7	Transport.....	24
7.8	Visual impact.....	24
7.9	Greenhouse gas and energy efficiency	25
7.10	Waste.....	26
7.11	Spontaneous Combustion	27
7.12	Biodiversity	29
8	Water Management	31
8.1	Water Take.....	31
8.2	Water Consumption.....	31
8.3	Groundwater	32
8.4	Surface Water	34
9	Rehabilitation	35
9.1	Management	35
9.2	Performance.....	35
9.3	Actions for the Next Reporting Period.....	40
10	Community	40
10.1	Complaints	40
10.2	Engagement.....	40
10.3	Contributions	41
11	Independent Audit	42

12	Incidents and Non-compliances.....	44
12.1	Incidents.....	44
12.2	Exceedances.....	45
13	Activities to be Completed in the Next Reporting Period.....	46
	Appendix 1. Approval Conditions Relevant to the Annual Review.....	48
	Appendix 2. Environmental Monitoring Locations.....	51
	Appendix 3. Noise Monitoring Results.....	54
	Appendix 4. Air Quality Monitoring Results.....	56
	Appendix 5. Visual Impact Results.....	60
	Appendix 6. Biodiversity Monitoring results.....	62
	Appendix 7. Water Accounting Framework Input – Output Statement.....	65
	Appendix 8. Groundwater Quality Results.....	66
	Appendix 9. Surface Water Quality Results.....	68

Figures

Figure 1.	Regional context.....	11
Figure 2.	Lease boundaries.....	12
Figure 3.	Temperature by month for the reporting period.....	16
Figure 4.	Wind speed and direction for the reporting period.....	16
Figure 5.	Rain by month for the reporting period with historic comparison.....	17
Figure 6.	Long-term results for TSP.....	20
Figure 7.	Long-term results for PM ₁₀	21
Figure 8.	Deposited dust contours (g/m ² /month).....	23
Figure 9.	Long-term greenhouse gas emissions and energy consumption.....	25
Figure 10.	Long-term waste stream quantities.....	26
Figure 11.	Locations affected by spontaneous combustion.....	28
Figure 12.	Long-term water consumption.....	32
Figure 13.	Long-term groundwater levels.....	33
Figure 14.	2018 Groundwater level contours.....	33
Figure 15.	Location of rehabilitation activities.....	38
Figure 16.	Long-term number of complaints.....	40
Figure 17.	Community contributions in the reporting period.....	41
Figure 18.	Environmental monitoring locations.....	51
Figure 19.	Ecological monitoring locations.....	52
Figure 20.	Noise modelling locations (land ownership).....	53
Figure 21.	Long-term maximum project noise levels.....	55
Figure 22.	EA photomontage from Thomas Mitchell Drive in year 10.....	60
Figure 23.	Current view from Thomas Mitchell Drive.....	60
Figure 24.	EA photomontage from Hassall Rd in year 1 (final landform).....	60
Figure 25.	Current view from Hassall Rd.....	60
Figure 26.	EA photomontage from Lake Liddell in year 10.....	60
Figure 27.	Current view from Lake Liddell.....	60
Figure 28.	EA photomontage from New England highway in year 10.....	61
Figure 29.	Current view from New England Highway.....	61
Figure 30.	Long-term groundwater bicarbonate.....	66
Figure 31.	Long-term groundwater calcium.....	66
Figure 32.	Long-term groundwater chloride.....	66
Figure 33.	Long-term groundwater EC.....	66
Figure 34.	Long-term groundwater magnesium.....	66
Figure 35.	Long-term groundwater pH.....	66

Figure 36. Long-term groundwater potassium.....	67
Figure 37. Long-term groundwater sodium.....	67
Figure 38. Long-term groundwater sulfate.....	67
Figure 39. Long-term groundwater TDS.....	67
Figure 40. Long-term groundwater TSS.....	67
Figure 41. Long-term surface water bicarbonate.....	68
Figure 42. Long-term surface water calcium.....	68
Figure 43. Long-term surface water chloride.....	68
Figure 44. Long-term surface water electrical conductivity.....	69
Figure 45. Long-term surface water magnesium.....	69
Figure 46. Long-term surface water pH.....	69
Figure 47. Long-term surface water potassium.....	70
Figure 48. Long-term surface water sodium.....	70
Figure 49. Long-term surface water sulfate.....	70
Figure 50. Long-term surface water total dissolved solids.....	71
Figure 51. Long-term surface water total suspended solids.....	71

Tables

Table 1. Statement of compliance.....	6
Table 2. Non-compliances.....	7
Table 3. Compliance status key.....	7
Table 4. Site contacts.....	10
Table 5. Statutory approvals.....	13
Table 6. Production summary (extraction).....	14
Table 7. Monitoring summary – TSP ($\mu\text{g}/\text{m}^3$).....	20
Table 8. Monitoring summary – PM ₁₀ matter ($\mu\text{g}/\text{m}^3$).....	20
Table 9. Monitoring summary - increase in deposited dust ($\text{g}/\text{m}^2/\text{month}$).....	22
Table 10. Monitoring summary - total deposited dust ($\text{g}/\text{m}^2/\text{month}$).....	22
Table 11. Long-term area affected by spontaneous combustion.....	29
Table 12. Measures planned for offset areas in the next reporting period.....	31
Table 13. Water take July 2017 - June 2018.....	31
Table 14. Rehabilitation status.....	37
Table 15. Independent Environmental Audit action progress.....	42
Table 16. Monitoring result exceedances.....	45
Table 17. Improvement measures planned for next reporting period.....	46
Table 18. Modelled noise generated by the project alone ($L_{\text{Aeq}}(15 \text{ min})$).....	54
Table 19. Monitoring summary - cumulative noise.....	55
Table 20. PM ₁₀ matter 24-hour results for the reporting period.....	56
Table 21. Deposited dust results for the reporting period ($\text{g}/\text{m}^2/\text{month}$).....	59
Table 22. Performance of reference sites.....	62
Table 23. Performance of pasture rehabilitation sites.....	62
Table 24. Performance of woodland sites.....	63

1 STATEMENT OF COMPLIANCE

A statement of compliance is provided in **Table 1**. Details of non-compliances are provided in **Table 2** with the compliance status rated in accordance with the key shown in **Table 3**.

Table 1. Statement of compliance

Were all conditions of the relevant approvals complied with?	
PA 06_0202	No
DA 106-04-00	Yes
EPL1323	No
CL229	Yes
CL395	Yes
ML1531	Yes
A173	Yes
20BL171953	Yes
20BL171954	Yes
20BL171955	Yes
20BL171956	Yes
20BL171957	Yes
WAL 41559	Yes
WAL 41491	Yes

Table 2. Non-compliances

Approval	Condition	Condition summary	Compliance status	Comment	Annual Review Reference
PA06_0202	Schedule 3 Condition 27	Water may only be discharged from site in accordance with the provisions of an EPL or the Protection of the Environmental Operations (Hunter River Salinity Trading Scheme) Regulation 2002.	Non-compliant (low)	Water being pumped to Pringles Dam overflowed the dam via the spillway and approximately 6 megalitres of water left the premise boundary.	Section 12.1
PA06_0202	Schedule 3 Condition 28	Prepare and implement a Site Water Management Plan.	Non-compliant (low)	Water was pumped from the ES Void to Pringles Dam, which DP&E determined was not consistent with Water Management Plan.	Section 12.1
EPL1323	Condition O2.1 (b)	All plant and equipment installed at the premises or used in connection with the licensed activity must be operated in a proper and efficient.	Non-compliant (low)	Water being pumped to Pringles Dam overflowed the dam via the spillway and approximately 6 megalitres of water left the premise boundary.	Section 12.1

Table 3. Compliance status key

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2 ACRONYMS

Acronym	Definition
AEMR	Annual Environmental Management Report
bcm	Bank cubic metres
CCC	Community Consultative Committee
CHPP	Coal handling and preparation plant
dB(A)	A-weighted decibels
DP&E	NSW Department of Planning and Environment
EA	Drayton Mine Expansion Environmental Assessment 2007
EC	Electrical conductivity
EPA	NSW Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environment Protection Licence
FY	Financial year
GJ	Gigajoules
HVAS	High volume air sampler
L _{A1} (1 min)	A-weighted sound pressure level that is exceeded for one percent of the 1-minute measurement period
L _{Aeq} (time period)	A-weighted equivalent continuous sound pressure level over the time period
m ²	Square metres
mAHD	Elevation in metres in respect to the Australian Height Datum
Max.	Maximum
mg/L	Milligrams per litre
Min.	Minimum
MI	Megalitres
mm	Millimetres
MOP	Mining Operations Plan
m/s	Metres per second
mS/cm	Microsiemens per centimetre
MSC	Muswellbrook Shire Council
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
pH	Potential hydrogen
PM ₁₀	Particulate matter 10 micrometres or less in diameter
POEO Act	Protection of the Environment Operations Act 1997
ppm	Parts per million

Acronym	Definition
ROM	Run of mine
SEARs	Secretary's Environmental Assessment Requirements
t	Tonnes
TARP	Trigger Action Response Plan
tCO ₂ -e	Tonnes of carbon dioxide equivalent
TDS	Total dissolved solids
TSP	Total suspended particulates
TSS	Total suspended solids
µg/m ³	Micrograms per cubic metre
UHAQMN	Upper Hunter Air Quality Monitoring Network

3 INTRODUCTION

Maxwell Ventures (Management) Pty Ltd, a wholly owned subsidiary of Malabar Coal Ltd (Malabar), owns and operates the Maxwell Infrastructure site (formally Drayton Mine) located on Thomas Mitchell Drive, Muswellbrook. Malabar purchased the site in 2018 from Anglo American and formally took control on 26 February 2018. The Maxwell Infrastructure site includes open cut workings, rehabilitation, coal handling and preparation facilities and the Antiene rail spur and loop.

Open cut coal extraction and mining activities commenced at the Maxwell Infrastructure site in 1983 and ceased in October 2016. The Maxwell Infrastructure site is currently in the closure phase of the mine operations with rehabilitation activities along with ancillary activities including upkeep of roads and maintenance of equipment progressing.

The regional context of the site is shown in **Figure 1**. Maxwell Infrastructure is bordered by Mt Arthur Coal to the west and AGL Macquarie's Bayswater Power Station adjoining the eastern and southern boundaries. The Antiene rural residential area exists to the north of the site. Lease boundaries for the site are shown in **Figure 2**.

This report details the compliance status of the Maxwell Infrastructure site with respect to development consents and mining leases from 1 January 2018 to 31 December 2018. It has been prepared in accordance with the Annual Review Guideline published by the Department of Planning and Environment (DP&E) in October 2015. It also fulfils Annual Review requirements under the conditions of development consents PA 06_0202 and DA 106-04-00 and Annual Environmental Management Report requirements under the conditions of a mining leases CL229, CL395, ML1531 and A173. These conditions and where they have been addressed in the report are listed in **Appendix 1**.

Names and contact details of the key personnel who are responsible for environmental management at the Maxwell Infrastructure site are provided in **Table 4**.

Table 4. Site contacts

Name	Role	Contact details
Robert Hayes	Operations Manager	Robert Hayes (02) 6542 0203 rhayes@malabarcoal.com.au
Donna McLaughlin	Manager Environment & Community	Donna McLaughlin (02) 6542 0298 dmclaughlin@malabarcoal.com.au

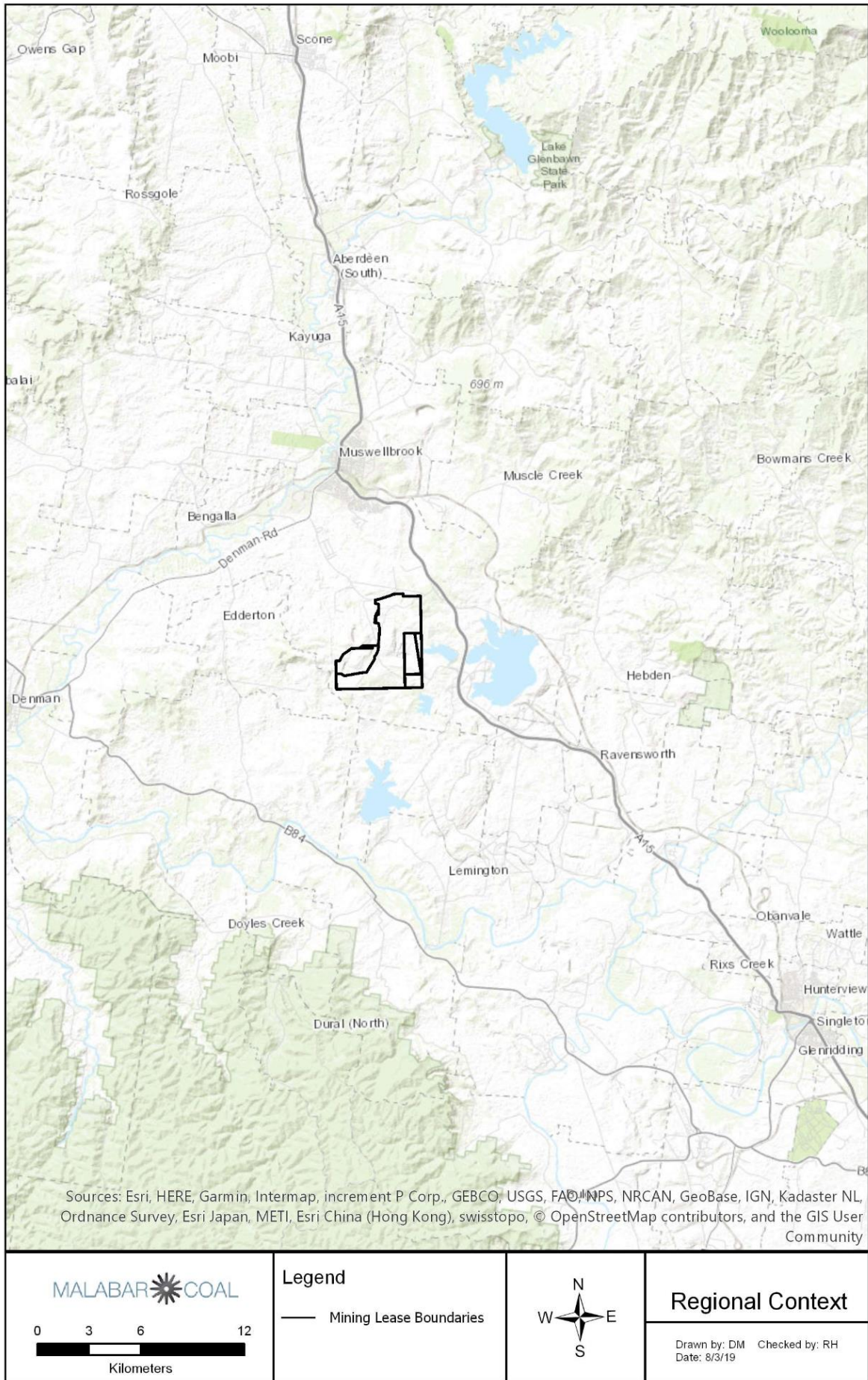


Figure 1. Regional context



Figure 2. Lease boundaries

4 APPROVALS

Existing statutory approvals relevant to the Maxwell Infrastructure site are listed in **Table 5**. The only modifications to these statutory approvals during the reporting period were changes to the name of the approval holder, as a result of the change of ownership.

In August 2018, Maxwell Ventures (Management) Pty Ltd submitted a request to DP&E for Secretary's Environmental Assessment Requirements (SEARs) for the proposed Maxwell Project. The Maxwell Project would involve solely underground coal mining within Exploration Licence (EL) 5460 and the utilisation of the substantial facilities that already exist at the Maxwell Infrastructure site. SEARs were received in September 2018. Conditions of EL5460, (and an overlapping site-specific State Environmental Planning Policy), preclude open-cut mining.

In December 2018, Maxwell Solar Pty Ltd submitted a request to DP&E for SEARs for the proposed Maxwell Solar Farm. The Maxwell Solar Farm would comprise of the installation of a solar plant with a capacity of approximately 25 megawatts that would be sited within part of the rehabilitated area of the Maxwell Infrastructure site. SEARs were received in March 2019, outside of the reporting period.

Table 5. Statutory approvals

Statutory Approval Reference	Description
PA 06_0202	Project Approval issued in 2008 under Section 75J of the (now repealed) Part 3A of the <i>Environmental Planning and Assessment Act 1979</i> (EP&A Act) for the Drayton Mine Extension Project.
DA 106-04-00	Development Consent issued in 2000 under Section 76 (A), 9 and 80 of Part 4 of the EP&A Act for use of the existing Drayton Rail Loop and Antiene Rail Spur.
EPL1323	Environment Protection Licence issued in 2000 under Section 55 of the <i>Protection of the Environment Operations Act 1997</i> (POEO Act) for mining for coal and coal works.
CL229	Coal Lease issued in 1992 under the <i>Mining Act 1973</i> .
CL395	Coal Lease issued in 1992 under the <i>Mining Act 1973</i> .
ML1531	Mining Lease issued in 2003 under the <i>Mining Act 1992</i> .
A173	Authorisation issued in 1998 under the <i>Mining Act 1973</i> .
20BL171953	Bore licence issued under the <i>Water Act 1912</i> for a test bore.
20BL171954	Bore licence issued under the <i>Water Act 1912</i> for a test bore.
20BL171955	Bore licence issued under the <i>Water Act 1912</i> for a test bore.
20BL171956	Bore licence issued under the <i>Water Act 1912</i> for a test bore.
20BL171957	Bore licence issued under the <i>Water Act 1912</i> for a test bore.

Statutory Approval Reference	Description
WAL 41559	Water Access Licence issued under the <i>Water Management Act 2000</i> for aquifer water extraction.
WAL 41491	Water Access Licence issued under the <i>Water Management Act 2000</i> for aquifer water extraction.

5 OPERATIONS SUMMARY

5.1 Mining Operations

Under Schedule 2, Condition 5 of Project Approval PA 06_0202, no mining operations can take place at the Maxwell Infrastructure site after 31 December 2017. Mining operations include coal extraction, processing and transportation activities. As such, approved limits for all materials associated with mining operations during the reporting period are zero, as are the actual and planned production figures. This is shown in the production summary for the reporting period presented in **Table 6**.

Table 6. Production summary (extraction)

Material	Approved limit	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Waste rock / overburden (bcm)	0	0	0	0
ROM coal / ore (t)	0	0	0	0
Coarse reject (t)	0	0	0	0
Fine reject (tailings) (t)	0	0	0	0
Saleable product (t)	0	0	0	0

5.2 Other Operations

No exploration activities were undertaken during the reporting period.

Although mining operations have ceased at the Maxwell Infrastructure site, rehabilitation of the completed mining areas along with ancillary activities including upkeep of roads and maintenance of equipment is progressing.

During the reporting period, site activities occurred during daylight hours typically on a five days per week basis and occasionally up to seven days. There were no coal processing or coal transport activities during the reporting period. Fixed site infrastructure continued to be preserved under a care and maintenance program.

A contractor was commissioned to assist with the rehabilitation activities, typical equipment on site during the reporting period consisted of two excavators (EX2500 and EX1200), six 785B trucks, five dozers ranging from D6 to D11, one water cart, one grader and two agricultural tractors. Other smaller ancillary equipment was brought in on an “as-needed” basis.

During the reporting period, contractor works were focused on final landform development and rehabilitation, with rehabilitation activities commencing within one week of Malabar taking control of the site. These activities are discussed in more detail in **Section 9**.

5.3 Next Reporting Period

It is anticipated that during the next reporting period operations will remain focused on final landform development and rehabilitation, with no significant variation in equipment use.

6 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

No actions were requested by regulators as an outcome of the previous Annual Review.

7 ENVIRONMENTAL PERFORMANCE

Maxwell Infrastructure's Environmental Monitoring Program provides an overview of the site's environmental monitoring. The monitoring is the primary check of the site's environmental performance. The Environmental Monitoring Program will be updated during the next reporting period to reflect recent changes to the Air Quality and Greenhouse Gas Management Plan and Noise Management Plan.

The locations of all environmental monitoring sites are shown in **Appendix 2**.

7.1 Meteorological Monitoring

Management

Meteorological conditions such as wind speed, wind directions, temperature, rainfall, solar radiation and humidity are monitored at the site's meteorological station (see **Appendix 2**).

Performance

During the reporting period, temperature trends were similar to previous years with a peak in summer and trough in winter. This is shown in **Figure 3**. Average temperatures were higher than previous years in the summer months.

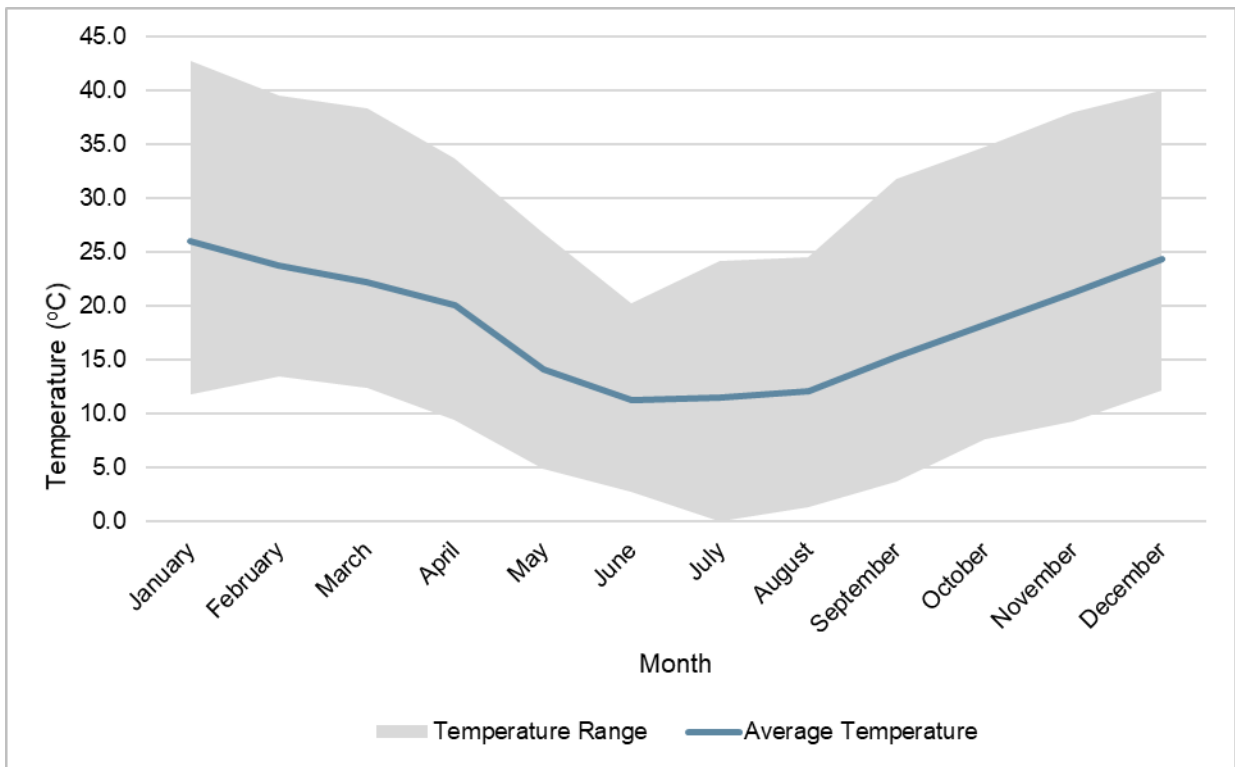


Figure 3. Temperature by month for the reporting period

A summary of wind monitoring over the reporting period is presented in **Figure 4**. Consistent with previous years, and consistent with the geography of the Hunter Valley, the predominant winds were from the south-east and north-west to west-north-west. Consistent with previous years, winds from the south-east dominated during the warmer months and winds from the north-west dominated during the cooler months. Wind speed throughout the reporting period was predominantly in the range of 0.5 to 4 metres per second (m/s).

