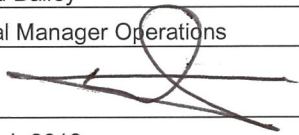




**MOUNT PLEASANT OPERATION**

**2018 ANNUAL REVIEW**  
**(ANNUAL REHABILITATION REPORT)**

<b>Document ID:</b>	00967870		
<b>Company:</b>	MACH Energy Australia Pty Ltd		
<b>Effective Date:</b>	29 March 2019	<b>Status:</b>	Issued for Use
<b>Approved By:</b>	Richard Bailey	<b>Revision Number:</b>	00

MOUNT PLEASANT OPERATION 2018 ANNUAL REVIEW	
Name of Operation	Mount Pleasant Operation
Name of Operator	MACH Energy Australia Pty Ltd
Development Consent	Development Consent DA 92/97
Name of Holder of Development Consent	MACH Energy Australia Pty Ltd
Mining Leases	Mining Lease 1645, Mining Lease 1708, Mining Lease 1709, Mining Lease 1750 and Mining Lease 1713
Name of Holder of Mining Leases	MACH Energy Australia Pty Ltd
Water Licences	Water Access Licences – see Table 3 Bore Licence Certificate 20BL168734
Name of Holder of Water Licences	MACH Energy Australia Pty Ltd
MOP Start Date	20 June 2018
MOP End Date	30 June 2019
Annual Review Start Date	1 January 2018
Annual Review End Date	31 December 2018
<p>I, Richard Bailey, certify that this audit report is a true and accurate record of the compliance status of the Mount Pleasant Operation for the period 1 January to 31 December 2018 and that I am authorised to make this statement on behalf of MACH Energy Australia Pty Ltd.</p> <p>Note.</p> <p>a) <i>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>b) <i>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	Richard Bailey
Title of Authorised Reporting Officer	General Manager Operations
Signature of Authorised Reporting Officer	
Date	29 March 2019

## STATEMENT OF COMPLIANCE

The compliance status of the Mount Pleasant Operation with its relevant approval conditions at the end of the reporting period (31 December 2018) is provided in Table SoC-1.

**Table SoC-1**  
**Statement of Compliance**

Were all conditions of the relevant approval(s) complied with?	
Development Consent DA 92/97	Yes
EPBC 2011/5795	Yes
Environment Protection Licence 20850	No
Authorisation 459	Yes
Mining Lease 1645	Yes
Mining Lease 1708	Yes
Mining Lease 1709	Yes
Mining Lease 1713	Yes
Mining Lease 1750	Yes
Water licences (as per Table 3)	Yes
Bore Licence Certificate 20BL168734	Yes

Table SoC-2 summarises the non-compliances with the approval conditions. Non-compliances are characterised as shown in Table SoC-3.

**Table SoC-2**  
**Summary of Non-Compliances**

Relevant Approval	Condition Number	Condition Description	Compliance Status	Comment	Report Section
EPL 20850	Condition M2.2	Licensee must comply with the air monitoring requirements.	NC	See Table 28	10.2
EPL 20850	Condition L1.1	Licensed activities must comply with section 120 of the <i>Protection of the Environment Operations Act 1997</i> .	NC	See Table 28	10.2

**Table SoC-3**  
**Compliance Status Key for Table SoC-2 – Non-Compliances**

Risk Level	Colour Code	Comment
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"> <li>potential for serious environmental consequences, but is unlikely to occur; or</li> <li>potential for moderate environmental consequences but is likely to occur.</li> </ul>
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>potential for low environmental consequences but is likely to occur.</li> </ul>
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).

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## 1 INTRODUCTION

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales (NSW), north-west of Muswellbrook and approximately 50 kilometres (km) north-west of Singleton (Figure 1). The villages of Aberdeen and Kayuga are located approximately 5 km north-northeast and 1 km north of the MPO boundary, respectively. The proponent of the MPO is MACH Energy Australia Pty Ltd (MACH Energy).