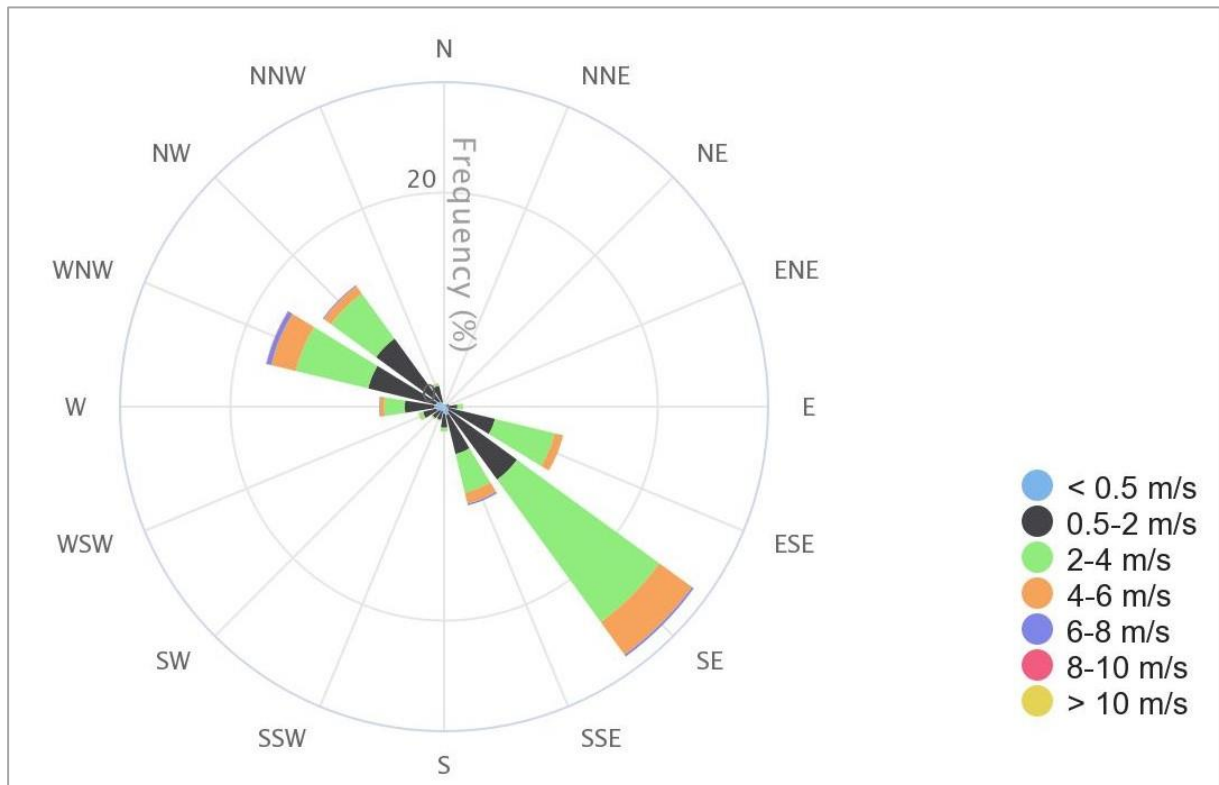


Figure 4. Wind speed and direction for the reporting period

Rainfall recorded during the reporting period was below average. This can be seen in **Figure 5**, which shows monthly rainfall during the reporting period compared to the average monthly rainfall for the previous 10 years. The decrease in rainfall was consistent with the NSW Department of Primary Industries Climate Unit predictions in the [NSW State Seasonal Updates](#) that local conditions ranged from intense drought to drought-affected from April 2018 onwards. Consistent with previous years, rainfall was generally higher during the warmer months.

No changes to meteorological monitoring are planned for the next reporting period.

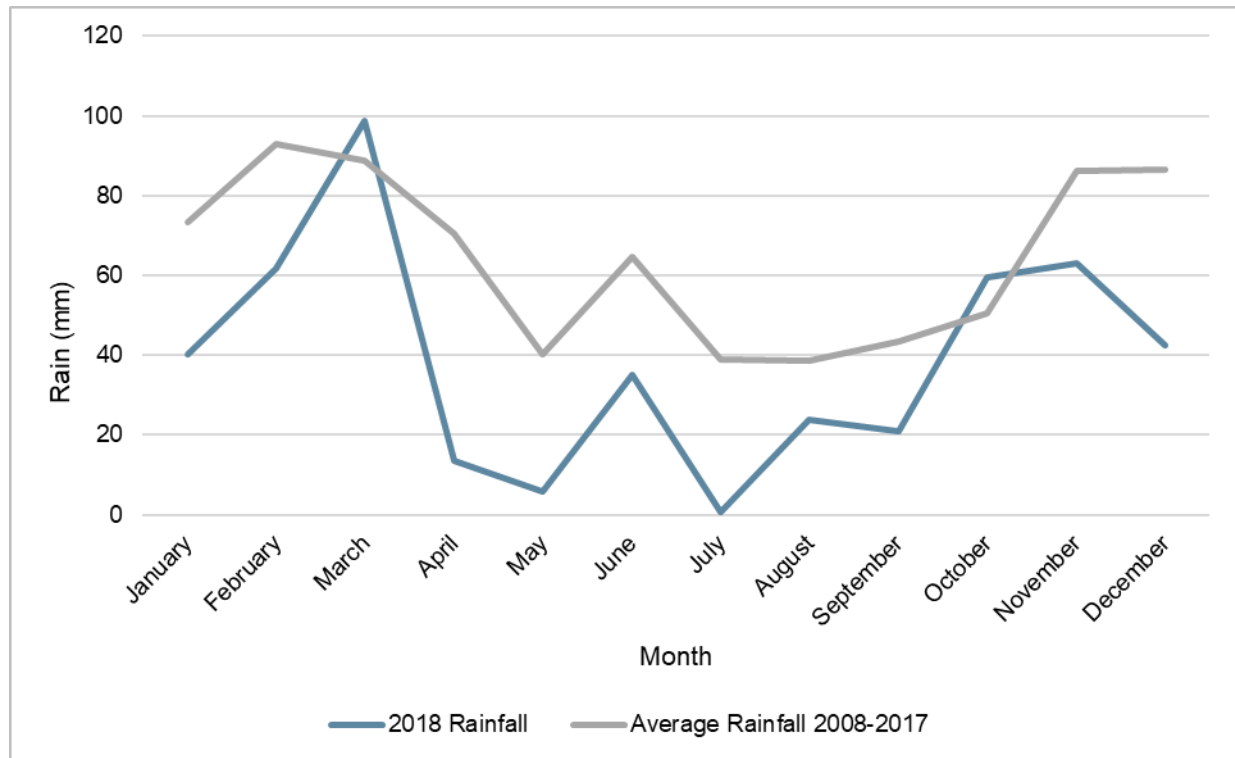


Figure 5. Rain by month for the reporting period with historic comparison

7.2 Noise

Management

Potential noise impacts from Maxwell Infrastructure are managed in accordance with the Noise Management Plan. On 16 October 2018 a revised Noise Management Plan was approved by DP&E. The revised Noise Management Plan was designed to simplify noise management at the site and reflect the change from active mining to the current rehabilitation phase of operations. Key changes included:

- A reduction of real-time barnowl noise monitors from two to one; and
- A reduction in the frequency of attended noise monitoring from monthly to six-monthly.

Operations at the Maxwell Infrastructure site were restricted to daylight hours during the reporting period and were undertaken on weekdays and occasional weekends. This schedule limited potential noise impacts to the less sensitive times for potential receptors.

Performance

Attended noise monitoring and modelling was conducted during the reporting period to assess noise impacts and determine compliance to approval criteria. Noise monitoring and modelling locations and are shown in **Appendix 2**. Noise impacts were assessed for the following periods:

- Day:
 - 7 am to 6 pm Monday to Saturday
 - 8 am to 6 pm Sundays and public holidays
- Evening:
 - 6 pm to 10 pm
- Night:
 - 10 pm to 7 am Monday to Saturday
 - 10 pm to 8 am Sundays and public holidays

Attended noise monitoring was conducted on a monthly basis during the reporting period except for November and December 2018, when monitoring was not required under the revised Noise Management Plan. Attended noise monitoring results were used to model noise impacts and assess compliance to approval criteria at relevant locations. Night $L_{A1(1min)}$ noise generated by the Project could not be measured in the reporting period because the site was not operational at night. Results for the reporting period are summarised in **Table 18** and **Table 19** in **Appendix 3**.

Approval criteria was not exceeded for any noise monitoring parameter at any location in the reporting period. Noise generated by the Maxwell Infrastructure site alone was consistently too low to be measured. This is below the EA predictions but was as expected. Similarly, cumulative noise impacts ranged between being too low to measure to levels well below approval criteria. Maximum noise levels from the Maxwell Infrastructure site are compared to maximum noise levels recorded over the previous five years in **Figure 21** in **Appendix 3**. Results show there has been a reduction in noise levels.

The noise model used for the noise assessment in the EA was validated for the reporting period by an acoustic consultant, as best as possible given the non-operational status of the mine, by comparing actual attended noise monitoring data in the reporting period with the predictions made in the noise model.

Proposed Improvements

Given Maxwell Infrastructure's performance in relation to noise impacts, no further measures to reduce the noise generated by the project have been identified.

No changes to noise management are planned for the next reporting period.

7.3 Blasting

Management

Potential blast impacts from the Maxwell Infrastructure site are managed in accordance with the Blast Management Plan.

Performance

No blasting was undertaken during the reporting period.

Proposed Improvements

Although no blasting was undertaken during the reporting period, blasting may still be required on occasion to assist with landform shaping. The Blast Management Plan will be updated during the next reporting period to reflect the change from active mining to the current rehabilitation phase of operations and the subsequent significant reduction in blasting activities.

7.4 Air Quality

Management

Potential air quality impacts from the Maxwell Infrastructure site are managed in accordance with the Air Quality and Greenhouse Gas Management Plan. On 10 October 2018 a revised Air Quality and Greenhouse Gas Management Plan was approved by DP&E. This replaced the previous Air Quality Management Plan and the Greenhouse and Energy Efficiency Management Plan. The revised Management Plan was designed to reflect the change from active mining to the current rehabilitation phase of operations. Key changes included:

- The removal of the Trigger Action Response Plan (TARP);
- The removal of one high volume air sampler (HVAS) from the monitoring program;
- A reduction in the number of depositional dust gauges from eight to four; and
- Clarification of the purpose of E-Samplers as management tools only.

In accordance with the previous and current management plans, a combination of depositional dust gauges, HVAS and tapered element oscillating microbalance (TEOM) monitors were used at Maxwell Infrastructure during the reporting period to:

- monitor air quality surrounding Maxwell Infrastructure,
- assist air quality management; and
- assess compliance to air quality impact limits specified by approval conditions.

These monitoring locations are shown in **Appendix 2**.

On-site E-Samplers also provide an indication of air quality conditions on site and assist with the management of potential PM₁₀ (particulate matter 10 micrometres or less in diameter) emissions from operations.

Performance

A summary of air quality monitoring results during the reporting period are presented below including an assessment of compliance to approval criteria, a comparison to predictions made in the EA and consideration of long-term trends.

Total suspended particulate (TSP)

The TSP level was monitored during the reporting period at the Lot 22 HVAS monitor. As shown in **Table 7**, the annual TSP level was higher than the impact assessment criterion and the EA prediction for year 10 of operations. The long-term trend for the annual TSP level, over a 10-year period, is shown in **Figure 6**.

Investigations into the increase in the TSP level during the reporting period found that the elevated levels were being influenced by cattle feeding by a leasee in an exposed area immediately adjacent to the Lot 22 monitor and were not attributable to impacts from the Maxwell Infrastructure site.

In consultation with DP&E, this monitor was decommissioned following the revision of the Air Quality and Greenhouse Gas Management Plan on 10 October 2018. Subsequently, the annual average was calculated using data from 10 October 2017 to 9 October 2018.

Table 7. Monitoring summary – TSP ($\mu\text{g}/\text{m}^3$)

Monitor	Averaging period	Approval criterion	EA year 10 prediction	Current reporting period result (2018)
Lot 22	Annual*	90	71.2	89.9

*The annual averaging period was from 10 October 2017 to 9 October 2018 (after which the Lot 22 HVAS monitor was not included in the air quality monitoring program).

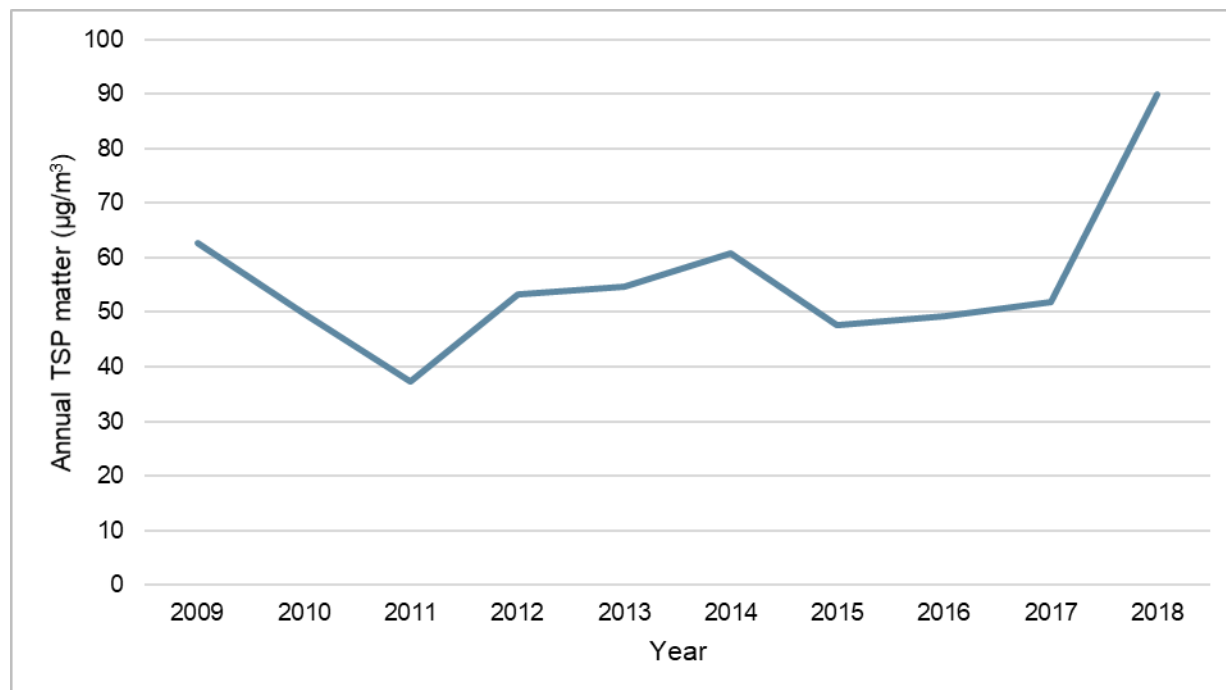


Figure 6. Long-term results for TSP

Note. Following investigations, it was determined that the elevated 2018 result was not attributable to impacts from the Maxwell Infrastructure site.

PM₁₀

As shown in **Table 8**, the annual PM₁₀ level remained below the annual impact assessment criterion and the EA prediction for year 10 of operations. The long-term trend in annual PM₁₀ levels, shown in **Figure 7**, illustrates a slight increase since 2015.

Table 8. Monitoring summary – PM₁₀ matter ($\mu\text{g}/\text{m}^3$)

Monitor	Averaging period	Approval criterion	EA year 10 prediction	Current reporting period result (2018)
TEOM	Annual	30	21.4	18.6

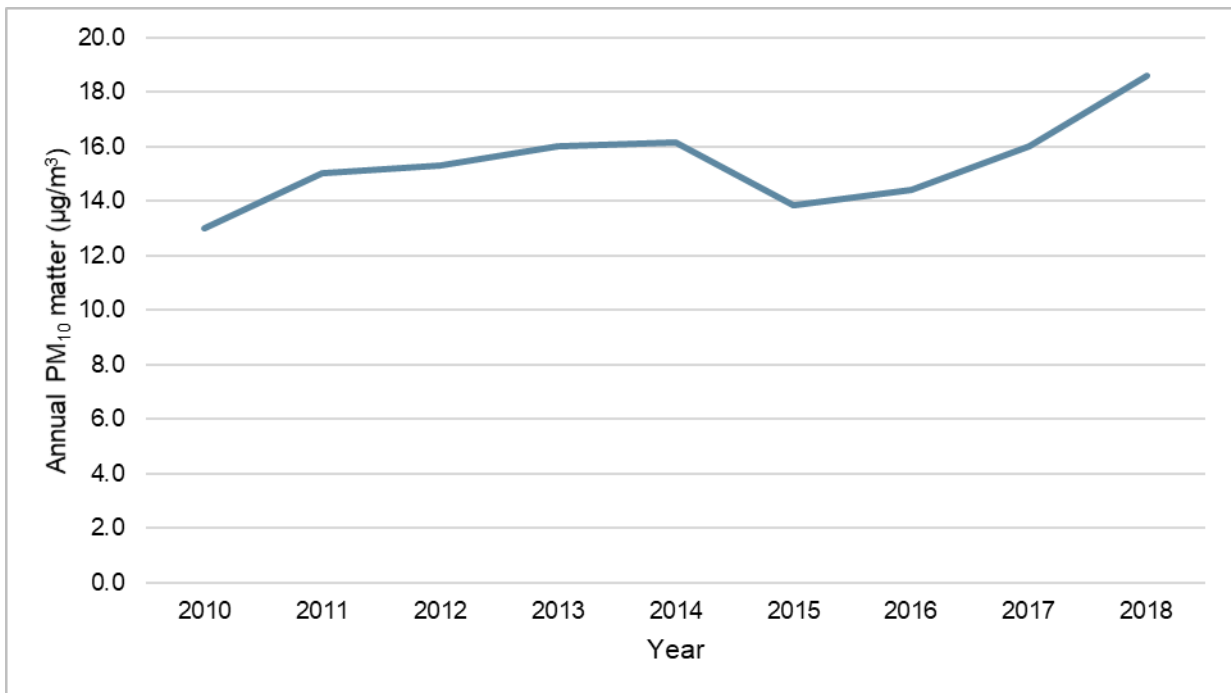


Figure 7. Long-term results for PM₁₀

All 24-hour PM₁₀ levels for the reporting period are presented in **Appendix 4**. The 24-hour criterion of 50 µg/m³ was exceeded on six days during the reporting period. Investigations into each of these exceedances determined that these results occurred on days when the monitor was **not** generally downwind of the operation. Rather the exceedances were consistent with regional conditions and **not** attributable to operations at the Maxwell Infrastructure site. Whilst exceedances were not attributable to the Maxwell Infrastructure site, the results have still been included in the long term annual PM₁₀ data. Details of these exceedances are provided in **Section 12.2**.

Deposited Dust

Deposited dust results were less than impact assessment criteria for both the maximum increase in dust level and maximum total deposited dust. This can be seen in the summary of results presented in **Table 9** and **Table 10**.

However, total deposited dust results were slightly higher during the reporting period than the historic mean for most monitors. In addition, results were higher than that modelled in the EA for total deposited dust in year 10 of operations. Operational activity during the reporting period was significantly less than that modelled, which suggests that background levels of deposited dust are higher than were expected in the EA model. Operational activity is also significantly reduced from previous years, suggesting that the site is not likely to be the source of the slight increase in results. A plot of contours generated from annual deposited dust results is presented in **Figure 8**. These contours also support that Maxwell Infrastructure is not the major contributor to deposited dust results, with results increasing with distance from the site boundary.

All deposited dust results obtained in the reporting period are provided in **Appendix 4**.

Table 9. Monitoring summary - increase in deposited dust (g/m²/month)

Monitor	Averaging period	Approval criterion	Current reporting period result (2018)	Previous reporting period result (2017)
2197*	Annual	2	-0.1	0.0
2230			0.0	0.0
2157*			0.0	0.0
2208*			-0.1	0.0
2247			0.1	0.0
2235			0.1	0.0
2175			0.1	0.0
2130*			-0.1	0.0

*The averaging period for this monitor was from November 2018 to October 2018 (after which the monitor was decommissioned).

Table 10. Monitoring summary - total deposited dust (g/m²/month)

Monitor	Averaging period	Approval criteria	Current reporting period result (2018)	Historic Mean (2011 – 2017)
2197*	Annual	4	2.3	3.2
2230			2.4	2.2
2157*			2.0	1.9
2208*			1.9	1.7
2247			2.4	1.9
2235			2.4	1.9
2175			2.1	1.9
2130*			2.0	2.1

*The averaging period for this monitor was from November 2018 to October 2018 (after which the monitor was decommissioned).

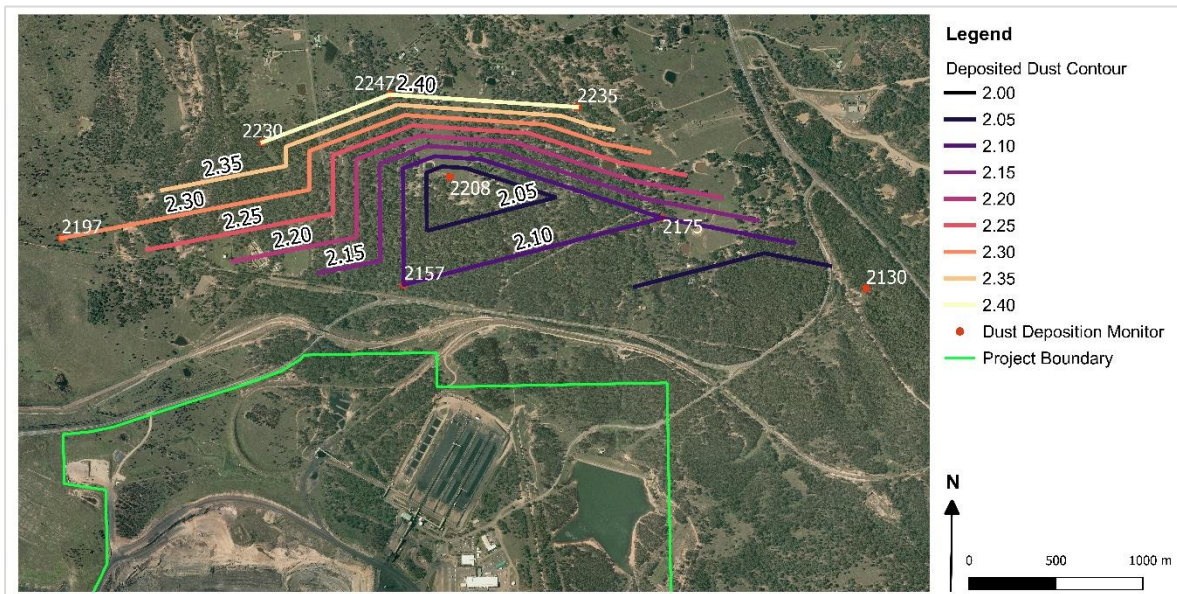


Figure 8. Deposited dust contours (g/m²/month)

Proposed Improvements

No changes to air quality management are planned for the next reporting period.

7.5 Aboriginal Cultural Heritage

Management

Aboriginal cultural heritage at the Maxwell Infrastructure site is managed in accordance with the Aboriginal Cultural Heritage Management Plan. As described in the management plan, 47 sites were salvaged at Maxwell Infrastructure prior to the reporting period. All salvaged artefacts remain stored on the premises in a secure location. Thirteen known sites remain conserved in-situ.

Performance

Field surveys were undertaken with Registered Aboriginal Parties in two small areas surrounding the Maxwell Infrastructure CHPP as part of the Aboriginal Cultural Heritage Assessment for the proposed Maxwell Underground Project. No new Aboriginal cultural heritage sites or objects were identified at the Maxwell Infrastructure site during the surveys.

There was no disturbance of any existing or new Aboriginal cultural heritage sites or objects during the reporting period.

Proposed Improvements

A revision of the Aboriginal Cultural Heritage Management Plan is planned for the next reporting period.

7.6 Non-Aboriginal Heritage

Management

No statutory-listed non-Aboriginal heritage sites have been identified within the Maxwell Infrastructure project area. However, one site, outside of the previously mined area, was noted in the EA as having high local significance and was fenced to protect it from disturbance.

Performance

The locally significant heritage site was not impacted during the reporting period and remains fenced to protect it from disturbance.

Proposed Improvements

No improvements to the management of non-Aboriginal heritage are proposed for the next reporting period.

7.7 Transport

Management

Coal transportation activities were not permissible during the reporting period under Project Approval PA 06_0202. The coal transport infrastructure remains under care and maintenance and relevant conditions of approval remain in place. This includes reporting requirements; communications with Mt Arthur Coal on the rail loop and Antiene rail spur; and the continuation of the Joint Community Consultative Committee (CCC) with Mt Arthur Coal.

Performance

No coal transportation activities were undertaken during the reporting period. Subsequently, the following items required to be reported in this AEMR are not applicable:

- Amount of coal transported from the site each year;
- Number of coal haulage train movements generated by the project (on a daily basis); and
- Date and time of each train movement generated by the project.

Proposed Improvements

During the next reporting period, the Maxwell Infrastructure rail loop will be used for the temporary stowage of empty rolling stock by Aurizon Operations Ltd (Aurizon). Prior to bringing empty trains on to the rail loop, Aurizon will undertake some minor maintenance work to the rail infrastructure.

No coal transportation activities are planned for the next reporting period.

7.8 Visual impact

Management

As predicted in the EA, the Maxwell Infrastructure site has minimal visual impact. Woodland remnants have been retained around and throughout the site and mature trees actively screen infrastructure and buildings.

In addition, operations at the Maxwell Infrastructure site have occurred during daylight hours only, negating the need for mobile lighting equipment.

Performance

A comparison of photomontages of predicted views in year 10 of operations with the current views from the same or a similar vantage points indicates that visual impacts are low and are consistent with EA predictions. These comparisons are provided in **Appendix 5**.

Two small gaps in the tree screen along the northern boundary on Thomas Mitchell Drive were noted during the reporting period. It was confirmed that trees have been planted in these two areas and, with further growth, would provide a more adequate screen in the future.

Proposed Improvements

A documented annual inspection process to review actual visual impacts with EA predictions will be implemented in the next reporting period.

7.9 Greenhouse gas and energy efficiency

Management

Greenhouse gas (GHG) emissions for the Maxwell Infrastructure site are regularly quantified to provide for emissions being maintained at the minimum practical level.

During the reporting period, the Greenhouse and Energy Efficiency Plan was revised and merged with the Air Quality Management Plan to create a new Air Quality and Greenhouse Gas Management Plan that was implemented in October 2018.

Performance

Annual estimations of GHG emissions and energy use at the Maxwell Infrastructure site are calculated over financial years, in line with National GHG and Energy Reporting requirements. As shown in **Figure 9**, GHG emissions and energy use decreased following the cessation of mining during FY17 and as expected this trend continued during FY18.

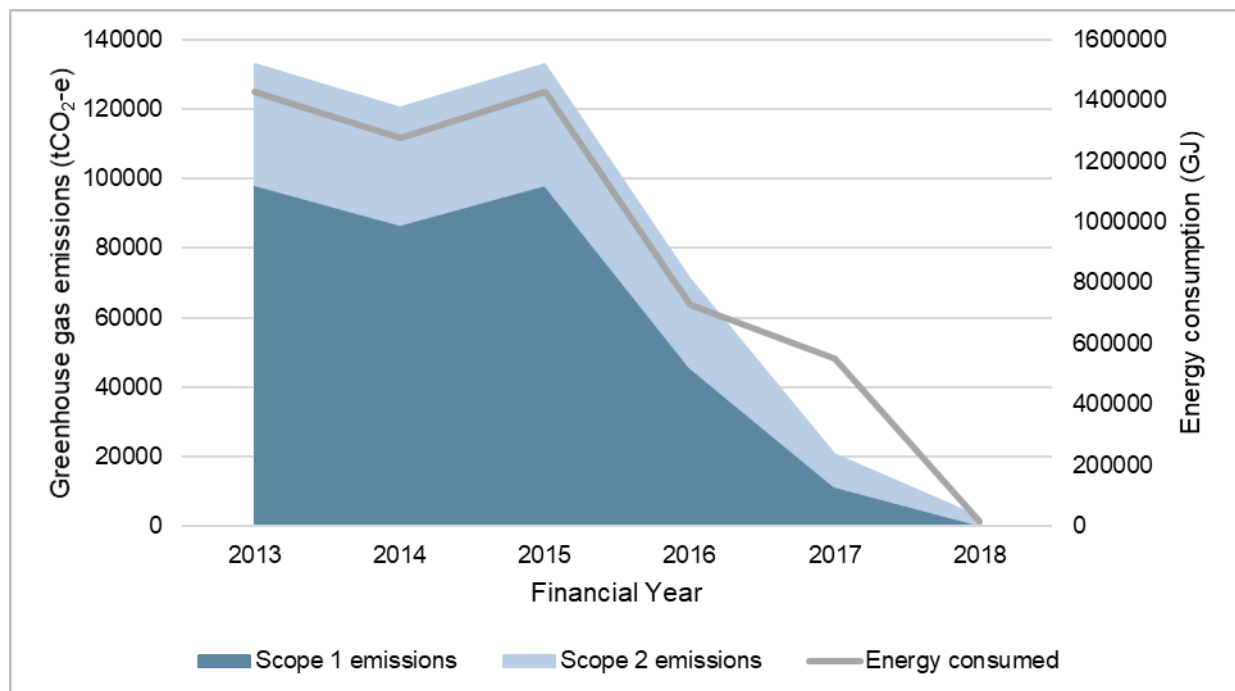


Figure 9. Long-term greenhouse gas emissions and energy consumption

GHG emissions and energy consumption were below National GHG and Energy Reporting thresholds for the FY18 period. Approximately 16,423 GJ of energy was consumed during FY18 and approximately 2,534 tCO₂-e was emitted from site activities. Of this, 602 tCO₂-e were scope 1 emissions and 1,932 tCO₂-e were scope 2 emissions.

The GHG emissions were significantly lower than the 82,533 tCO₂-e predicted for year 10 of operations in the EA since this prediction was based on the greater fuel and energy demands of an active mine and included fugitive emissions from coal mining.

Proposed Improvements

No changes to greenhouse gas and energy management are planned for the next reporting period.

7.10 Waste

Management

Waste is managed at the Maxwell Infrastructure site in accordance with the Waste Management Plan. Where appropriate, spent resources are reused or recycled in preference to being disposed of as waste.

A site initiative commenced in late 2018 to remove unused resources, particularly around infrastructure areas and recycle materials where possible, the results of this program will be realised in 2019 when the materials are removed from site.

Performance

Waste and recycling streams are monitored monthly at the Maxwell Infrastructure site. Quantities of the major waste and recycling streams over the past 10 years are shown in **Figure 10**. This comparison shows that waste significantly reduced with the cessation of mining in late 2016. This is commensurate with the reduction in resource use associated with the reduced operational activity at the site.

No predictions were made in the EA in relation to waste quantities.

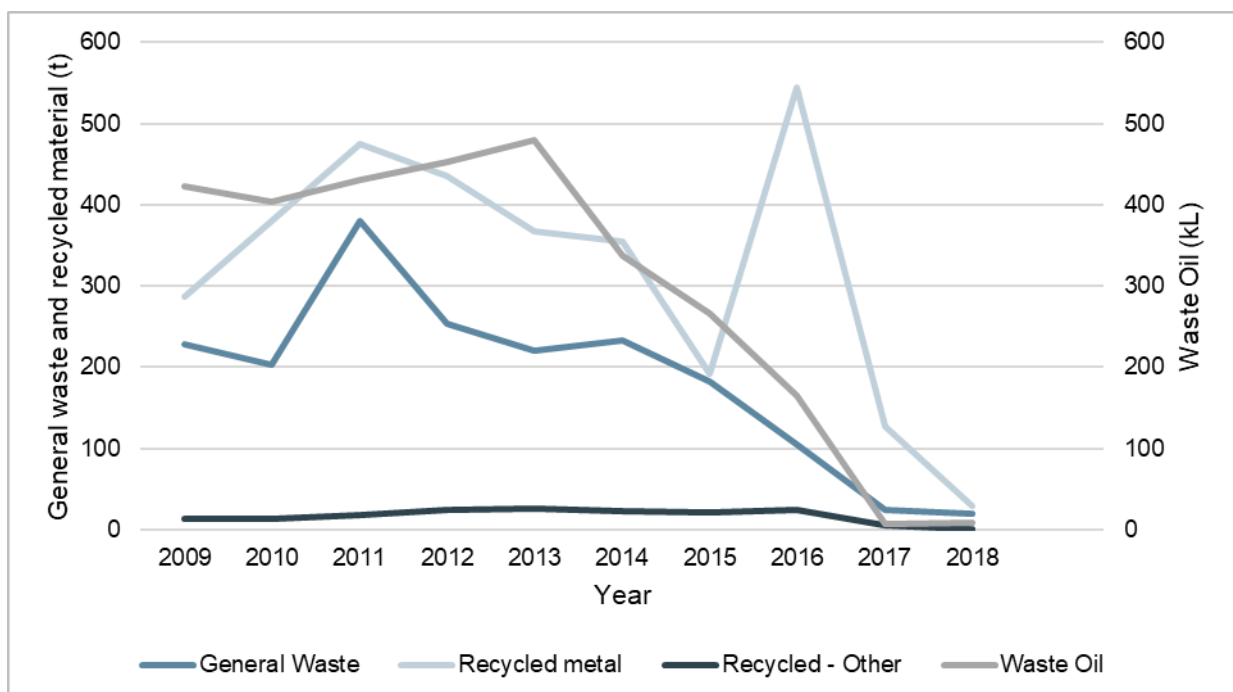


Figure 10. Long-term waste stream quantities

Maxwell Infrastructure has a sewage treatment plant (STP) for effluent generated on-site. From the STP, treated effluent is pumped to settlement ponds. Previously, overflow from the ponds was applied to land. However, due to the low number of people on site and reduced volume of effluent, the treated effluent now evaporates from the first pond.

Maxwell Infrastructure also maintains a bioremediation area for the remediation of material contaminated by hydrocarbons. A small amount of material, from the clean-out of sumps in the industrial area, was placed in the bioremediation area in the reporting period. No material was removed from the bioremediation area during the reporting period.

Proposed Improvements

A revision of the Waste Management Plan is planned for the next reporting period.

The initiative that commenced in late 2018 to remove and recycle unused resources, particularly around infrastructure areas, will continue during the next reporting period. This is likely to result in an increase in the quantity of metal recycled.

7.11 Spontaneous Combustion

Management

Spontaneous combustion at the Maxwell Infrastructure site is managed in accordance with the Spontaneous Combustion Management Plan. The management of spontaneous combustion is focused on the monitoring of previously capped areas along with the capping of any new outbreaks.

Along with regular inspections conducted as part of the general site activities, formal monthly spontaneous combustion inspections are conducted. A thermal imaging camera is utilised to assist the identification of areas where ground surface temperatures are above background levels. The surface area exhibiting smoke or steam emissions is estimated for each detected outbreak.

In addition, an annual aerial survey using a fixed wing aircraft fitted with infrared detection is used to identify the presence of hot spots on a site-wide basis. During the reporting period, this survey was conducted in September 2018.

Spontaneous combustion monitoring supports the planning of activities to prevent and remediate spontaneous combustion outbreaks. These management activities include reprofiling, track rolling and the application of inert capping.

Performance

Spontaneous combustion locations are categorised in accordance with the following intensity criteria:

- Minor - visible steam or smoke exists, however, the area affected is 200 m² or less.
- Moderate - exhibiting continuous visible smoke or steam and / or has an area of greater than 200 m².
- Major - exhibiting naked flames, regardless of the area affected.

As shown in **Figure 11**, most spontaneous combustion outbreaks identified during the reporting period were of a minor intensity.

During the reporting period, works to address spontaneous combustion were focused in the north of the mine at locations 290, 303, 305 and 306. As shown in **Table 11**, approximately 1,170 m² was estimated to be affected by spontaneous combustion which is higher than recent years.

As part of the rehabilitation activities, approximately 29 ha of land was capped with inert material prior to the application of soil ameliorants and seeding. This area was located to the south of the site and can be seen in **Figure 15** in **Section 9.2**. Whilst there was no direct evidence of spontaneous combustion in this area, this location had historically been prone to spontaneous combustion outbreaks. Further detail on these works are provided in **Section 9**.



Figure 11. Locations affected by spontaneous combustion

Table 11. Long-term area affected by spontaneous combustion

Year	Area Affected (m ²)
2009	1,020
2010	1,170
2011	1,070
2012	1,160
2013	1,180
2014	810
2015	870
2016	810
2017	1,150
2018	1,170

Proposed Improvements

The area affected by spontaneous combustion is expected to decrease during the next reporting period, as the final landform is nearing completion.

A revision of the Spontaneous Combustion Management Plan is planned for the next reporting period.

7.12 Biodiversity

Management

Biodiversity at the Maxwell Infrastructure site and its offset areas is managed in accordance with the Flora and Fauna Management Plan and the Rehabilitation and Offset Management Plan.

After taking control of the site, Maxwell Infrastructure engaged an external specialist to undertake an assessment (gap analysis) of rehabilitation and biodiversity. The assessment identified the current extent of woodland and grassland rehabilitation, reviewed current rehabilitation practices, assessed the condition of the rehabilitation and identified practical management actions.

Routine ecological monitoring is conducted across Maxwell Infrastructure's offset areas and rehabilitated lands. The ecological monitoring program was streamlined as some sites were replicates located in discrete locations and non-target vegetation types. The streamlined monitoring program maintains the spatial distribution required to provide representative data.

During the reporting period the following measures were implemented to improve biodiversity at the Maxwell Infrastructure site:

- A review of the ecological monitoring program;
- Implementation of an annual walkover inspection;
- Revised seed mix for pasture to increase diversity;
- Revised woodland seed mix to target species endemic to the area;
- Commencement of a grazing trial in the Southern Tip; and
- Reintroduced a targeted weed management program.

Performance

Ecological monitoring was undertaken during November and December 2018 at sites shown in **Appendix 2**. Monitoring consisted of:

- Biometric vegetation sampling;
- Recording of closure criteria features;
- Evidence of pest animals; and
- Rehabilitation walkover inspections.

There are no predictions in the EA to compare against performance during the reporting period. Instead, performance is compared to closure criteria and to performance since 2016, when these criteria were implemented. These results are detailed in **Table 22** to **Table 24** in **Appendix 6**.

As shown in **Table 22**, the regeneration of species from all structural layers was recorded at all reference sites monitored in 2018 and species composition was generally similar to previous years.

The total cover of invasive weeds increased at all sites, however, this did not exceed five percent cover. The increase in weed cover is likely the result of ongoing drought conditions and minimal weed control efforts in previous years. Weed control activities during the reporting period occurred within the Wildlife Refuge, Northern Offset Area, Southern Offset Area, rehabilitation areas and areas surrounding the CHPP and offices. Weed control will continue during the next reporting period.

Pasture rehabilitation sites monitored during the reporting period are shown in **Table 23**. The species listed in the Mining Operations Plan (MOP) are being naturally supplemented by non-target perennial grass species. Ecological monitoring identified a greater diversity with four to 12 perennial species at the monitoring sites during 2018 against a MOP target of five species.

Some pasture rehabilitation sites recorded a dominance of a single species, resulting in reduced diversity. A grazing trial was commenced on the Southern Tip in November 2018, which is expected to reduce the single species dominance in this area. Nationally significant weeds remained low at pasture rehabilitation sites during the reporting period.

Woodland rehabilitation sites (which includes the Southern Offset area) monitored during the reporting period are shown in **Table 24**. Monitoring results indicate that the ground cover was generally trending towards the reference sites. All reference sites are located on natural ground and have not been impacted by mining operations.

The diversity of canopy and mid-storey species, in particular at the Southern Offset area, were moderately representative of the reference sites, however, foliage cover was low. Low foliage cover provides open areas for invasive groundcover species to establish. To remediate this issue, further development of a canopy and mid-storey cover through infill planting, and appropriate weed control will occur during the next reporting period.

Proposed Improvements

Table 12 identifies the management measures planned to be implemented in offset areas during the next reporting period. Measures planned for rehabilitation areas are discussed in **Section 9.3**.

Table 12. Measures planned for offset areas in the next reporting period

Location	Management measure
Drayton Wildlife Refuge and Northern Offset Area	Weed control program targeted on Prickly Pear
Southern Offset Area	Weed control program targeted at Galenia, Prickly Pear and Golden Wreath Wattle
Southern Offset Area	Relocation of logs on site for habitat
Southern Offset Area	Installation of nest boxes
Southern Offset Area	Infill planting

8 WATER MANAGEMENT

8.1 Water Take

Maxwell Infrastructure does not actively draw water from any ground or surface water sources. Consequently, it does not hold any water licences for this purpose. Maxwell Infrastructure holds Water Access Licences, WAL 41559 and WAL 41491, for the passive intake of aquifer water associated with the mine excavation.

Although mining has ceased, the EA predicts that ground water will continue to flow into the mine voids until it stabilises. **Table 13** shows the calculated passive water take in accordance with the conditions of WAL 41559 and WAL 41491. This estimated passive inflow is calculated using a site water balance model. The inflow of 767 MI estimated for the reporting period is less than the 985 MI per year (or 2.7 MI/day) that was predicted for year 10 of operations in the EA. It is also less than the total entitlement of 1,387 MI allowed by WAL 41559 and WAL 41491.

Table 13. Water take July 2017 - June 2018

Water Licence #	Water sharing plan, source and management zone	Entitlement	Passive take inflows	Active pumping	TOTAL
WAL 41559	North Coast Fractured and Porous Rock Groundwater Sources	985 MI	767 MI	0 MI	767 MI
WAL 41491	New England Fold Belt Coast Groundwater Source	402 MI			

8.2 Water Consumption

In the reporting period Maxwell Infrastructure consumed approximately 91.5 MI of raw water from dams on site. This water was used in the industrial area primarily for vehicle and equipment wash-down and for dust suppression during mine rehabilitation. In the reporting period 1.2 MI of potable water was also used. Potable water use is restricted to the administration areas for people to use for purposes such as toilets, washing and consumption, except for approximately 0.02 MI that was delivered to cattle troughs.

As **Figure 12** shows, water consumption has reduced substantially over the long-term, particularly since mining ceased in 2016. The associated reduction in operational activity has decreased raw water demand and the reduction in the number of people on site has decreased demand for potable water.

Water stored on site in storages increased from approximately 10,581 MI to 12,304 MI in the reporting period, indicating that water consumption was well within the limits required to

maintain the site's closed raw water system, with no active intake or output of water. This is also demonstrated by the input-output statement of the water accounting framework in **Appendix 7**.

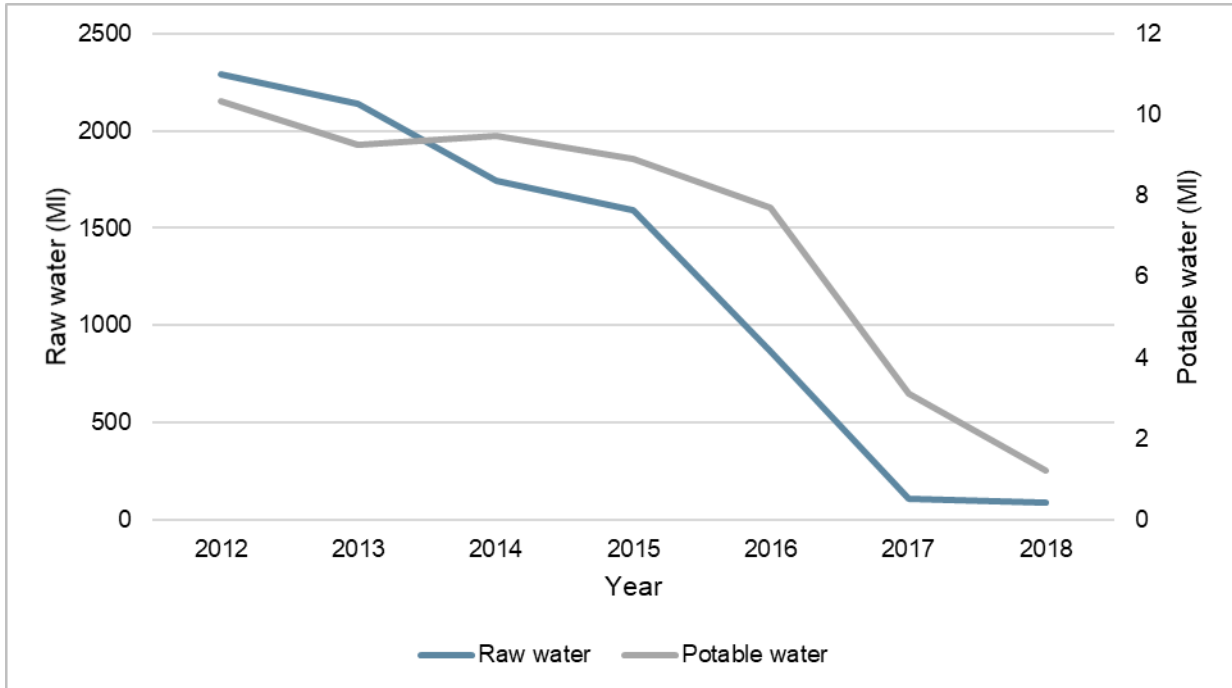


Figure 12. Long-term water consumption

In the reporting period Maxwell Infrastructure also supplied approximately 0.1 MI of potable water to nearby residents at their request for domestic water supply. This amount will decrease in the next reporting period as Maxwell Infrastructure no longer supplies water to residents unless it is deemed that this would be reasonable compensation for an impact from site activities.