The initial development application for the MPO was made in 1997. This was supported by an Environmental Impact Statement (EIS) prepared by Environmental Resources Management Mitchell McCotter (ERM Mitchell McCotter) (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning granted Development Consent DA 92/97 to Coal & Allied Operations Pty Ltd (Coal & Allied). This allowed for the “Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities” at the MPO. The consent allowed for operation 24 hours per day, seven days per week and the extraction of 197 million tonnes (Mt) of run-of-mine (ROM) coal over a 21 year period, at a rate of up to 10.5 Mt of ROM coal per year.

The MPO Modification 1 (MOD 1) was submitted for approval on 19 May 2010. MOD 1 included the provision of an infrastructure envelope for siting the mine infrastructure, the provision of an optional conveyor/service corridor linking the MPO facilities with the Muswellbrook-Ulan Rail Line and modification of the existing Development Consent DA 92/97 boundaries to accommodate the optional conveyor/service corridor and minor administrative changes. MOD 1 was approved on 19 September 2011.

The MPO South Pit Haul Road Modification (MOD 2) was submitted for approval on 30 January 2017 with a supporting Environmental Assessment (EA) prepared by MACH Energy (MACH Energy, 2017a). MOD 2 proposed to realign an indicative internal haul road to enable more efficient access to the South Pit open cut. MOD 2 was approved on 29 March 2017.

The MPO Mine Optimisation Modification (MOD 3) was submitted on 31 May 2017. MOD 3 comprised an extension to the time limit on mining operations (to 22 December 2026) and extensions to the South Pit Eastern Out of Pit Emplacement to facilitate development of an improved final landform. MOD 3 was approved on 24 August 2018.

The MPO Rail Modification (MOD 4) was submitted on 18 December 2017. MOD 4 proposed the following changes:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that followed the original rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.

MOD 4 was approved on 16 November 2018. Appendix 2 of the modified Development Consent DA 92/97 illustrates the Conceptual Project Layout Plan of the approved MPO at 2021 and 2025, Approved Surface Disturbance Plan and Conceptual Final Landform incorporating the MOD 4 infrastructure relocations (Development Consent DA 92/97 Attachment 1).

Figure 2 shows the general arrangement of the MPO, as well as the extent of disturbance and rehabilitation at the end of 2018 and the forecasted additional disturbance proposed in 2019.