8.3 Groundwater

Management

Groundwater impacts at the Maxwell Infrastructure site are managed in accordance with the Water Management Plan. As a part of this plan, groundwater levels and quality are regularly monitored. Monitoring locations are shown in **Appendix 2**.

Performance

Groundwater levels

Groundwater levels, measured monthly at Maxwell Infrastructure, have remained stable over the reporting period. The long-term groundwater levels at monitoring locations over the past 10 years is displayed in **Figure 13**. This shows that, consistent with the predicted “cone of depression” around the mine area, groundwater levels have lowered or remained stable at monitoring locations surrounding the mine over this time.

The elevation of groundwater levels has also remained above the elevation of the water surface in the voids, indicating that there is an inflow of aquifer water into the voids as predicted in the EA and supported by the site water balance model discussed in **Section 8.1**. This is apparent in **Figure 14** where contours have been calculated from the groundwater levels recorded in the reporting period in combination with water levels in the mine voids, in the absence of groundwater bores in the mine area.

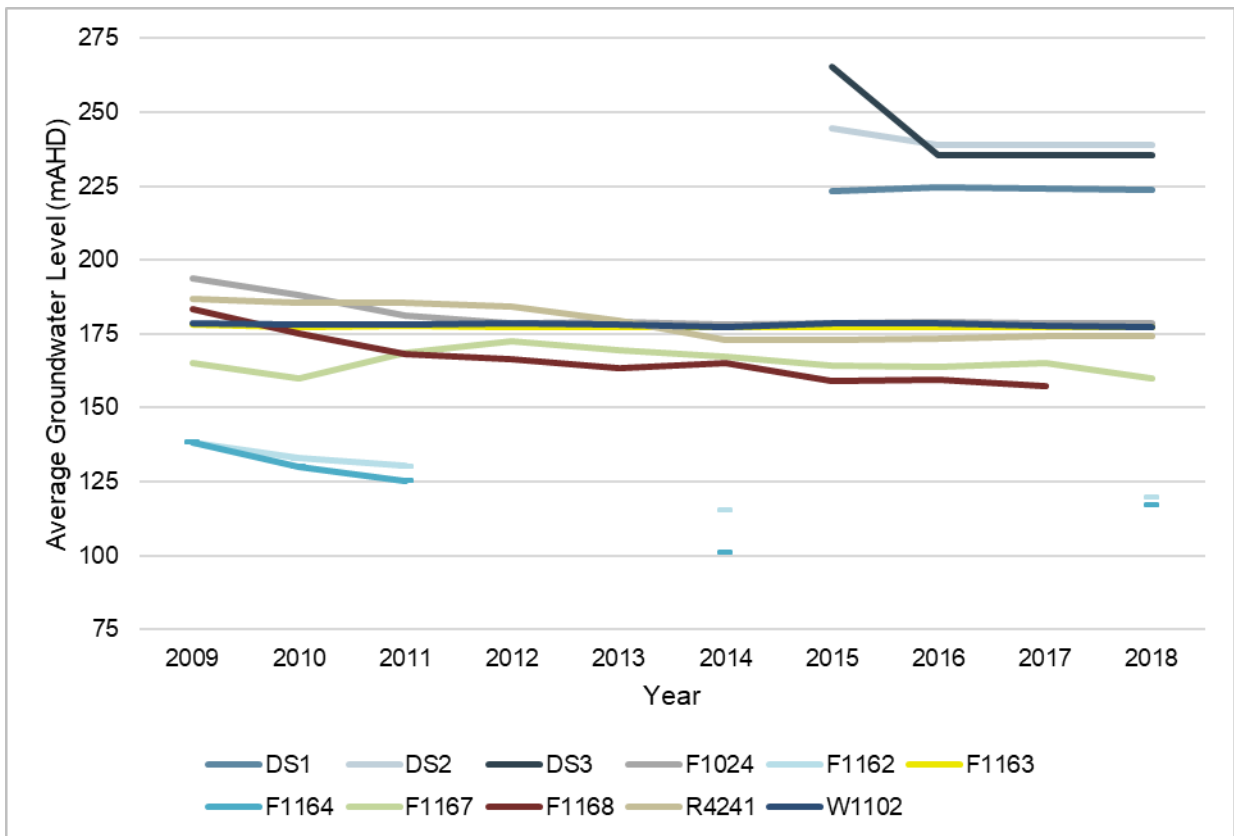


Figure 13. Long-term groundwater levels

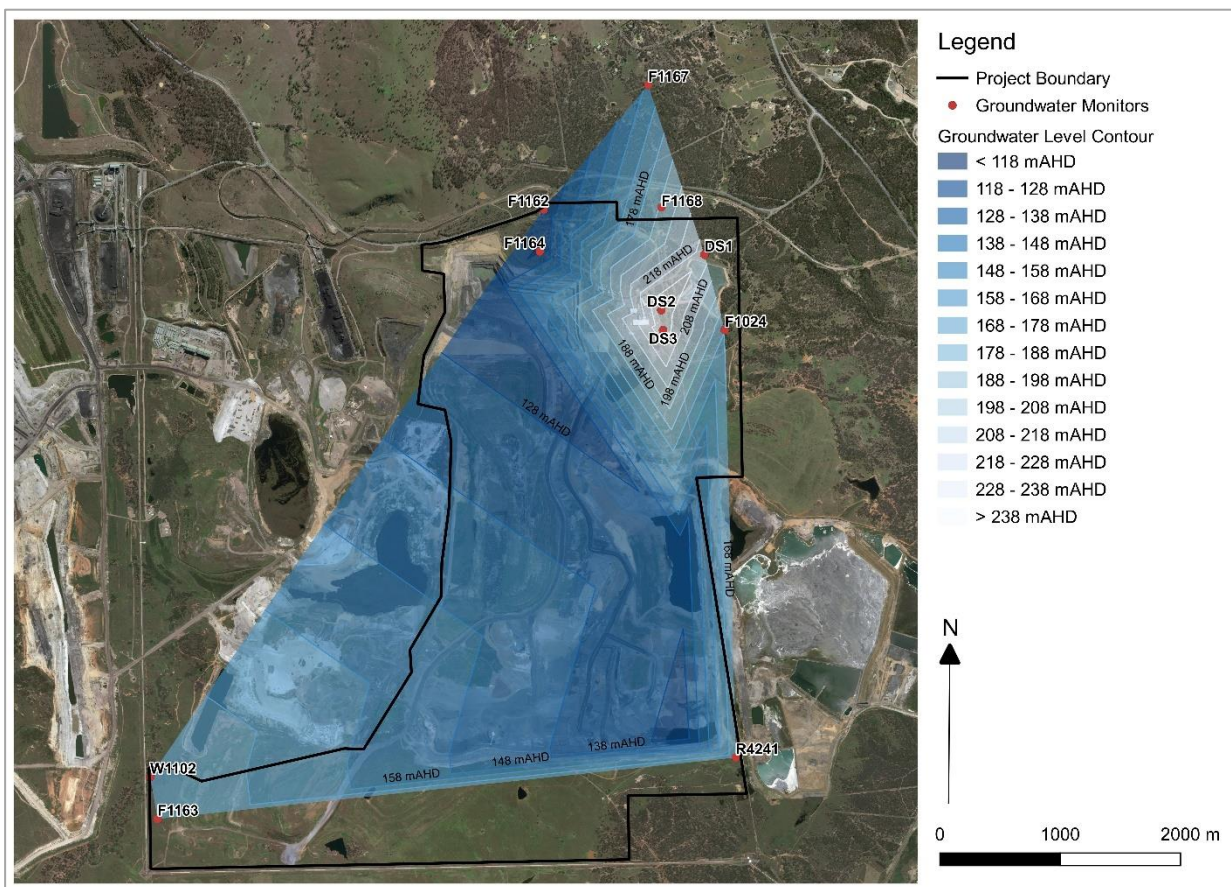


Figure 14. 2018 Groundwater level contours

Groundwater Quality

The quality of groundwater at the Maxwell Infrastructure site is analysed at least bi-annually. However, samples were unable to be obtained at this frequency from all monitoring locations in the reporting period:

- F1024, F1162, F1163, and F1167 had insufficient water to collect a sample for water quality analysis;
- F1168 was unable to be sampled as it remained blocked (as reported in the 2017 AEMR);
- Only one sample was collected from F1164 as there was insufficient water on the second bi-annual sample attempt;
- Only one sample was collected from W1102 as it is no longer accessible due to being located on the Mt Arthur Coal sublease.

Average groundwater quality results for the reporting period are provided in **Appendix 8** along with a comparison to average results recorded for the previous five years, where available. Results in the reporting period were generally consistent with those recorded previously. This supports the prediction in the EA that the project would not impact groundwater quality.

The only exception to this was an increase in total suspended solids recorded at DS3. Water levels in this bore were extremely low in the reporting period and the high levels of suspended solids are likely to have been caused by the immediate bore conditions, rather than a change in broader groundwater quality.

Proposed Improvements

A revision of the Water Management Plan is planned for the next reporting period. A review of groundwater monitoring locations will also be undertaken.

8.4 Surface Water

Management

Surface water impacts at the Maxwell Infrastructure site are managed in accordance with the Water Management Plan. This includes monthly water quality monitoring at locations shown in **Appendix 2**.

Performance

The quality of surface water at Maxwell Infrastructure is analysed monthly. However, samples were unable to be obtained at this frequency from all monitoring locations in the reporting period:

- SW13 was not sampled from April to August and Far East Tip (1895) was not sampled from August to December as they were not accessible due to being located on land not owned by Malabar;
- A sample could not be collected from Antiene Dam (2221) in December as there was insufficient water.

Average surface water quality results for the reporting period are provided in **Appendix 9** along with a comparison to the average results recorded for the previous five years. Results in the reporting period were generally consistent with those recorded previously although most sites show a slight upward trend in salinity, as indicated by increases in electrical conductivity, total dissolved solids and salts. This is consistent with the EA where it is noted that pit water contained within the mine water system may have elevated salinity levels and may also be influenced by the below average rainfall.

This trend is reversed in the Rail Loop Dam (2114) where runoff from the CHPP and previous coal stockpile area is the predominant source of water.

Water quality at Antiene Dam (2221) saw increases in all water quality parameters in the reporting period except for bicarbonate and pH, which decreased. Water levels at this site were extremely low during the reporting period due to below average rainfall. The change in water quality was not caused by activities at Maxwell Infrastructure as Antiene Dam is off-site and not connected to the site's water management system.

In October 2018, mine water being pumped to Pringles Dam for livestock water overflowed the dam via the spillway. Details of this incident and improvements implemented to prevent a recurrence are provided in **Section 12.1**.

Proposed Improvements

A revision of the Water Management Plan is planned for the next reporting period.

9 REHABILITATION

9.1 Management

Rehabilitation at the Maxwell Infrastructure site is managed in accordance with the MOP and Rehabilitation and Offset Management Plan. The MOP has also been approved by DP&E as addressing the requirements of the Final Void Management Plan and Mine Closure Plan.

The key objectives for post rehabilitation land use are:

- To establish as much of the original floristic diversity as possible;
- To create a stable, free-draining post-mining landform that is compatible with the surrounding landscape and capable of a productive land use; and
- To create a post-mining landform which enhances the local and regional habitat corridors.

Whilst the rehabilitation at Maxwell Infrastructure is progressing, no areas of rehabilitation have been formally signed off by DP&E as meeting the land use objectives and completion criteria.

9.2 Performance

During the reporting period, final landform development and rehabilitation was the focus of operations at the Maxwell Infrastructure site, with rehabilitation activities commencing within one week of Malabar taking control of the site.

Buildings and Infrastructure

No buildings or infrastructure were decommissioned or demolished during the reporting period.

During the next reporting period, part of the Pringle's Core Shed and CHPP Bathroom will be demolished and removed from site due to the identification of asbestos material.

Landform Design

During the reporting period, reshaping activities of overburden and exposed areas were undertaken by D11 dozers. Where possible, landform designs were modified to more natural landscapes, incorporating dams and natural drainage lines.

Up to two metres of inert material was then placed on the reshaped areas that were prone to spontaneous combustion (inert material has been stockpiled around the site for use in the management of spontaneous combustion). Approximately 29 ha of land was capped with inert material prior to the application of soil ameliorants and seeding.

Drainage

Contour drains were installed on rehabilitated slopes. All drains had a longitudinal gradient of 1 to 1.5 per cent. Deep ripping across the contour was also undertaken on steeper slopes.

Approximately nine drop structures have been identified for installation during the next reporting period.

Soil Amelioration

Due to historic site practices, good quality topsoil for use during rehabilitation is minimal. Soil ameliorants were used during the reporting period to increase soil organic matter, improve soil nutrient levels and promote vegetation growth.

Biosolids which are a by-product of the wastewater treatment process, were used as a soil ameliorant in pasture areas.

Mixed Waste Organic Material (organic mulch), which is made predominantly from the organic material from household general waste, was used as a soil ameliorant in some woodland areas prior to the waste exemption being revoked by the EPA in October 2018. All remaining organic mulch on site has been stockpiled until further advice is provided by the EPA.

Gypsum was applied to all areas at a rate of 5 tonnes per hectare using a coarse grade recycled gypsum product.

Seeding

Both woodland and pasture seed mixes and rates were revised during the reporting period in consultation with an agronomist and an ecologist.

The pasture seed mix was modified to increase diversity, from seven species to 12 species. Cover crop rates were reduced to allow the establishment of perennial species. The pasture seed was blended with 200 kilograms per hectare of fertiliser and applied with a tractor and seeder combination.

The woodland seed mix was based on a Spotted Gum-Ironbark-Grey Box Woodland. The seed mix was modified to target species that are more likely to germinate and successfully grow using the methods and equipment available. In addition, the cover crop rate was reduced to allow establishment of target species. Species such as Kurrajong, Native Olive, Blackthorn and Native Coffee Bush were removed from the list as these species typically have poor success germinating in mine rehabilitation. The modified seed mix added an additional seven shrub species, six herb species and seven native grass species.

Native species that required heat treatment to break dormancy mechanisms were treated with either boiling or smoke water. Seed was chemically treated to limit ant predation and inoculated with mycorrhiza to promote faster establishment. All woodland areas were seeded by hand.

Rehabilitation of Disturbed Land

During the reporting period, Maxwell Infrastructure completed 92.8 hectares of rehabilitation across six areas of the site. Of the 92.8 hectares, 6 hectares were seeded to woodland rehabilitation and 86.8 hectares were seeded to pasture rehabilitation. Approximately 6.2 hectares of rehabilitation was disturbed during the reporting period to allow access to an inert material stockpile for rehabilitation. There were some minor variations in the locational distribution of rehabilitation, compared to what was proposed in the current MOP. The locations of rehabilitation activities are shown in **Figure 15**.

The 2016 MOP approved by Department of Industry – Resources and Energy (now Department of Planning and Environment - Resource Regulator) required 166 hectares of rehabilitation to be completed during the reporting period. This assumed that the site would go into a closure phase and did not take into consideration the proposed Maxwell Underground Project and utilisation of substantial existing facilities at Maxwell Infrastructure. As stated in the 2017 AEMR, the revised rehabilitation figure for the reporting period was 83 hectares. It is anticipated that 86 hectares of rehabilitation will be completed during the next reporting period.

A summary of the rehabilitation status is provided in **Table 14**. A reconciliation of the rehabilitation status for the Maxwell Infrastructure site identified some historic reporting inaccuracies. These inaccuracies have been addressed and corrected in **Table 14**.

Table 14. Rehabilitation status

Mine Area Type	Previous reporting period (actual) Year 2017	This reporting period (actual) Year 2018	Next reporting period (forecast) Year 2019
A. Total mine footprint¹	1318.2	1517.0	1517.0
B. Total active disturbance²	612.5	635.6	549.6
C. Land being prepared for rehabilitation³	0.0	86	0.0
D. Land under active rehabilitation⁴	705.7	644.8	730.8
E. Completed rehabilitation⁵	0.0	0.0	0.0

¹ Total mine footprint includes all areas within the mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities.

² Total active disturbance includes all areas ultimately requiring rehabilitation.

³ Land being prepared for rehabilitation includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development.

⁴ Land under active rehabilitation includes areas under rehabilitation and being managed to achieve relinquishment.

⁵ Completed rehabilitation requires formal sign-off by the Resource Regulator that the area has successfully met the rehabilitation land use objectives and completion criteria.

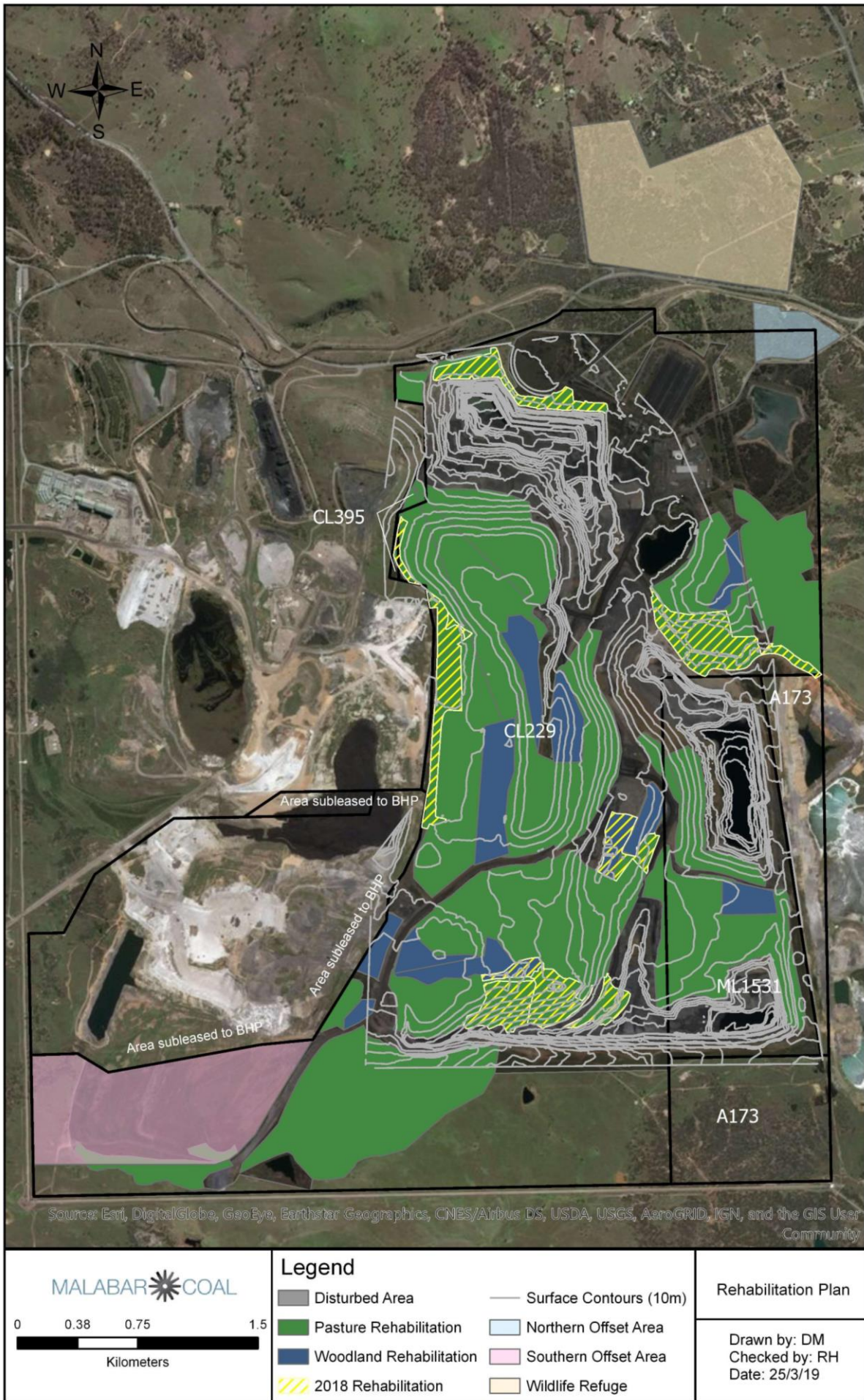


Figure 15. Location of rehabilitation activities

Other Rehabilitation Activities

As previously mentioned in **Section 7.12**, after taking control of the site, Maxwell Infrastructure engaged an external specialist to undertake an assessment (gap analysis) of the rehabilitation and biodiversity. This assessment identified the current extent of woodland and grassland rehabilitation, reviewed current rehabilitation practices, assessed the condition of the rehabilitation and identified practical management actions. Short-term recommended management actions have been implemented and long-term recommended management actions will be considered as the rehabilitation progresses.

During the reporting period, some remedial works were undertaken on an area of existing pasture rehabilitation. Works included the removal of redundant contours and the placement of topsoil and reseeded of some bare areas. The progress of the remedial works will be monitored during the next reporting period.

The culling of kangaroos was undertaken during the reporting period to reduce grazing pressure and minimise the impacts to native groundcover species from the digging of day beds under trees and shrubs in rehabilitation areas.

Weed control activities during the reporting period occurred on the Southern and Eastern Tip rehabilitation areas with a focus on Prickly Pear and Galenia.

Trials

Cattle Grazing Trial

A grazing trial commenced on rehabilitation at the Southern Tip during November 2018. The trial involves the introduction of 50 head of cattle onto pasture rehabilitation to improve grass species diversity. The trial also aims to demonstrate that Maxwell Infrastructure can create a post mining landscape that is compatible with the surrounding landscape and capable of sustaining a productive land use. The progress of the trial will be monitored during the next reporting period.

Native Grass Trial

A native grassland establishment trial was undertaken at Maxwell Infrastructure during 2013. The trial involved seeding a small area on the North Tip with locally collected grassland species from Dartbrook. The seed mix was dominated by Red Grass (*Bothriochloa macra*) and Queensland Blue Grass (*Dichanthium sericeum*).

The trial was monitored in 2013 and determined to be unsuccessful due to poor germination. The area was re-inspected during the reporting period as part of the gap analysis and is now showing to be dominated by native grasses, particularly Lobed Bluegrass (*Bothriochloa biloba*) and Queensland Bluegrass. Given the recent results, Queensland Blue Grass was added into the existing pasture mix as a trial on a 24-hectare parcel of land that was rehabilitated during the reporting period. The area will be monitored over the coming years.

Geofluv Trial

During 2013, an area of 11.5 hectares of mine rehabilitation was designed and built using the Geofluv natural landform software. The design included four main channels with six side channels to drain water from the slope. The area, which was seeded with native shrubs and a cover crop, has high erosional stability and now contains a dense cover of grass species. Due to the area occurring within the conceptual woodland corridor, a tree planting effort will be undertaken within the Geofluv landform area during the next reporting period.

The remaining areas of rehabilitation at the Maxwell Infrastructure site have not been designed or constructed using the Geofluv natural landform software. However, where possible, landform designs will be modified to create more natural looking landscapes that are safe, stable and non-polluting.

9.3 Actions for the Next Reporting Period

The following activities will occur during the next reporting period:

- A tree planting program covering 30 hectares of rehabilitation;
- Relocation of logs on site for habitat;
- Installation of rock structures to assist in appropriate water management;
- Remedial works to address areas of poor performing rehabilitation; and
- A weed control program targeted at Galenia, Prickly Pear and Golden Wreath Wattle.

10 COMMUNITY

10.1 Complaints

The Maxwell Infrastructure site maintains a 24-hour community hotline (1800 652 960) for any issues or enquiries. The community hotline number is advertised in the local newspapers and on the [Malabar Coal website](#). In addition to the community hotline, the Maxwell Infrastructure site can also be contacted by email (info@malabarcoal.com.au).

During the reporting period, one complaint was received regarding air quality.

On 31 May 2018, Maxwell Infrastructure received a request to consider paying for a residential roof to be cleaned and repaired allegedly due to long-term dust deposited from mining operations. Following discussions with the complainant regarding his concerns along with a review of historic and current air quality monitoring results, Maxwell Infrastructure declined to clean and repair the roof. An alternative offer was made to purchase and install a water filtering system which was accepted by the complainant and installed.

The number of complaints received during the reporting period was consistent with the previous year as shown in **Figure 16**.

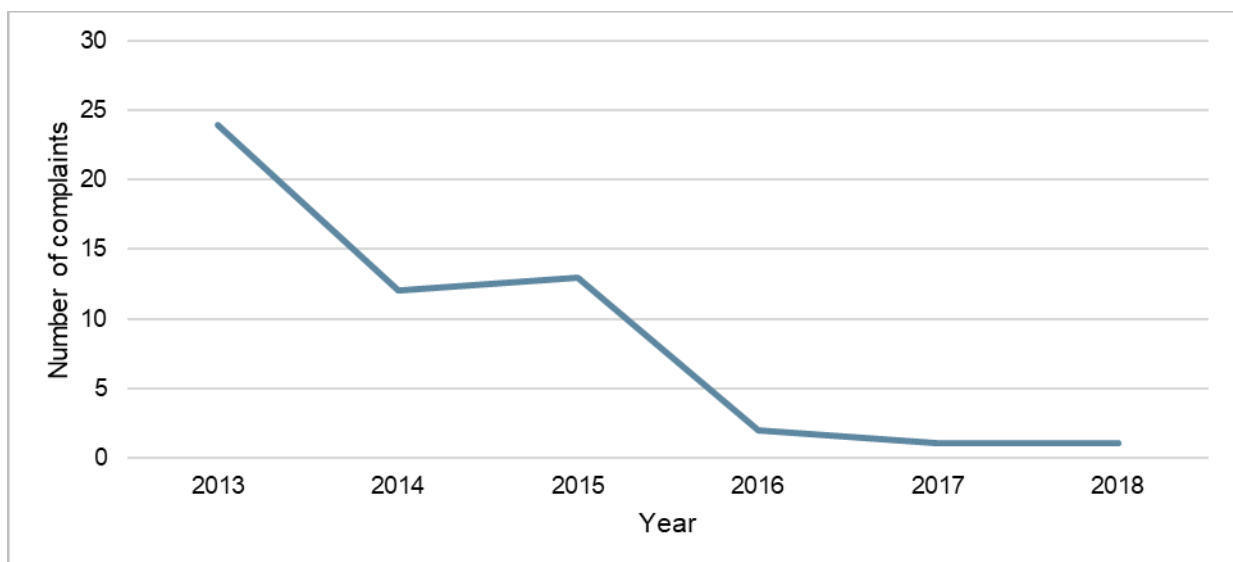


Figure 16. Long-term number of complaints

10.2 Engagement

The Maxwell Infrastructure Community Consultative Committee (CCC) met on four occasions during the reporting period. During these meetings the CCC reviewed the site's environmental performance and discussed community issues. The meetings were held on the following days:

- 21 March 2018

- 4 July 2018
- 12 September 2018
- 19 December 2018

Two meetings were also held for the Joint CCC. These were attended by CCC representatives from Maxwell Infrastructure and Mt Arthur Coal. During these meetings the CCC reviewed the environmental performance of the Antiene Rail Spur which is a shared asset between the two sites. The meetings were held on the following days:

- 4 July 2018
- 19 December 2018

Two information sessions were held in relation to Malabar Coal's proposed Maxwell Underground Project and Solar Project in November 2018. The information sessions were held on the following days:

- 21 November 2018 at Jerrys Plains School of Arts Hall
- 22 November 2018 at the Maxwell Infrastructure site

Each session provided information about the proposed projects, possible impacts, and employment opportunities. In September 2018, the Maxwell Infrastructure CCC was also endorsed by DP&E to be the CCC for the proposed Maxwell Underground Project given the Maxwell Project is located within the general vicinity of the Maxwell Infrastructure site.

Information on environmental management and performance, as well as relevant approvals, can be accessed by the community through the [Malabar Coal website](#).

10.3 Contributions

Malabar Coal regularly donates to local community groups, charities, schools, scholarships and sporting teams within Muswellbrook, Denman and the surrounding areas. During the reporting period, over \$37,000 was donated to the local community. Categories of the contributions are detailed below in **Figure 17**.

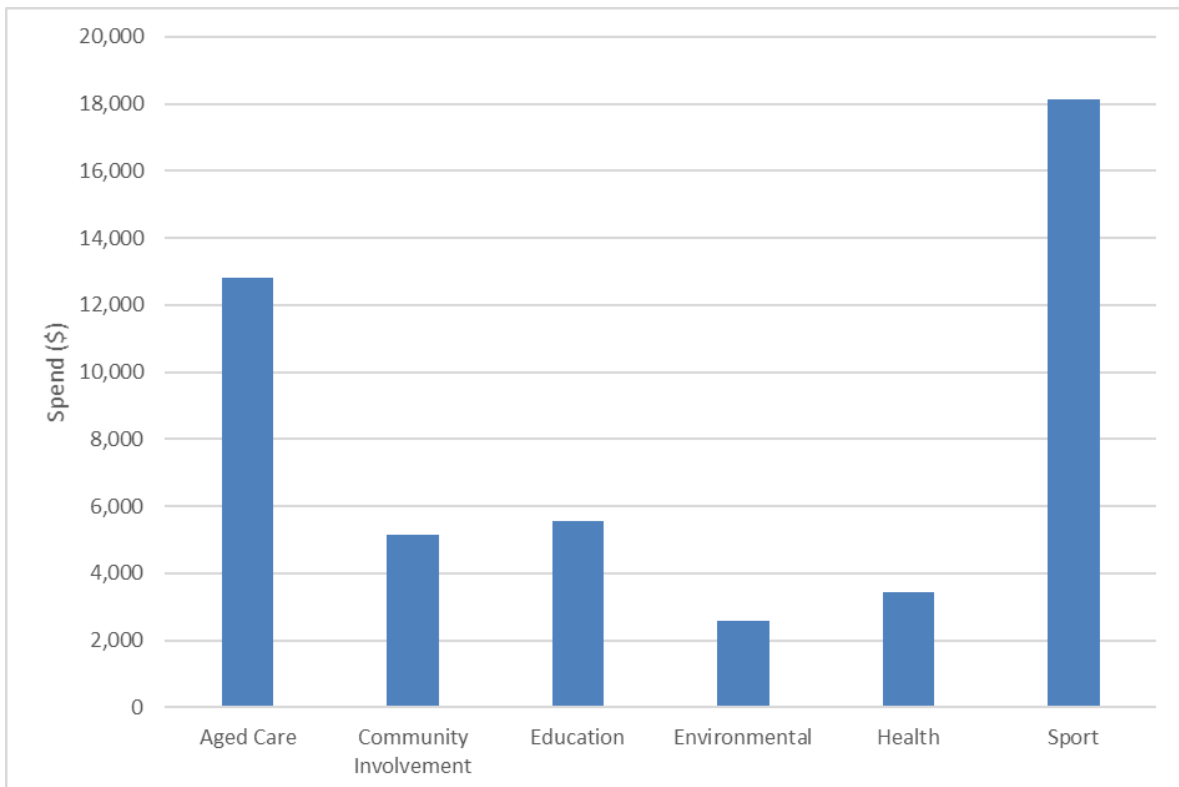


Figure 17. Community contributions in the reporting period

11 INDEPENDENT AUDIT

An Independent Environmental Audit was carried out by SLR Consulting Australia in November 2018. The audit covered the period from 6 November 2015 to 1 November 2018 and assessed compliance with:

- Project Approval PA 06_0202;
- Development Approval DA 106-04-00;
- Environment Protection Licence EPL 1323;
- Coal Leases CL 229 and CL 395; and
- Mining Lease ML 1531.

The Independent Environmental Audit identified that during the three-year audit period there were:

- Fifteen non-compliances against PA 06_0202 (14 administrative and one low risk);
- Eight administrative non-compliances against DA 106-04-00;
- Four non-compliances against EPL 1323 (two administrative and two low risk);
- Four non-compliances against identical conditions of ML 1531 and CL 229 (two administrative and two low risk); and
- Two administrative non-compliances against CL 395.

Fifteen recommendations were provided to address the non-compliances identified and four recommendations for improvement were suggested. All recommendations were accepted by Maxwell Infrastructure. Current progress on the resulting action plan is presented in **Table 15**, noting that some recommendations have been split for easier action-tracking.

Table 15. Independent Environmental Audit action progress

Reference Number	Recommendation	Due Date
REC 1	Cumulative noise levels should be included in future noise monitoring reporting and Annual Reviews.	Completed
REC 2	Clean out sump at the lower lube bay and transfer sediment to the bioremediation area.	Completed
REC 3	Ensure dams listed in Section 7.4.2 of the Water Management Plan are inspected following storm events of more than 30mm in a 24-hour period.	Completed
REC 4	Ensure groundwater monitoring is completed as per the Groundwater Monitoring Plan.	Completed
REC 5	The Rehabilitation and Offset Management Plan is from 2013 and should be updated. If the current draft MOP amendment that is with the DP&E and Resource Regulator is approved, the Rehabilitation and Offset Management Plan should be updated for consistency.	31/09/2019
REC 6	Ensure for the next update of the Aboriginal Cultural Heritage Plan, that OEH are included in the consultation.	31/12/2019
REC 7a	Ensure an analysis of monitoring results against historic data is included in Annual Reviews;	Completed
REC 7b	Ensure an analysis of monitoring results against predictions in the EA is included in Annual Reviews;	Completed
REC 7c	The current Annual Reviews should be streamlined to be more concise as per the Annual Review guidelines; and	Completed
REC 7d	The focus of the document should be more on rehabilitation.	Completed
REC 8	Malabar Coal need to undertake a review of management plans within 3 months of submitting the IEA report.	Completed

Reference Number	Recommendation	Due Date
REC 9a	Ensure the plans approved in October 2018 (AQMP and Noise MP) are sent to relevant stakeholders within three months as per sub condition a).	Completed
REC 9b	Ensure this audit is sent to the agencies within the three-month period.	Completed
REC 10	Inform DPI Water of the current Environment and Community Manager.	Completed
REC 11	Ensure future copies of the Environmental Management Strategy are prepared in consultation with the CCC.	31/03/2019
REC 12	Ensure future versions of the AQ and GHG MP are prepared in consultation with the owners of the Bayswater rail loading facility (Mt Arthur Coal).	Completed
REC 13a	Advise Mt Arthur the estimated annual tonnages for coal haulage on the Antiene Spur, sixty business days before the commencement of each year.	Completed
REC 13b	Advise Mt Arthur the estimated 3-monthly tonnages for coal haulage on the Antiene Spur on the first business day of each month.	Completed
REC 14	Ensure copies of the audit of this Development Consent are sent to the relevant government agencies for comment, within 2 weeks of the report's completion.	Completed
REC 15	Report complaints with respect to the Maxwell Infrastructure transportation operations to DP&E, EPA and Resources Regulator on a 6-monthly basis.	Completed
REC 16a	Liaison with the Resource Regulator and DP&E regarding an agreement on the final landform for the site. Based on the information provided to SLR, the site will continue to complete rehabilitation as per the landform in the approved 2015 MOP unless directed otherwise from the Resource Regulator or the DP&E	31/12/2019
REC 16b	The site needs to review the circumstances when the chisel plough is used. For some recent rehabilitation the chisel plough has been used, when deep ripping on a horizontal aspect should be used.	Completed
REC 16c	There are some general water management improvements in some areas of recent rehabilitation, including a review/repair of some contour drains.	Completed
REC 16d	There is a large area of gully erosion at the site in an area that was shaped and rehabilitated during Anglo's management; up to 3 metres width. It has been determined that a drop structure will need to be established in this area. We recommend - Engineering design; and - Review of rock material onsite for suitability.	Completed
REC 16e	The eastern face of the North tip is an area of rehabilitation that has failed. It is noted the area that has failed is one of the steeper rehabilitated slopes. Implement actions to attempt to rectify this problem including additional work on the landform, use of ameliorants, and a review of seed mix.	31/12/2019
REC 16f	Soil testing should be completed in areas of failed rehabilitation as well as prior to implementing future rehabilitation.	Completed
REC 16g	Provide additional information in the Annual Review. This includes proposed improvements of current rehabilitation areas and proposed activities for future rehabilitation.	Completed

Reference Number	Recommendation	Due Date
REC 17	Cumulative noise levels should be included in future noise monitoring reporting and Annual Reviews.	Completed
REC 18	There is little information within the Annual Review about proposed activities within the offset areas. Additional information is recommended including proposed activities and timings for offset areas. It is recommended that this information is outlined within a table.	Completed
REC 19a	Ensure cardboard waste found within the lower lube bay is moved to the cardboard recycling bin.	Completed
REC 19b	Remove any unwanted waste from site. This includes the scrap metal which has been sorted in areas. SLR understands there is a plan in place for this.	30/06/2019
REC 19c	Removal off site of one empty oil drum located in one of the laydown areas.	Completed

The next Independent Environmental Audit is scheduled to be undertaken in 2021.

12 INCIDENTS AND NON-COMPLIANCES

12.1 Incidents

Pringles Dam

On 29 October 2018 mine water being pumped to Pringles Dam for livestock water overflowed the dam via the spillway and it is estimated that approximately 6 ML of water left the premise boundary and onto adjacent grazing land owned by AGL Macquarie. Maxwell Infrastructure promptly and pro-actively reported the incident to AGL Macquarie and DP&E.

Since the incident, Maxwell Infrastructure has implemented the following controls:

- a comprehensive written permit to undertake a filling operation;
- monitoring of water levels before, during and on completion of filling;
- written authorisations;
- set timed reminders in place; and installation of electrical timers.

Pringles Dam will also be explicitly included in the Water Management Plan when it is revised in 2019.

The incident was investigated by DP&E who determined that Maxwell Infrastructure failed to comply with Schedule 3, Condition 28 of PA 06_0202 by failing to implement the Water Management Plan by transferring water from the ES Void to Pringles Dam. DP&E also determined that Maxwell Infrastructure failed to comply with Schedule 3, Condition 27 of PA 06_0202 by discharging water from site.

Following DP&E's investigation, no action was taken regarding Schedule 3, Condition 27 and a warning letter was issued regarding Schedule 3, Condition 28.

The incident was investigated by EPA who alleged that Maxwell Infrastructure contravened Section 64 of the Protection of the Environment Operations (POEO) Act for failing to comply with a licence condition, specifically Condition O2.1 that requires all plant and equipment to be operated in a proper and efficient manner; Section 120 for polluting waters; and Section 148 for failing to notify the EPA of the incident.

Following the EPA's investigation, a penalty notice was issued for \$15,000 for the alleged contravention of Section 64, an official caution was issued for the alleged breach of Section 120 and a warning was issued for the alleged breach of Section 148.

12.2 Exceedances

Instances where monitoring results exceeded approval criteria are listed in **Table 16** with subsequent investigation details.

Table 16. Monitoring result exceedances

Date	Monitor	Averaging period	Result	Calculated Contribution	Approval criteria	Investigation details
15/02/18	TEOM	24-hour	63 µg/m ³	5 µg/m ³	50 µg/m ³	This monitor is located to the north east of the site. Wind direction during the 24-hour period was predominantly from the south east with the monitor located downwind of the site for 15 per cent of the day. One dozer was operating at Maxwell Infrastructure on this day. The UHAQMN also recorded elevated readings at Singleton (63.9 µg/m ³), Camberwell (68.0 µg/m ³) and Muswellbrook (74.0 µg/m ³) indicating a regional dust event.
19/03/18	TEOM	24-hour	52 µg/m ³	8 µg/m ³	50 µg/m ³	This monitor is located to the north east of the site. Wind direction during the 24-hour period was predominantly from the north west with the monitor located downwind of the site for 20 per cent of the day. No operational activity was occurring at Maxwell Infrastructure on this day. The UHAQMN also recorded elevated readings at Muswellbrook (69.1 µg/m ³), Camberwell (72.8 µg/m ³) and Singleton (71.7 µg/m ³) indicating a regional dust event.
20/03/18	TEOM	24-hour	51 µg/m ³	5 µg/m ³	50 µg/m ³	This monitor is located to the north east of the site. Wind direction during the 24-hour period was predominantly from the North West with the monitor located downwind of the site for 7 per cent of the day. No operational activity was occurring at Maxwell Infrastructure on this day. The Upper Hunter UHAQMN also recorded high readings at Muswellbrook (58.9 µg/m ³), Camberwell (46.8 µg/m ³) and Singleton (44.0 µg/m ³) indicating a regional dust event.

Date	Monitor	Averaging period	Result	Calculated Contribution	Approval criteria	Investigation details
15/04/18	TEOM	24-hour	56 µg/m ³	0 µg/m ³	50 µg/m ³	This monitor is located to the north east of the site. Wind direction during the 24-hour period was predominantly from the north west with the monitor located downwind of the site for less than 1 per cent of the day. The UHAQMN also recorded elevated readings at Muswellbrook (66.1 µg/m ³), Singleton (72.1 µg/m ³) and Maison Dieu (70.3 µg/m ³) indicating a regional dust event.
22/11/18	TEOM	24-hour	124 µg/m ³	0 µg/m ³	50 µg/m ³	This monitor is located to the north east of the operation. Wind direction during the 24-hour period was predominantly from the north west. This monitor was not located downwind of Maxwell Infrastructure's operations at any time during this day. The UHAQMN also recorded an elevated reading at Muswellbrook (185.9 µg/m ³) indicating a regional dust event.
23/11/18	TEOM	24-hour	106 µg/m ³	0 µg/m ³	50 µg/m ³	This monitor is located to the north east of the operation. Wind direction during the 24-hour period was predominantly from the north west. This monitor was not located downwind of Maxwell Infrastructure's operations at any time during this day. The UHAQMN also recorded an elevated reading at Muswellbrook (125.6 µg/m ³) indicating a regional dust event.

13 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

In addition to outstanding actions listed in **Section 11 (Table 15)** to address the Independent Environmental Audit recommendations, the measures listed in **Table 17** will also be implemented during the next reporting period to continue to improve the environmental or community performance at the Maxwell Infrastructure site.