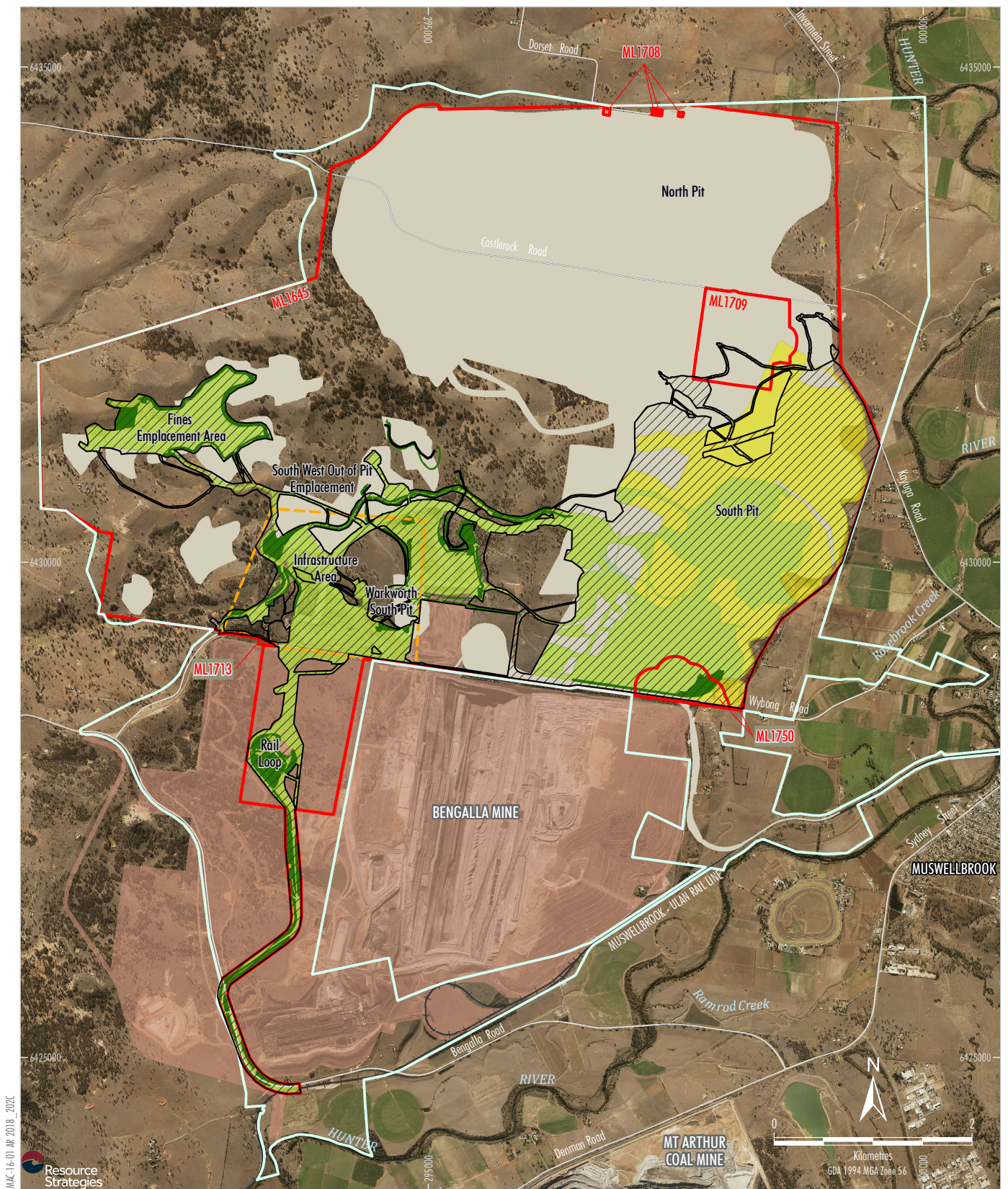
- LEGEND**
- Mining Operation
  - Proposed Mining Operations (Application Lodged)
  - Mining Lease Boundary (Mount Pleasant)
  - Railway
  - Local Government Boundary
  - State Forest
  - National Parks and Wildlife Estate

Source: Geoscience Australia (2006); NSW Division of Resources & Geoscience (2017);  
Office of Environment and Heritage NSW (2017); Land and Property Information (2017)

**MACHEnergy**  
MOUNT PLEASANT OPERATION  
Project Location

**Figure 1**





#### LEGEND

- Mining Lease Boundary
- Development Consent Boundary
- Approximate Extent of Approved Surface Development <sup>1</sup>
- Infrastructure Area Envelope
- MOP Footprint <sup>+</sup>
- End 2018 Active Disturbance Area
- End 2018 Rehabilitation Area
- 2019 Forecast Additional Disturbance Area
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

#### NOTE

1. Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, signalling, other ancillary works and construction disturbance.  
<sup>+</sup> Mount Pleasant Operation Mining Operations Plan and Rehabilitation Management Plan - V2 Amendment A (Aug 2018)

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2018); Department of Planning and Environment (2016); MACH Energy (2019)  
 Orthophoto: MACH Energy (July 2018)

**MACH**Energy  
 MOUNT PLEASANT OPERATION  
 2018 Mining Activities

Figure 2



## 1.1 PURPOSE AND SCOPE

This Annual Review details MACH Energy's environmental and community performance for the reporting period 1 January 2018 to 31 December 2018. This Annual Review has been prepared in accordance with the Department of Planning and Environment (DPE) *Post-approval requirements for State significant mining developments - Annual Review Guideline – October 2015* (DPE, 2015a) and MACH Energy's statutory approvals (Section 2), specifically Condition 3, Schedule 5 of Development Consent DA 92/97 and Condition 3(f) of Mining Leases (MLs) 1645, 1708, 1709, 1713 and 1750.

This Annual Review is not intended to be an exhaustive description of MACH Energy's operations, approvals and activities, rather it is a summary of MACH Energy's compliance status with respect to MACH Energy's statutory approvals.