Table 17. Improvement measures planned for next reporting period

Reference Number	Measure	Planned Timing
01	Update the Blast Management Plan	Jan 2019 (completed)
02	Update the Aboriginal Cultural Heritage Management Plan	Dec 2019
03	Document visual impact inspection process	Jun 2019
04	Update the Spontaneous Combustion Management Plan	Aug 2019

Reference Number	Measure	Planned Timing
05	Implement a weed control program targeted at Galenia, Prickly Pear and Golden Wreath Wattle.	Dec 2019
06	Relocate logs for habitat in the Southern Offset Area	Dec 2019
07	Install nest boxes in the Southern Offset Area	Dec 2019
08	Update the Water Management Plan	May 2019
09	Undertake tree planting program on 30 hectares of rehabilitation	Dec 2019
10	Place woody debris in woodland rehabilitation areas	Dec 2019
11	Install rock structures to assist in appropriate water management on rehabilitation	Dec 2019
12	Commence remedial works to address areas of poor performing rehabilitation	Dec 2019

APPENDIX 1. APPROVAL CONDITIONS RELEVANT TO THE ANNUAL REVIEW

Condition	Description	Report Section
PA 06_0202		
Schedule 3 Condition 7	The Proponent shall: (a) implement all reasonable and feasible noise mitigation measures; (b) investigate ways to reduce the noise generated by the project, including maximum noise levels which may result in sleep disturbance; and (c) report on these investigations and the implementation and effectiveness of these measures in the AEMR.	7.2
Schedule 3 Condition 44	The Proponent shall: (a) keep records of the: <ul style="list-style-type: none"> • amount of coal transported from the site each year; and • number of coal haulage train movements generated by the project (on a daily basis); • date and time of each train movement generated by the project; and (b) include these records in the AEMR.	7.7
Schedule 3 Condition 47	The Proponent shall: ... (e) report on waste management and minimisation in the AEMR,	7.10
Schedule 5 Condition 5	Within 12 months of this approval, and annually thereafter, the Proponent shall submit an AEMR to the Director-General and relevant agencies. This report must: (a) identify the standards and performance measures that apply to the project; (b) describe the works carried out in the last 12 months; (c) describe the works that will be carried out in the next 12 months; (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years; (e) include a summary of the monitoring results for the project during the past year; (f) include an analysis of these monitoring results against the relevant: <ul style="list-style-type: none"> • limits/criteria in this approval; • monitoring results from previous years; and • predictions in the EA; (g) identify any trends in the monitoring results over the life of the project; (h) identify and discuss any non-compliance during the previous year; and (i) describe what actions were, or are being, taken to ensure compliance.	7, 8 and 9 5.1 and 5.2 5.3 10.1 7, 8 and 9 7, 8 and 9 7, 8 and 9 1 and 12 12 and 13

Condition	Description	Report Section
Appendix 3 Statement of Commitments Ref 21	[Maxwell Infrastructure] will prepare and submit to relevant regulatory departments an AEMR which will discuss monitoring results and include a discussion on predictions and commitments made within this EA.	7, 8 and 9
DA 106-04-00		
Schedule 2 Condition 5.1b	The Applicant shall: ... (iii) provide all results and analysis of air quality monitoring in the AEMR including a determination of the annual dust deposition rate in gm/m ² /month, which shall be plotted in the AEMR.	7.4 and Appendix 4
Schedule 2 Condition 5.3.2c	The Applicant shall also: ... (ii) include a summary of noise monitoring results in the AEMR.	7.2 and Appendix 3
Schedule 2 Condition 8.1a	The Applicant shall, throughout the life of the rail loading facility and rail loop and for a period of at least three years after the completion of operations in the DA area, prepare and submit an Annual Environmental Management Report (AEMR), which may be incorporated into the existing Drayton AEMR to the satisfaction of the Director- General. The AEMR shall include a review of the performance of coal transportation against the Environmental Management Strategy, the conditions of this consent, and other licences and approvals relating to the coal transport operations. To enable ready comparison with the predictions of the EIS, diagrams and tables, the report shall include, but not be limited to, the following matters: (i) an annual compliance review of the performance of the project against conditions of this consent and statutory approvals; (ii) a review of the effectiveness of the environmental management of the coal transport operations in terms of EPA, DMR, and MSC requirements; (iii) results of all environmental monitoring required under this consent or other approvals, including interpretations and discussion by a suitably qualified person; (iv) identify trends in monitoring results over the life of coal transport operations; (v) a listing of any variations obtained to approvals applicable to the subject area during the previous year; and (vi) environmental management targets and strategies for the next year, taking into account identified trends in monitoring results.	1 and 12 7.7 7, 8 and 9 7, 8 and 9 4 13
Schedule 2 Condition 8.1b	In preparing the AEMR, the Applicant shall: (i) respond to any request made by the Director-General for any additional requirements; and (ii) comply with any requirements of the Director-General or other relevant government agencies.	N/A N/A

Condition	Description	Report Section
Schedule 2 Condition 9.2a	The environmental coordinator employed by [Maxwell Infrastructure] (refer condition 2.1) shall be responsible: ... (ii) for providing a report of complaints received with respect to the Drayton coal transportation operations every six months throughout the life of the project to the Director-General, MSC, EPA, DMR, and CCC, or as otherwise agreed by the Director-General. A summary of this report shall be included in the AEMR (condition 8.1(a)).	10
CL 229, CL 395 and ML 1531		
Condition 3	<p>(1) Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management report (AEMR) with the Director-General.</p> <p>(2) The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:</p> <ul style="list-style-type: none"> (a) the accepted Mining Operations Plan; (b) development consent requirements and conditions; (c) Environment Protection Authority and Department of Land and Water Conservation (or Department of Environment and Conservation and Department of Planning) licences and approvals; (d) Any other statutory environmental requirements; (e) Details of any variations to environmental approvals applicable to the lease area; and (f) Where relevant, progress towards final rehabilitation objectives. 	<p>All</p> <p>9</p> <p>7, 8 and 9</p> <p>7, 8 and 9</p> <p>7, 8 and 9</p> <p>4</p> <p>9</p>

APPENDIX 2. ENVIRONMENTAL MONITORING LOCATIONS



Figure 18. Environmental monitoring locations

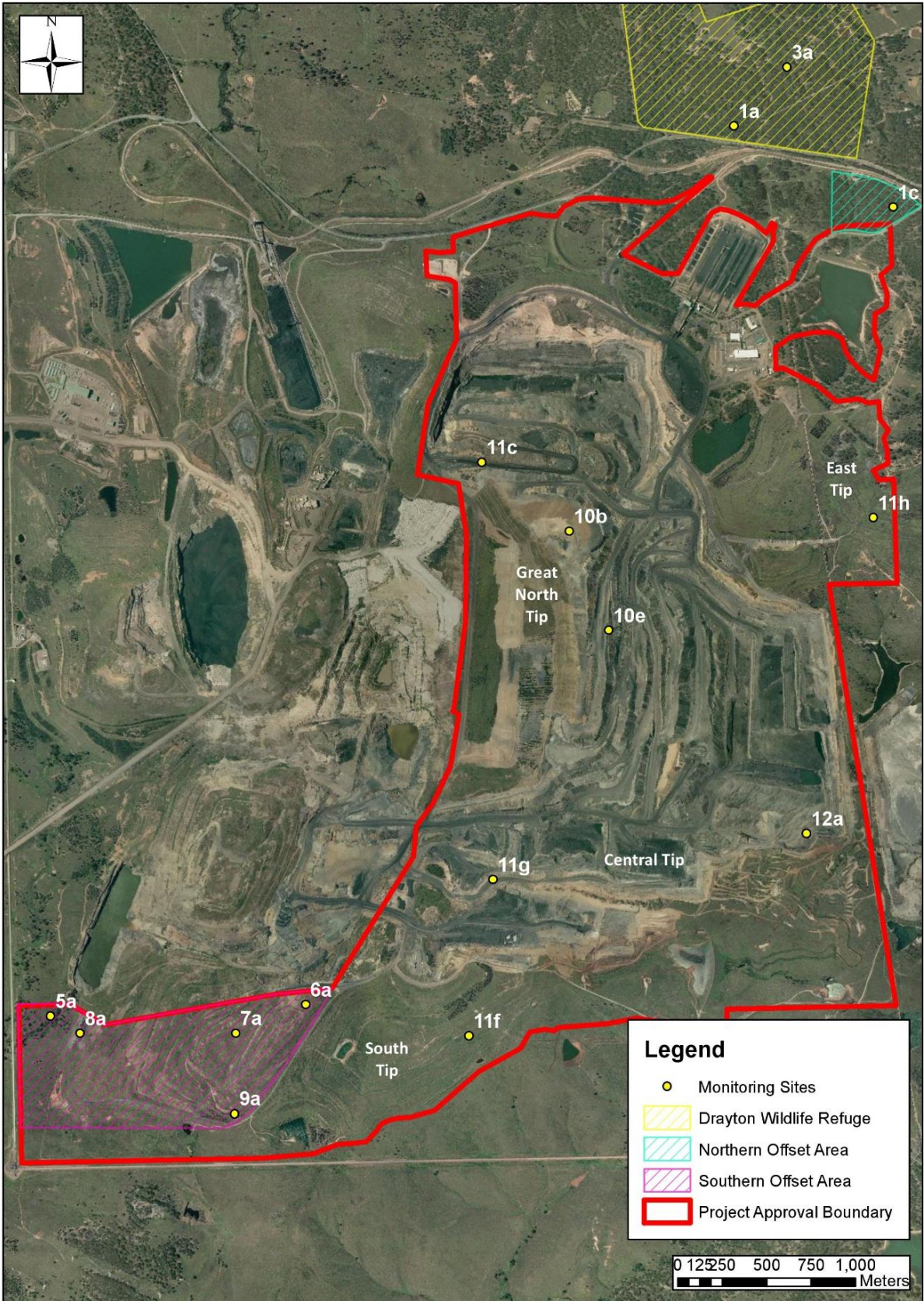


Figure 19. Ecological monitoring locations

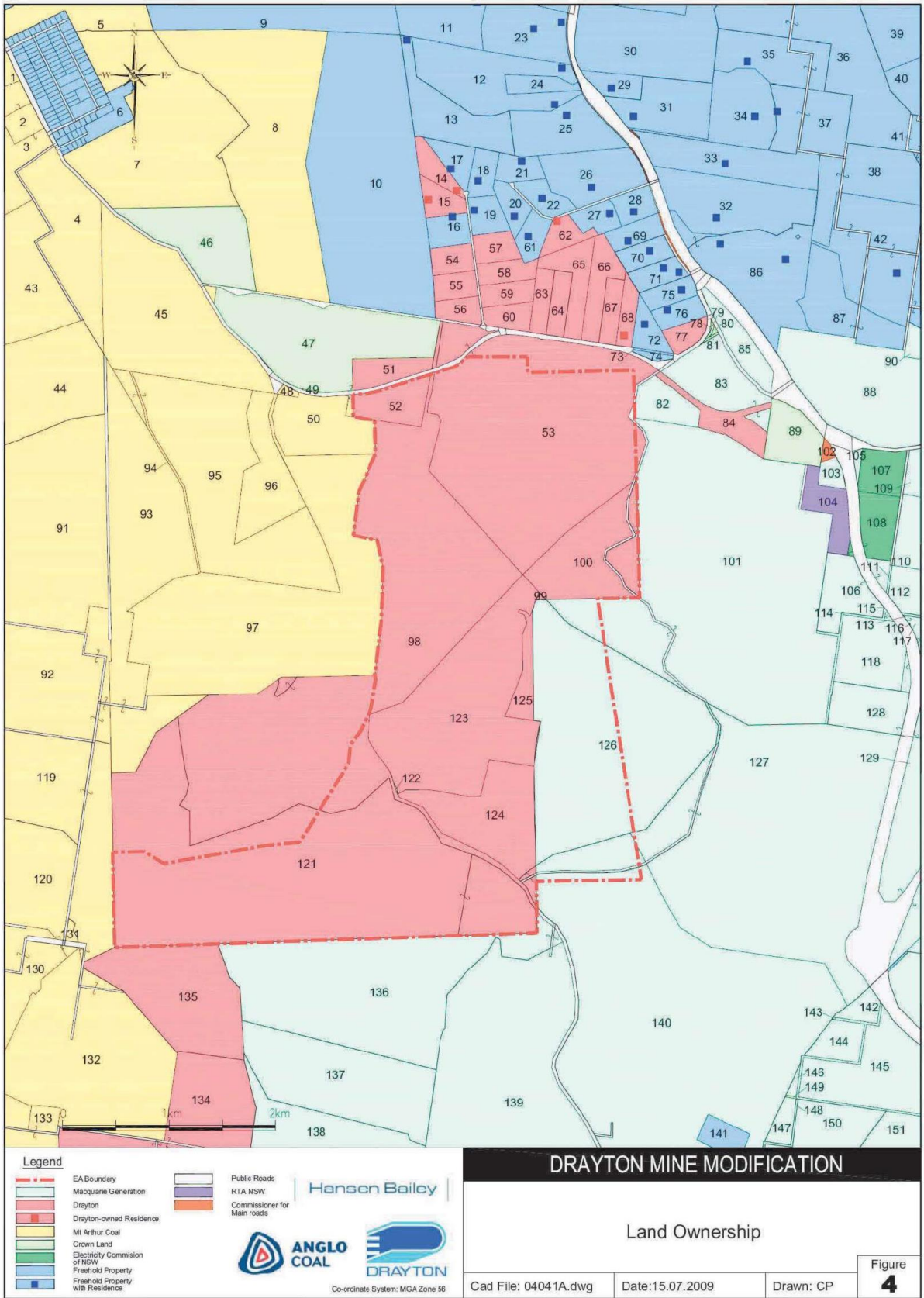


Figure 20. Noise modelling locations (land ownership)

APPENDIX 3. NOISE MONITORING RESULTS

Table 18. Modelled noise generated by the project alone (L_{Aeq} (15 min))

Location	Approval criterion (dB(A))			EA year 10 prediction (dB(A))			2018 maximum result (dB(A))		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
34	35	35	39	<30	<30	34	<20	<20	<20
29	35	35	36	32	33	34	<20	<20	<20
31	35	35	37	32	34	35	<20	<20	<20
33	35	35	38	<30	32	36	<20	<20	<20
86	35	35	38	30	31	38	<20	<20	<20
32	35	35	40	30	33	39	<20	<20	<20
71	35	35	41	32	35	40	<20	<20	<20
75*	35	35	41	32	34	40	<20	<20	<20
70	35	36	41	33	36	40	<20	<20	<20
76*	35	36	42	33	35	42	<20	<20	<20
28	35	37	40	33	36	39	<20	<20	<20
69	35	37	41	34	36	40	<20	<20	<20
13	36	36	35	35	34	33	<20	<20	<20
12	36	36	36	34	35	35	<20	<20	<20
25*	36	37	37	34	35	35	<20	<20	<20
26	36	37	38	34	36	37	<20	<20	<20
27	36	37	39	34	36	38	<20	<20	<20
72*	36	37	42	34	36	42	<20	<20	<20
17	37	38	36	36	37	36	<20	<20	<20
21	38	38	38	36	37	37	<20	<20	<20
22	38	38	38	36	37	37	<20	<20	<20
18	38	39	38	37	38	37	<20	<20	<20
20	39	40	39	38	39	39	<20	<20	<20
61*	39	40	39	37	39	39	<20	<20	<20
14	40	39	39	38	39	38	<20	<20	<20
19	40	40	39	39	40	39	<20	<20	<20
16*	41	41	39	40	41	39	<20	<20	<20
23	35	35	35	32	33	33	<20	<20	<20
35*	35	35	35	<30	30	34	<20	<20	<20
42*	35	35	35	<30	<30	31	<20	<20	<20
37	35	35	35	<30	<30	33	<20	<20	<20

* Measured: Doherty (16), Kerr (25), Wilson (35), Smith (42), Skinner (61), Robertson (72), Shaman (75), Holder (76)

Table 19. Monitoring summary - cumulative noise

Location	Approval criterion (dB(A))			EA year 10 prediction (dB(A))	2018 maximum result (dB(A))		
	Day (L _{Aeg} (11 hr))	Evening (L _{Aeg} (4 hr))	Night (L _{Aeg} (9 hr))		Day (L _{Aeg} (11 hr))	Evening (L _{Aeg} (4 hr))	Night (L _{Aeg} (9 hr))
Doherty	50	45	40	n/a	24	38	35
Kerr					<20	<20	27
Skinner					<20	<20	26
Robertson					<20	33	<20
Sharman					<20	<20	<20
Horder					<20	28	29
Wilson					<20	27	24
Smith					<20	28	<20

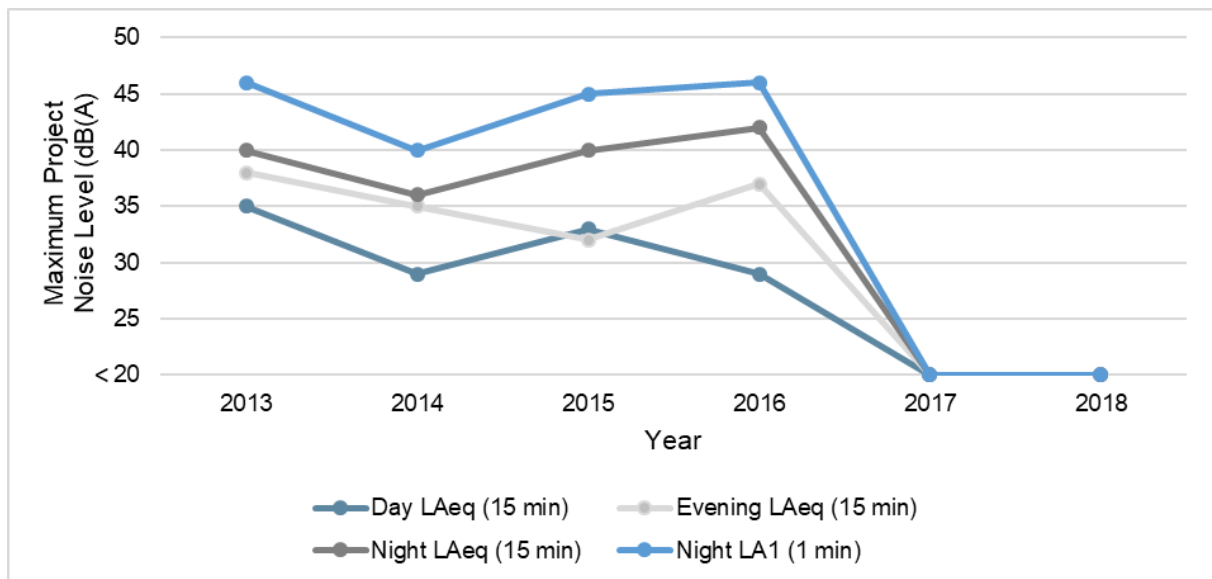


Figure 21. Long-term maximum project noise levels

APPENDIX 4. AIR QUALITY MONITORING RESULTS

Table 20. PM₁₀ matter 24-hour results for the reporting period

Date	PM ₁₀ 24-hour result (µg/m ³)	Date	PM ₁₀ 24-hour result (µg/m ³)	Date	PM ₁₀ 24-hour result (µg/m ³)
01/01/18	17.4	11/02/18	32.7	24/03/18	10.9
02/01/18	22.2	12/02/18	34.1	25/03/18	11.6
03/01/18	17.7	13/02/18	27.5	26/03/18	12.2
04/01/18	21.9	14/02/18	23.1	27/03/18	17.5
05/01/18	22.6	15/02/18	63.1	28/03/18	18.2
06/01/18	18.0	16/02/18	36.9	29/03/18	17.6
07/01/18	13.8	17/02/18	33.6	30/03/18	12.3
08/01/18	34.0	18/02/18	29.8	31/03/18	31.7
09/01/18	24.1	19/02/18	29.9	01/04/18	17.9
10/01/18	21.6	20/02/18	11.3	02/04/18	17.7
11/01/18	26.3	21/02/18	11.9	03/04/18	20.8
12/01/18	24.0	22/02/18	17.5	04/04/18	15.9
13/01/18	23.6	23/02/18	21.7	05/04/18	11.5
14/01/18	15.5	24/02/18	19.0	06/04/18	34.3
15/01/18	15.3	25/02/18	6.6	07/04/18	19.6
16/01/18	25.4	26/02/18	1.9	08/04/18	19.4
17/01/18	24.9	27/02/18	13.4	09/04/18	26.3
18/01/18	29.2	28/02/18	15.7	10/04/18	27.8
19/01/18	28.8	01/03/18	28.5	11/04/18	26.2
20/01/18	29.0	02/03/18	20.0	12/04/18	20.4
21/01/18	20.2	03/03/18	23.8	13/04/18	17.7
22/01/18	32.6	04/03/18	16.3	14/04/18	18.2
23/01/18	49.2	05/03/18	16.5	15/04/18	56.4
24/01/18	41.0	06/03/18	8.9	16/04/18	13.4
25/01/18	31.8	07/03/18	12.8	17/04/18	19.8
26/01/18	31.2	08/03/18	12.1	18/04/18	19.3
27/01/18	25.9	09/03/18	9.8	19/04/18	12.8
28/01/18	16.0	10/03/18	14.6	20/04/18	13.7
29/01/18	23.4	11/03/18	13.9	21/04/18	27.2
30/01/18	28.0	12/03/18	16.1	22/04/18	19.4
31/01/18	23.2	13/03/18	17.6	23/04/18	14.9
01/02/18	19.1	14/03/18	0.0	24/04/18	19.9
02/02/18	13.2	15/03/18	19.6	25/04/18	18.9
03/02/18	16.3	16/03/18	34.8	26/04/18	20.8
04/02/18	16.2	17/03/18	30.8	27/04/18	21.3
05/02/18	19.1	18/03/18	25.6	28/04/18	15.3
06/02/18	17.8	19/03/18	51.5	29/04/18	12.1
07/02/18	17.5	20/03/18	51.2	30/04/18	14.6
08/02/18	21.5	21/03/18	10.2	01/05/18	12.5
09/02/18	45.1	22/03/18	6.7	02/05/18	17.8
10/02/18	34.0	23/03/18	8.7	03/05/18	13.8

Date	PM ₁₀ 24-hour result (µg/m ³)
04/05/18	33.6
05/05/18	21.1
06/05/18	20.8
07/05/18	12.7
08/05/18	20.6
09/05/18	18.2
10/05/18	24.7
11/05/18	19.6
12/05/18	14.6
13/05/18	11.1
14/05/18	19.8
15/05/18	16.3
16/05/18	20.6
17/05/18	17.4
18/05/18	19.1
19/05/18	18.5
20/05/18	15.2
21/05/18	15.7
22/05/18	10.8
23/05/18	11.3
24/05/18	20.1
25/05/18	28.3
26/05/18	21.8
27/05/18	18.9
28/05/18	18.0
29/05/18	16.0
30/05/18	6.1
31/05/18	7.6
01/06/18	7.9
02/06/18	10.3
03/06/18	12.1
04/06/18	11.5
05/06/18	10.6
06/06/18	9.9
07/06/18	14.8
08/06/18	16.0
09/06/18	8.1
10/06/18	6.5
11/06/18	6.2
12/06/18	6.4
13/06/18	10.2
14/06/18	11.3
15/06/18	8.4

Date	PM ₁₀ 24-hour result (µg/m ³)
16/06/18	7.4
17/06/18	9.1
18/06/18	6.9
19/06/18	6.2
20/06/18	10.2
21/06/18	14.8
22/06/18	6.6
23/06/18	8.2
24/06/18	13.8
25/06/18	16.6
26/06/18	14.2
27/06/18	14.4
28/06/18	7.0
29/06/18	3.5
30/06/18	7.9
01/07/18	13.37
02/07/18	13.42
03/07/18	12.87
04/07/18	14.36
05/07/18	6.97
06/07/18	11.56
07/07/18	11.29
08/07/18	8.07
09/07/18	6.66
10/07/18	11.75
11/07/18	12.27
12/07/18	13.85
13/07/18	11.25
14/07/18	8.41
15/07/18	10.3
16/07/18	10.55
17/07/18	10.28
18/07/18	37.72
19/07/18	25.95
20/07/18	23.66
21/07/18	11.13
22/07/18	13.25
23/07/18	17
24/07/18	31.39
25/07/18	19.05
26/07/18	19.22
27/07/18	27.93
28/07/18	24.42

Date	PM ₁₀ 24-hour result (µg/m ³)
29/07/18	16.36
30/07/18	12.98
31/07/18	14.25
01/08/18	15.74
02/08/18	27.81
03/08/18	21.85
04/08/18	43.44
05/08/18	17.1
06/08/18	21
07/08/18	24.66
08/08/18	7.84
09/08/18	9.63
10/08/18	11.4
11/08/18	16.27
12/08/18	8.91
13/08/18	8.5
14/08/18	6.88
15/08/18	9.18
16/08/18	18.01
17/08/18	18.59
18/08/18	22.22
19/08/18	18.89
20/08/18	12.2
21/08/18	13.6
22/08/18	12.26
23/08/18	21.56
24/08/18	21.31
25/08/18	19.4
26/08/18	10.76
27/08/18	10.42
28/08/18	16.57
29/08/18	17.53
30/08/18	17.57
31/08/18	29.99
01/09/18	17.67
02/09/18	11.08
03/09/18	15.28
04/09/18	5.52
05/09/18	13.25
06/09/18	11.11
07/09/18	9.7
08/09/18	8.12
09/09/18	7.42

Date	PM ₁₀ 24-hour result (µg/m ³)
10/09/18	12.07
11/09/18	14.31
12/09/18	15.29
13/09/18	33.01
14/09/18	22.54
15/09/18	24.18
16/09/18	24.94
17/09/18	22.53
18/09/18	22.91
19/09/18	28.41
20/09/18	19.55
21/09/18	18.63
22/09/18	24.76
23/09/18	21.46
24/09/18	14.5
25/09/18	9.94
26/09/18	10.65
27/09/18	9.31
28/09/18	9.49
29/09/18	15.26
30/09/18	18.3
01/10/18	13.9
02/10/18	17.5
03/10/18	25.8
04/10/18	19.6
05/10/18	1.5
06/10/18	5.5
07/10/18	8.9
08/10/18	5.2
09/10/18	8.5
10/10/18	12.5
11/10/18	5.8
12/10/18	6.0
13/10/18	9.1
14/10/18	10.5
15/10/18	10.3
16/10/18	12.0
17/10/18	11.1
18/10/18	6.6
19/10/18	8.0
20/10/18	13.7
21/10/18	12.9
22/10/18	19.9

Date	PM ₁₀ 24-hour result (µg/m ³)
23/10/18	13.7
24/10/18	29.3
25/10/18	19.4
26/10/18	22.6
27/10/18	25.5
28/10/18	25.3
29/10/18	23.4
30/10/18	21.5
31/10/18	27.7
01/11/18	27.2
02/11/18	18.0
03/11/18	23.3
04/11/18	32.9
05/11/18	24.1
06/11/18	34.0
07/11/18	19.7
08/11/18	5.2
09/11/18	20.3
10/11/18	20.9
11/11/18	15.9
12/11/18	15.3
13/11/18	16.5
14/11/18	21.3
15/11/18	23.0
16/11/18	10.4
17/11/18	15.4
18/11/18	11.2
19/11/18	16.1
20/11/18	20.4
21/11/18	31.1
22/11/18	123.6
23/11/18	106.1
24/11/18	19.9
25/11/18	22.8
26/11/18	18.1
27/11/18	31.5
28/11/18	7.6
29/11/18	4.7
30/11/18	13.9
01/12/18	22.6
02/12/18	32.1
03/12/18	25.1
04/12/18	36.2

Date	PM ₁₀ 24-hour result (µg/m ³)
05/12/18	7.2
06/12/18	9.7
07/12/18	8.2
08/12/18	13.9
09/12/18	22.7
10/12/18	24.2
11/12/18	10.8
12/12/18	7.8
13/12/18	7.9
14/12/18	11.6
15/12/18	22.5
16/12/18	25.8
17/12/18	16.7
18/12/18	27.0
19/12/18	20.3
20/12/18	13.7
21/12/18	18.4
22/12/18	13.3
23/12/18	16.1
24/12/18	16.5
25/12/18	8.0
26/12/18	13.6
27/12/18	28.1
28/12/18	22.9
29/12/18	24.7
30/12/18	19.7
31/12/18	34.1

Table 21. Deposited dust results for the reporting period (g/m²/month)

Month	2197	2230	2157	2208	2247	2235	2175	2130
Jan-18	2.2	3.4	4.4	3	3.5	3.6	2.9	3.5
Feb-18	3.5	3.1	3.3	3	2.7	3.5	2.2	3.6
Mar-18	2.5	1.9	2.6	1.6	3.2	1.9	1.9	1.7
Apr-18	2.2	1.9	1	1.7	1.7	1.6	1.7	1.3
May-18	2.2	1.8	1.5	1.7	1.9	1.6	1.8	2.3
Jun-18	1.4	1.2	1.3	1.1	1.9	1.3	1.2	1.1
Jul-18	1.8	1.7	1.2	1.2	2.2	1.8	1.6	1
Aug-18	2.9	2.6	1.9	1.5	2.1	2	1.9	1.8
Sep-18	1.8	3.9	1.6	3.8	2.6	3.1	3.1	2.6
Oct-18	2.7	1.4	1.9	1.2	1.6	1.5	1.3	1
Nov-18	-	3.3	-	-	2.4	2.9	2.2	-
Dec-18	-	2.7	-	-	3.2	3.7	3.5	-

APPENDIX 5. VISUAL IMPACT RESULTS

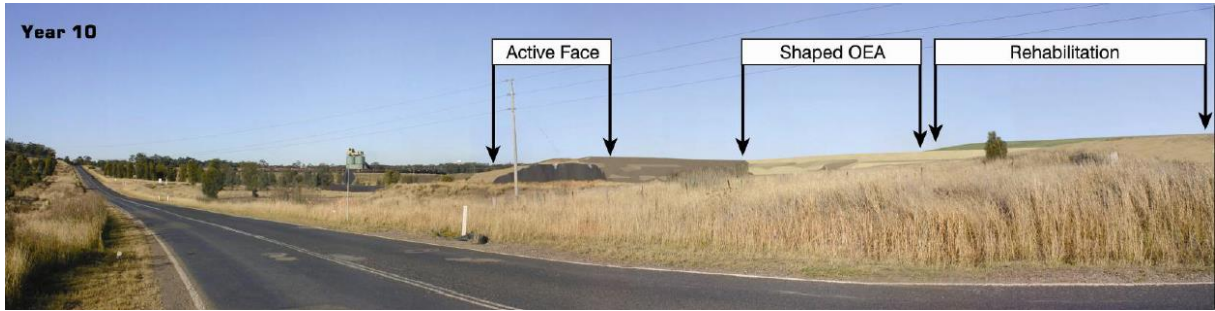


Figure 22. EA photomontage from Thomas Mitchell Drive in year 10



Figure 23. Current view from Thomas Mitchell Drive



Figure 24. EA photomontage from Hassall Rd in year 1 (final landform)



Figure 25. Current view from Hassall Rd

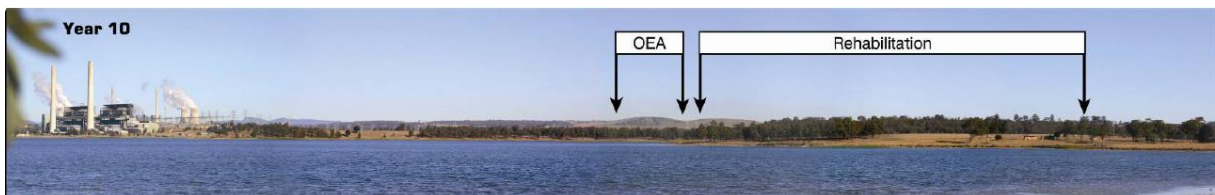


Figure 26. EA photomontage from Lake Liddell in year 10



Figure 27. Current view from Lake Liddell

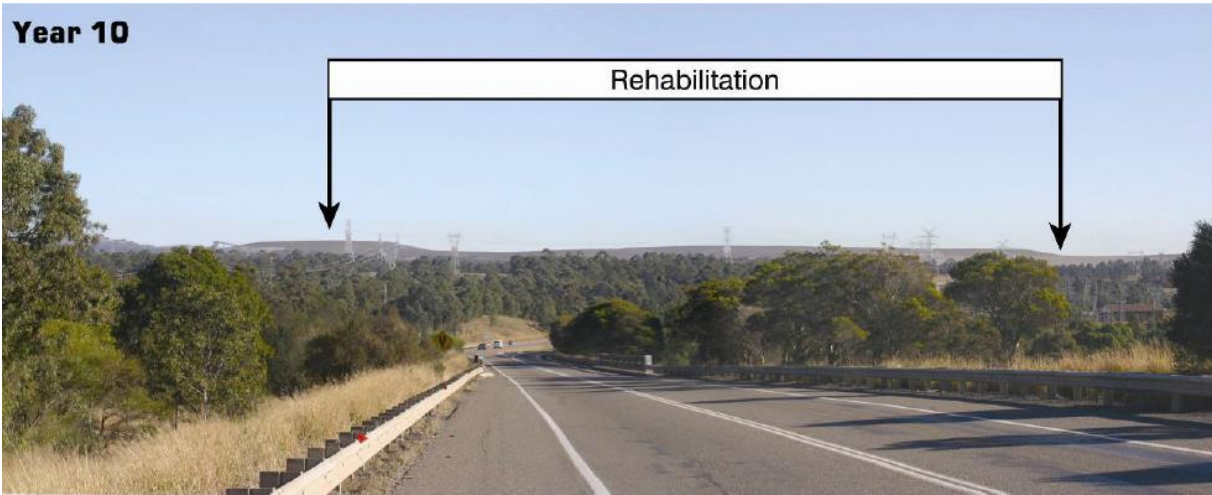


Figure 28. EA photomontage from New England highway in year 10



Figure 29. Current view from New England Highway

APPENDIX 6. BIODIVERSITY MONITORING RESULTS

Table 22. Performance of reference sites

Performance Criteria	Site No.	2016			2017			2018		
		Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground
Is there regeneration of species from all structural layers?	1a	Y	Y	Y	Y	Y	Y	Y	Y	Y
	1c	Y	Y	Y	Y	Y	Y	Y	Y	Y
	3a	Y	Y	Y	Y	N	N	Y	Y	Y
	5a	Y	Y	Y	Y	Y	Y	Y	Y	Y
Species composition does not decrease by more than 10% from year to year	1a	55			37			36 (3%)		
	1c	35			45			39 (13%)		
	3a	42			41			35 (15%)		
	5a	40			33			33 (0%)		
Total Cover of Invasive Weed Species is less than 5%	1a	2			2			5		
	1c	1			0			5		
	3a	1			0			2		
	5a	5			2			5		

Table 23. Performance of pasture rehabilitation sites

Performance Criteria	Site No.	2016	2017	2018
Ground cover is between 90-100%	11c	80	90	80
	11f	48	30	80
	11g	94	75	80
	11h	92	87	85
Appropriate seed mix (5 species from MOP Table 29)	11c	Y	Y	Y
	11f	Y	Y	Y
	11g	Y	Y	Y
	11h	Y	Y	Y
More than 80% target species	11c	13	35	18
	11f	38	24	27
	11g	53	33	27
	11h	32	15	45
Less than 40% cover of a single species	11c	80	80	70
	11f	15	25	25
	11g	50	20	45
	11h	40	75	45
	11c	1	2	2

Performance Criteria	Site No.	2016	2017	2018
Five to six perennial species per square metre	11f	2	4	2
	11g	3	2	2
	11h	2	1	2
Less than 20% significant weed cover	11c	1	5	0.1
	11f	40	5	23
	11g	2	3	5
	11h	5	3	2
Weeds have been actively managed	11c	-	-	N
	11f	-	-	N
	11g	-	-	N
	11h	-	-	N

Table 24. Performance of woodland sites

Performance Criteria	Site No.	2016			2017			2018		
		Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground
Ground cover is establishing evenly with bare areas not greater than analogue sites. (i.e. 14 percent in 2018)	6a	18%			18%			8%		
	7a	8%			6%			15%		
	8a	0%			4%			5%		
	9a	2%			2%			5%		
	10b	16%			20%			15%		
	10e	0%			2%			22%		
	12a	-			-			10%		
80% of species from each stratum are represented	6a	50%	0%	13%	50%	125%	29%	50%	100%	46%
	7a	50%	0%	17%	50%	25%	17%	0%	25%	50%
	8a	50%	0%	8%	100%	25%	25%	100%	0%	33%
	9a	50%	0%	17%	50%	25%	13%	50%	50%	21%
	10b	50%	0%	17%	150%	50%	33%	100%	50%	42%
	10e	100%	0%	4%	100%	75%	17%	150%	75%	42%
	12a	-	-	-	-	-	-	150%	75%	21%
An average of 100 stems/ha surviving in woodland/forest rehabilitation (stems per hectare)	6a	50			-			2		
	7a	75			-			33		
	8a	98			-			5		
	9a	n/a			n/a			n/a		
	10b	n/a			n/a			n/a		
	10e	n/a			n/a			n/a		
	12a	-			-			35		
	6a	29			68			60		

Performance Criteria	Site No.	2016			2017			2018		
		Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground	Canopy	Mid-storey	Ground
Exotic weeds form less than 10% of the species cover	7a	85			52			70		
	8a	88			92			60		
	9a	77			92			90		
	10b	2			2			25		
	10e	-			-			40		
	12a	-			-			40		
Total ground coverage of noxious and nationally significant weeds (High Threat Exotic) is <10%	6a	-			-			44		
	7a	-			-			65		
	8a	-			-			52		
	9a	-			-			84		
	10b	-			-			5		
	10e	-			-			21		
	12a	-			-			3		

Key

	Met performance criteria
	Did not meet performance criteria

APPENDIX 7. WATER ACCOUNTING FRAMEWORK INPUT – OUTPUT STATEMENT

Reporting Period	Date	Storage (ML)
Start	01/01/2018	10,581
Finish	31/12/2018	12,304

INPUTS-OUTPUTS

Input-Output	Element (Source / Destination)	Sub-element (Inputs/Outputs)	Water Quality			Sub-element Total (ML)	Measured, Estimated, Simulated	Accuracy
			Category 1 (ML)	Category 2 (ML)	Category 3 (ML)			
Inputs	Surface Water	<i>Precipitation and Runoff</i>		1,594		1,594	Simulated	Medium
		<i>Rivers and Creeks</i>						
		<i>External Surface Water Storage</i>						
	Groundwater	<i>Aquifer Interception</i>			767	767	Estimated	Low
		<i>Bore Fields</i>						
		<i>Entrainment</i>						
	Seawater	<i>Estuary</i>						
		<i>Sea/Ocean</i>						
	Third Party Water	<i>Contract</i>						
		<i>Waste Water</i>						
<i>Other</i>		1.2				Measured	High	
TOTAL INPUTS			1	1,594	767	2,361		
Outputs	Surface Water	<i>Discharge</i>						
		<i>Environmental Flows</i>						
	Groundwater	<i>Seepage</i>						
		<i>Reinjection</i>						
	Seawater	<i>Discharge to Estuary</i>						
		<i>Discharge to Sea/Ocean</i>						
	Supply to Third Party							
	Other	<i>Evaporation</i>	543			543	Simulated	Medium
<i>Entrainment</i>				92	92	Simulated	Medium	
<i>Other (potable, misc)</i>		1			1	Measured	High	
TOTAL OUTPUTS			544	92	92	636		

APPENDIX 8. GROUNDWATER QUALITY RESULTS

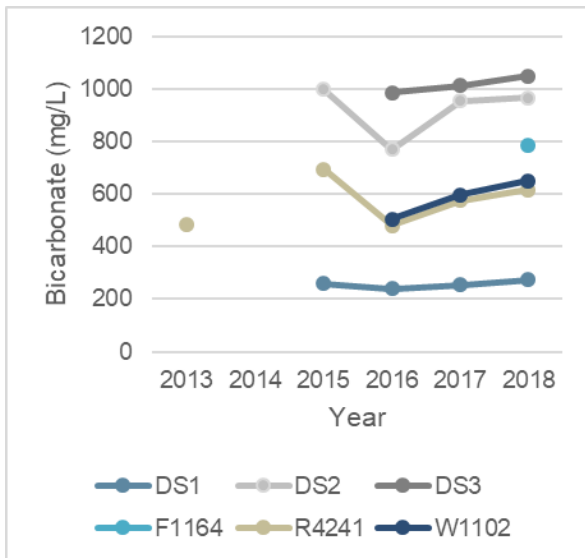


Figure 30. Long-term groundwater bicarbonate

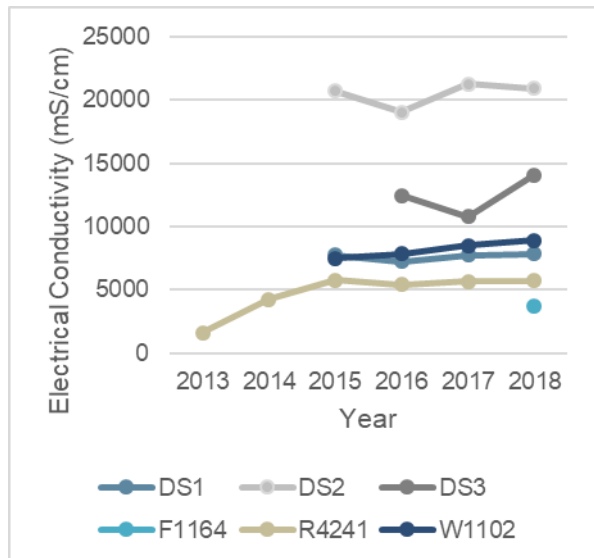


Figure 33. Long-term groundwater EC

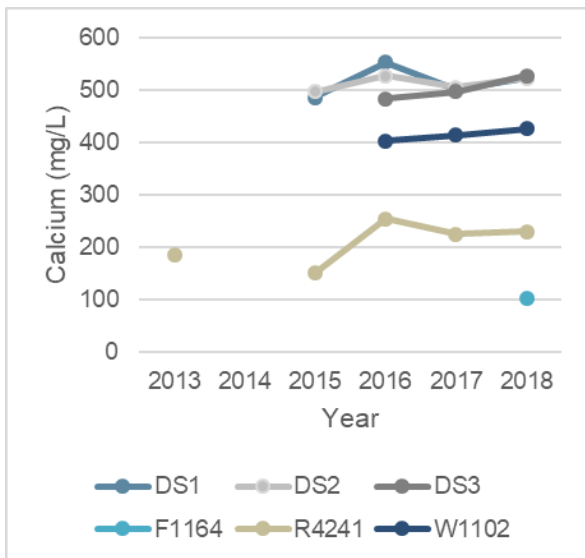


Figure 31. Long-term groundwater calcium

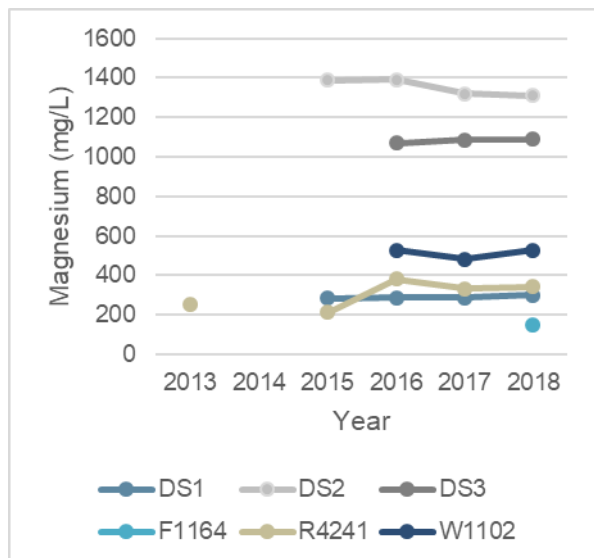


Figure 34. Long-term groundwater magnesium

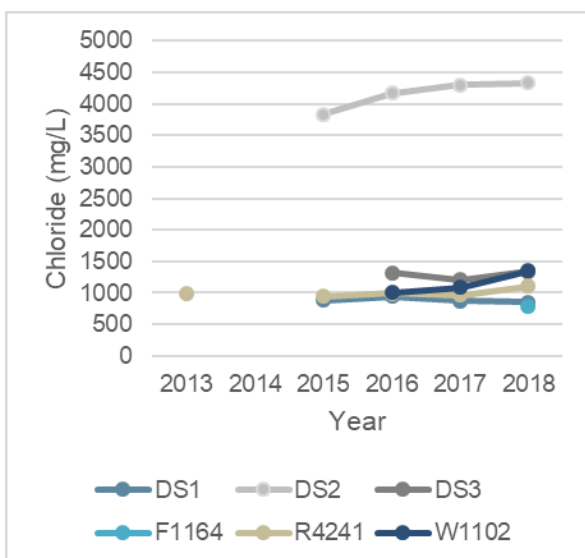


Figure 32. Long-term groundwater chloride

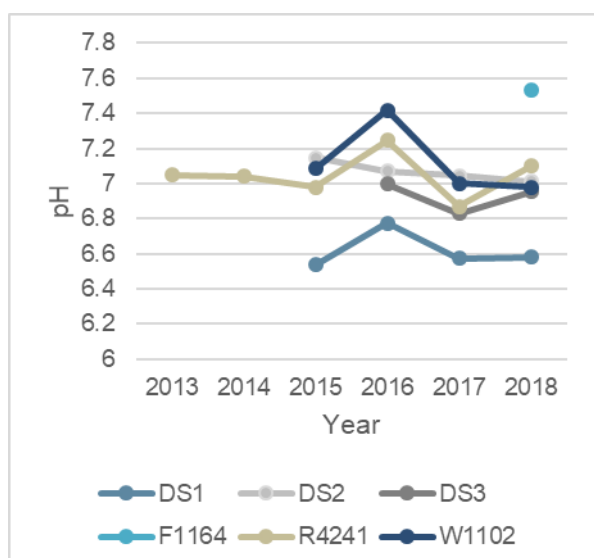


Figure 35. Long-term groundwater pH

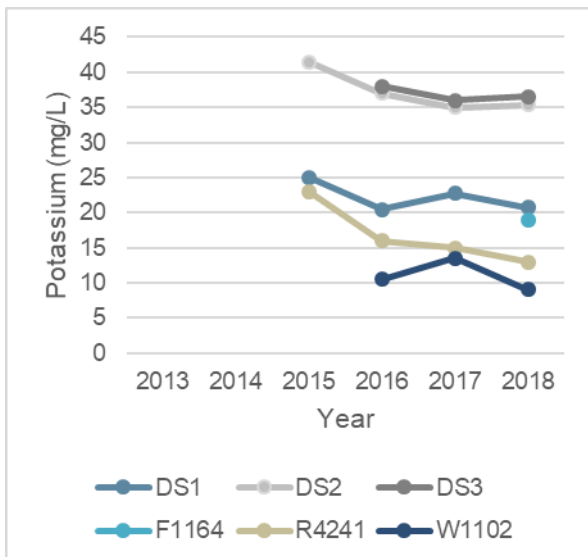


Figure 36. Long-term groundwater potassium

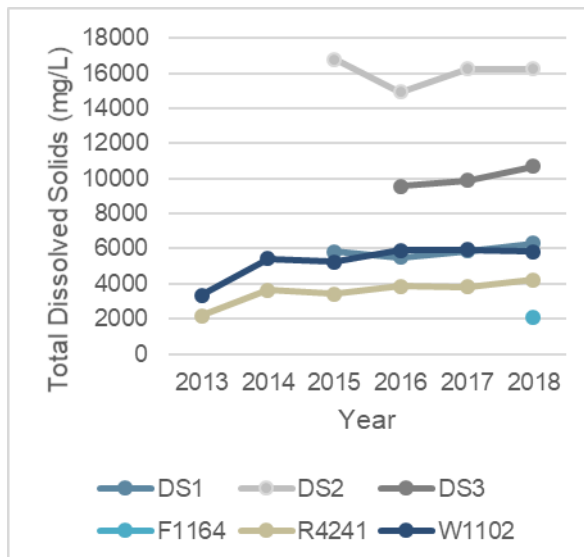


Figure 39. Long-term groundwater TDS

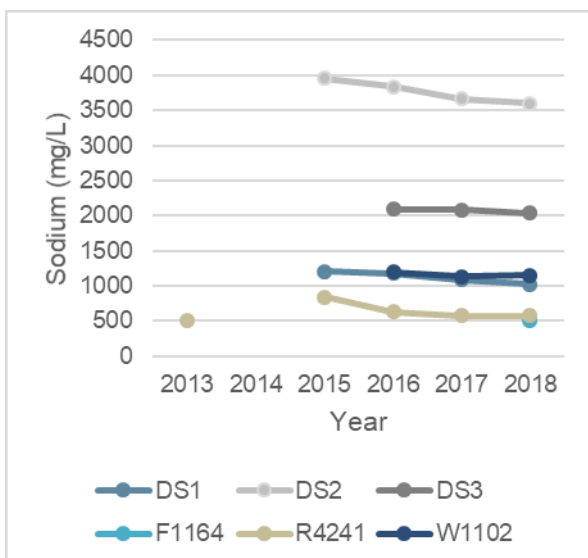


Figure 37. Long-term groundwater sodium

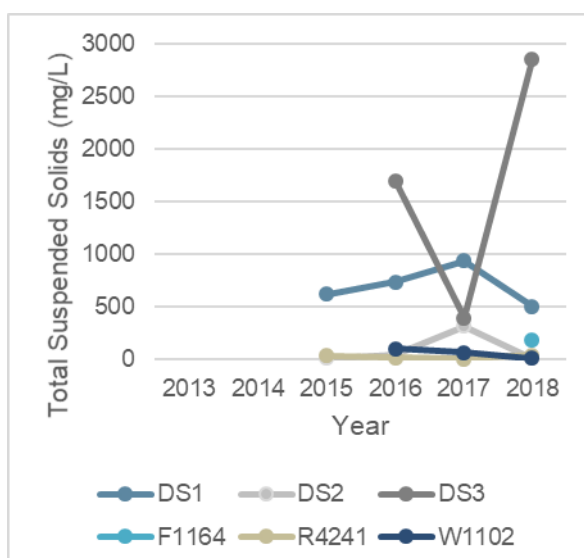


Figure 40. Long-term groundwater TSS

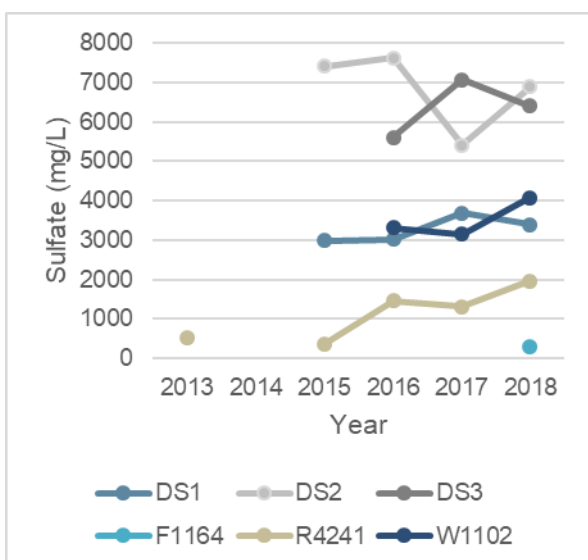


Figure 38. Long-term groundwater sulfate

APPENDIX 9. SURFACE WATER QUALITY RESULTS

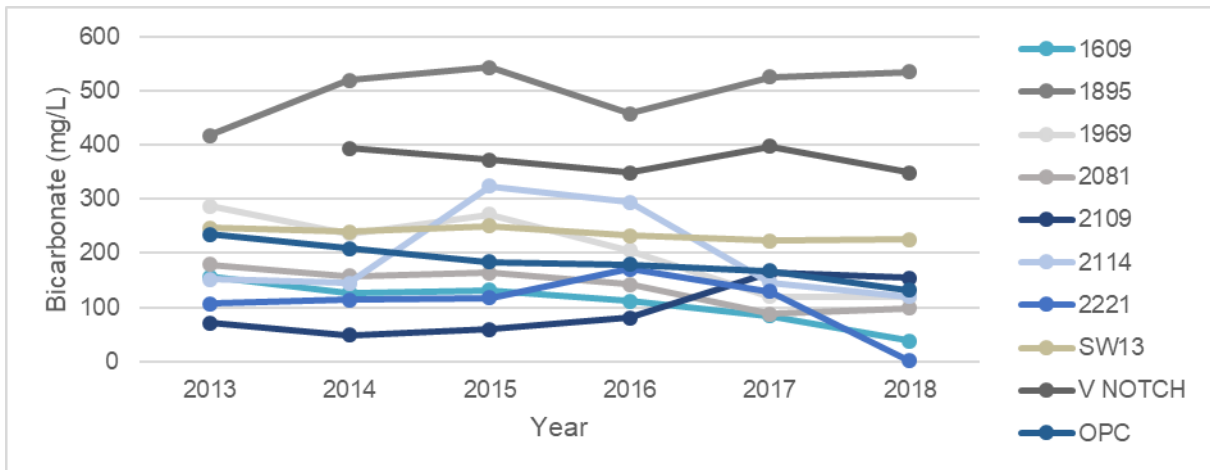


Figure 41. Long-term surface water bicarbonate

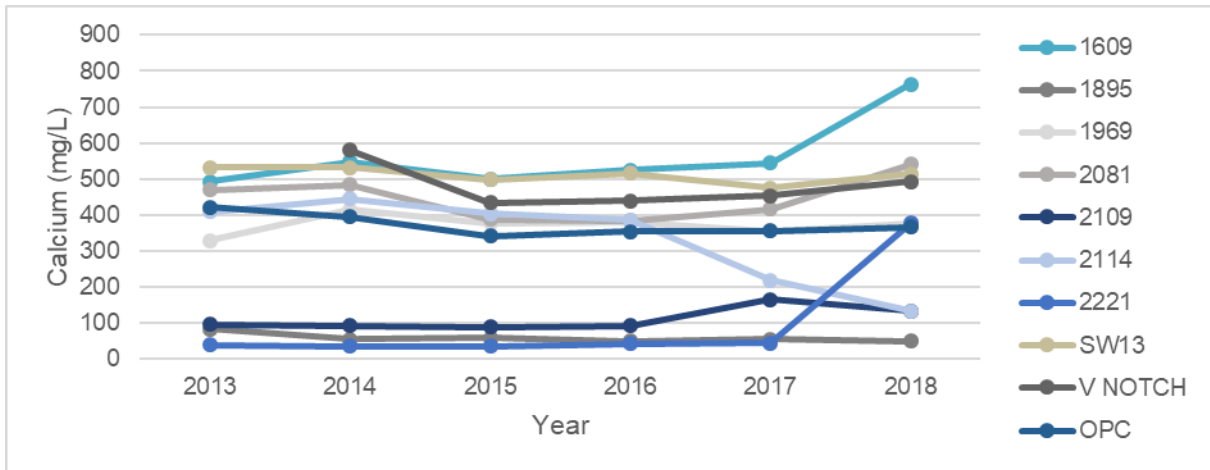


Figure 42. Long-term surface water calcium

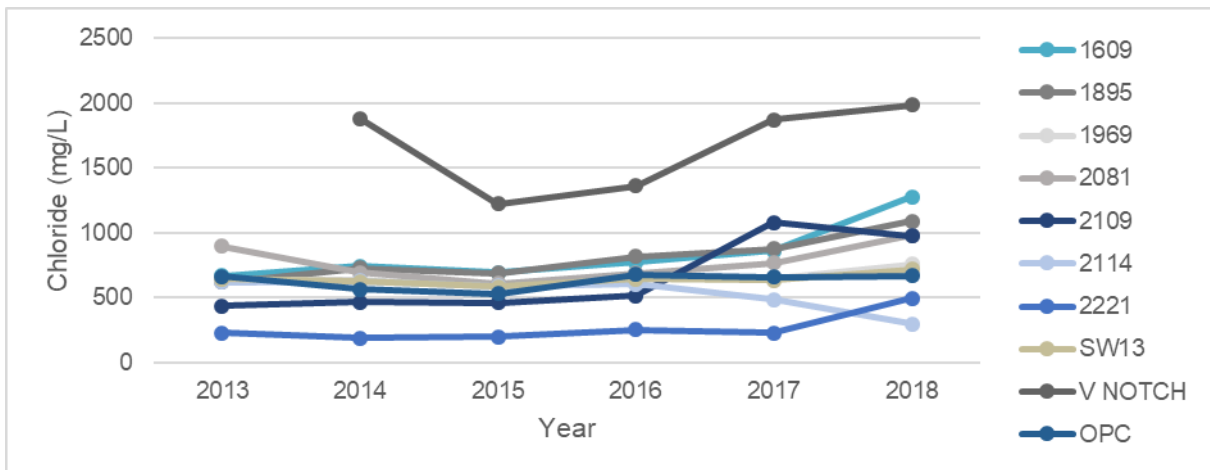


Figure 43. Long-term surface water chloride

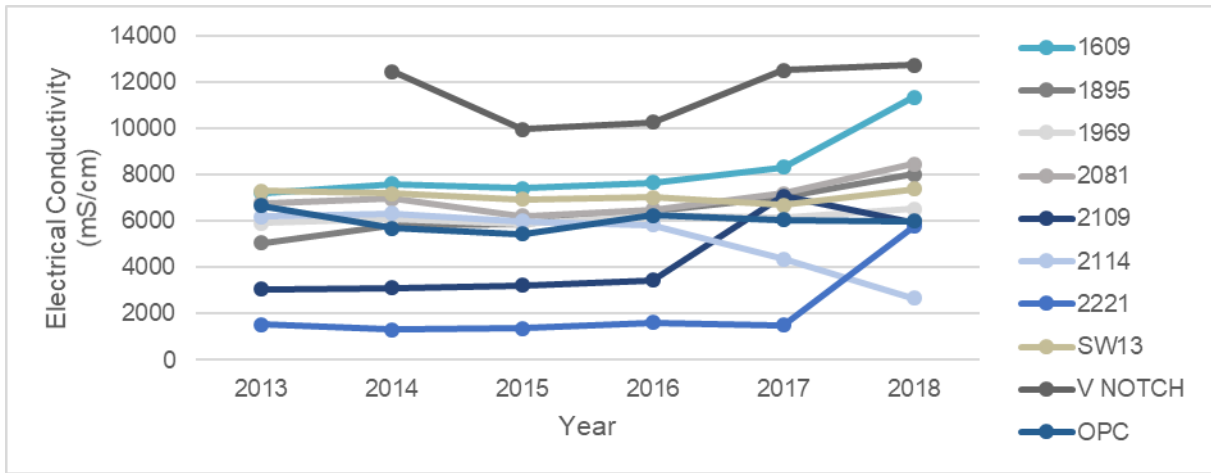


Figure 44. Long-term surface water electrical conductivity

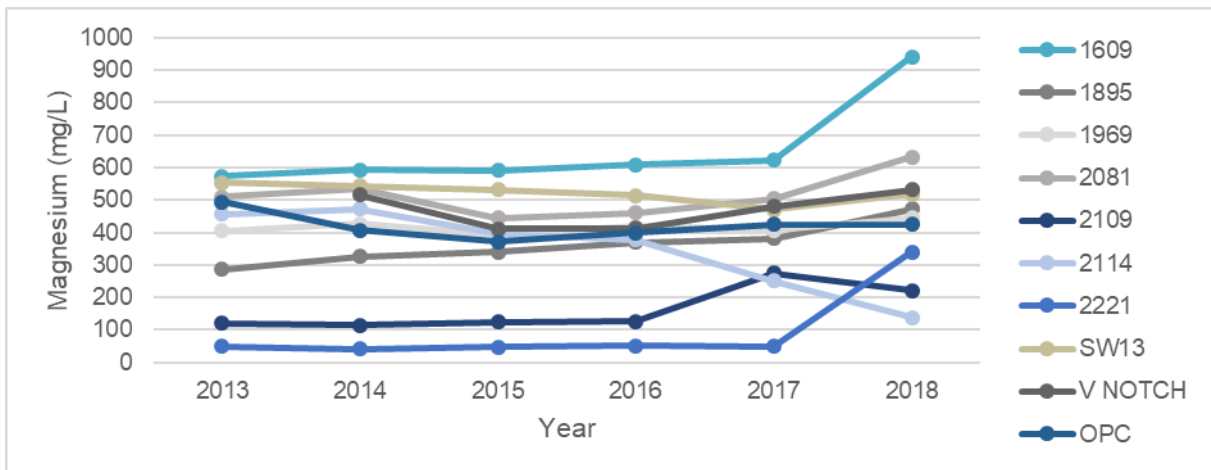


Figure 45. Long-term surface water magnesium

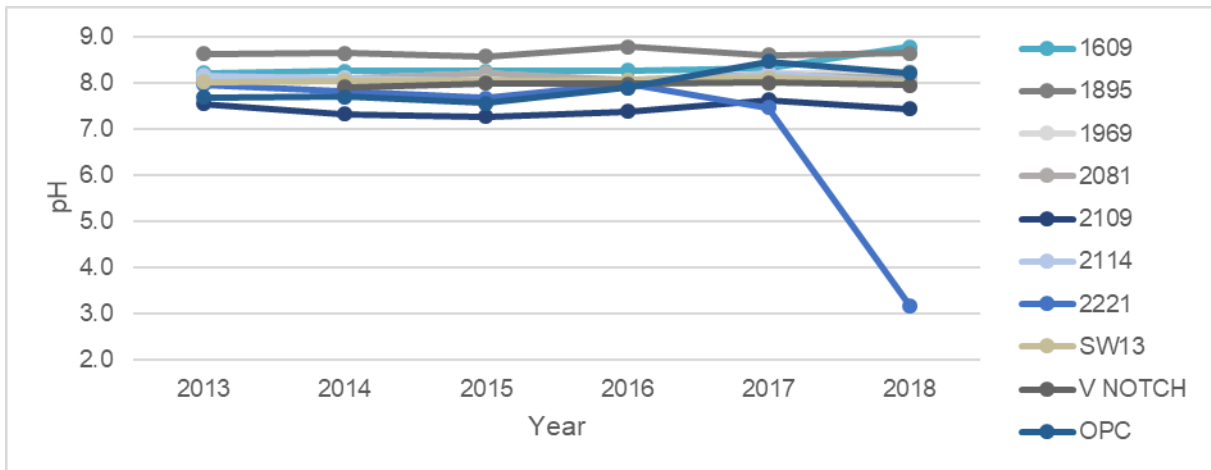


Figure 46. Long-term surface water pH

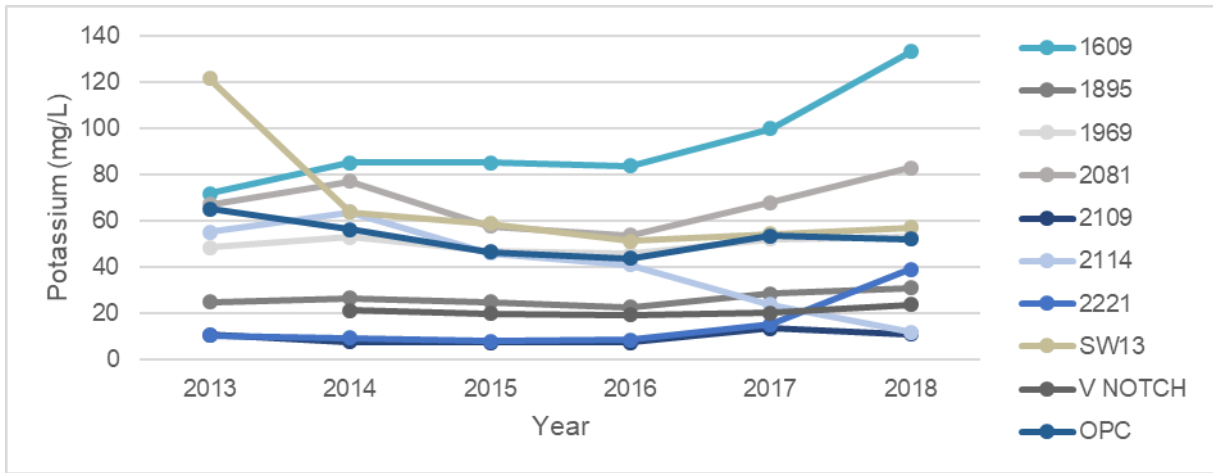


Figure 47. Long-term surface water potassium

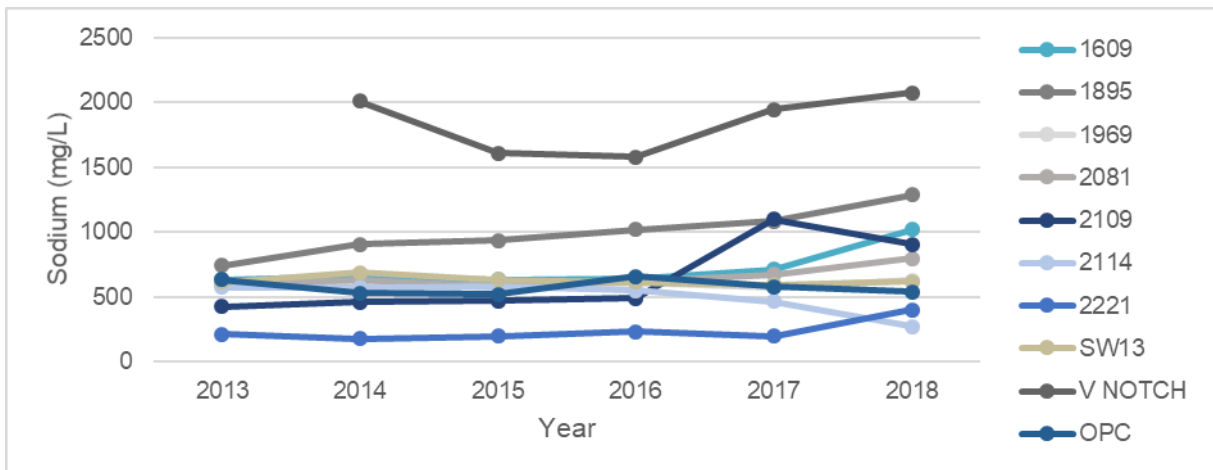


Figure 48. Long-term surface water sodium

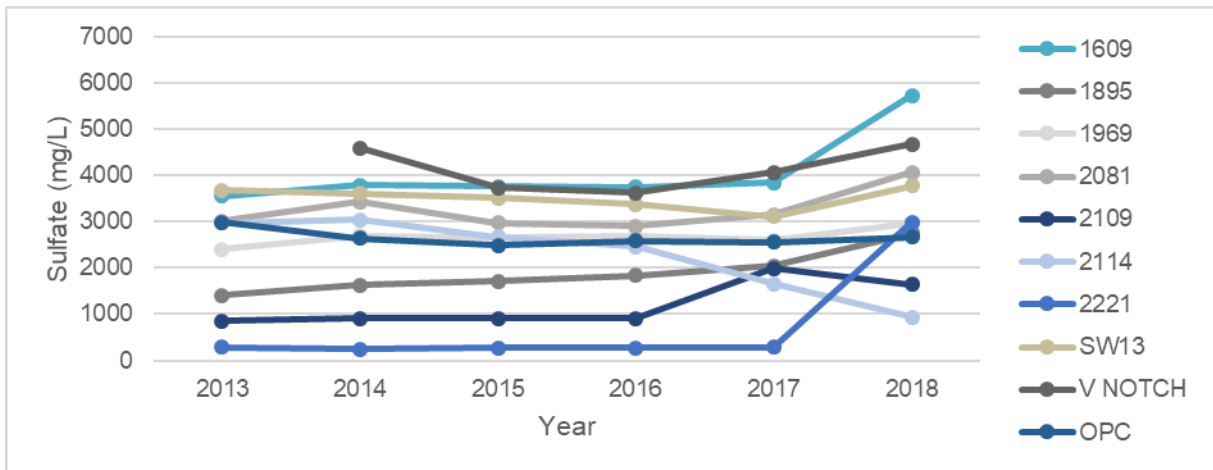


Figure 49. Long-term surface water sulfate

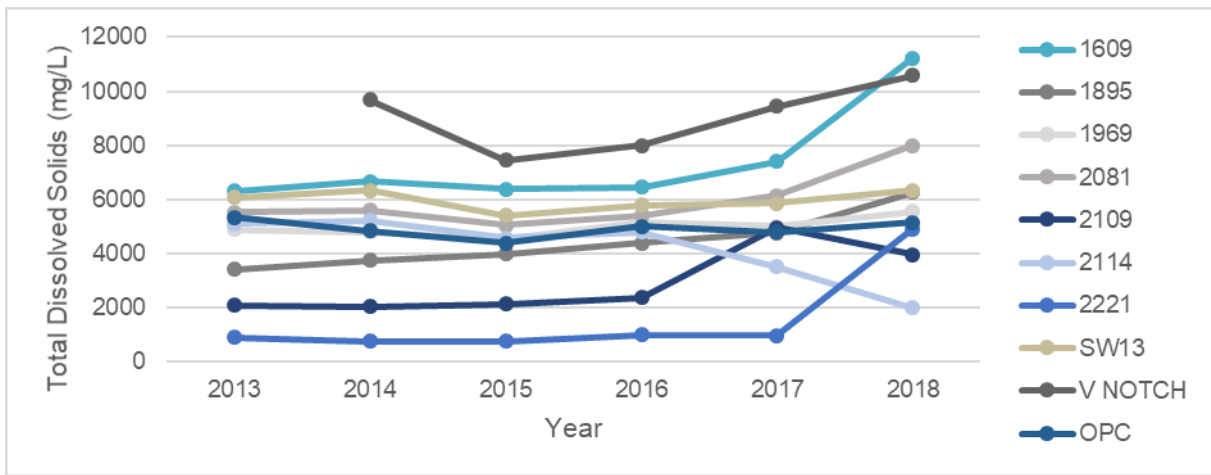


Figure 50. Long-term surface water total dissolved solids

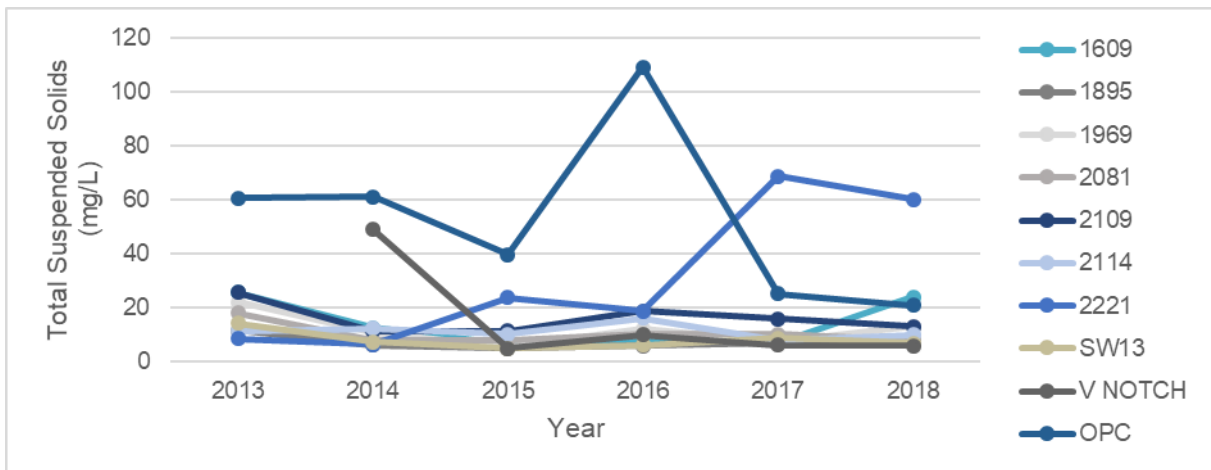


Figure 51. Long-term surface water total suspended solids