In March 2017, the Secretary of the DPE revised the submission timing of the MPO Annual Review to the end of March each year.

This Annual Review is distributed to a range of stakeholders including government authorities, Muswellbrook Shire Council and members of the Community Consultative Committee (CCC). A copy of the Annual Review will be made publicly available on the MACH Energy website (<https://machenergyaustralia.com.au/mount-pleasant/documentation/>).

## 1.2 KEY PERSONNEL

Contact details for key MACH Energy personnel responsible for the environmental and community management of the MPO are provided in Table 1.

**Table 1**  
**Key Personnel**

Position	Contact	Phone Number
General Manager Operations	Richard Bailey	0417 412 962
General Manager Resource Development	Chris Lauritzen	-
Environmental Advisor	Chloe Annandale	0407 784 554
Land and Property Superintendent	Ian Webber	0428 162 856
External Relations Superintendent	Ngaire Baker	0400 214 885

## 2 APPROVALS

The MPO operates under a number of statutory approvals, leases and licences that regulate activities at the MPO (Tables 2 and 3).

**Table 2**  
**Consent, Lease and Licence Details**

Consent/Lease/Licence	Authority	Grant/Renewal	Expiry Date
Development Consent DA 92/97 <sup>1</sup>	DPE	22/12/1999	-
EPBC Approval 2011/5795	DoEE	29/02/2012	28/10/2035
Environment Protection Licence (EPL) 20850	EPA	24/11/2016	-
Authorisation 459	DRG	07/04/1992	08/04/2018 <sup>2</sup>
ML 1645	DRG	17/12/2010	17/12/2031
ML 1708	DRG	02/02/2015	02/02/2036
ML 1709	DRG	02/02/2015	02/02/2036
ML 1713	DRG	02/02/2015	02/02/2036
ML 1750	DRG	03/03/2017	03/03/2038
Bore Licence Certificate 20BL168734	Dol - L&W	13/03/2003	Perpetuity

Note:

EPBC = *Environment Protection and Biodiversity Conservation Act 1999*,

DoEE = Commonwealth Department of the Environment and Energy,

EPL = Environment Protection Licence, ML = Mining Lease, EPA = NSW Environment Protection Authority,

DRG = Division of Resources and Geoscience (under DPE), and Dol - L&W = NSW Department of Industry – Lands & Water.

<sup>1</sup> Development Consent DA 92/97 has been modified four times since the original approval was granted in 1999. Approval for MOD 1 was granted on 19 September 2011, approval for MOD 2 was granted on 29 March 2017, approval for MOD 3 was granted on 24 August 2018 and approval for MOD 4 was granted on 16 November 2018.

<sup>2</sup> A renewal request has been submitted and is currently awaiting approval. The existing approval will continue until the renewal is approved.

**Table 3**  
**MACH Energy Water Access Licences (WALs) (*Water Management Act 2000*)**

Water Sharing Plan	Water Source	Licence Number	Entitlement (ML)
<i>Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009</i>	Hunter Regulated River Alluvial Water Source	18253	74
		18266	68
		18206	24
		18199	5
		18122	33
		18131	60
		21503	21
		18177	5
		<b>Sub-total</b>	<b>290</b>
	Muswellbrook Water Source	23935	41
		<b>Sub-total</b>	<b>41</b>
	Sydney Basin – North Coast Groundwater Source	41437	40
		40298	90
		<b>Sub-total</b>	<b>130</b>
	Krui River Water Source	18336	12
		<b>Sub-total</b>	<b>12</b>

**Table 3 (Continued)**  
**MACH Energy Water Access Licences (WALs) (*Water Management Act 2000*)**

Water Sharing Plan	Water Source	Licence Number	Entitlement (ML)
<i>Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009</i> (Continued)	Hunter Regulated River Water Source	1230	8
		1259	33.2
		1227	99
		1258	5
		992	75
		7808	36
		702	267
		1260	4.8
		993	265
		1308	15.1
		604	183
		605	8
		677	24
		1338	17.5
		662	9
		663	16
		10775	243
		41438	420
		638	3
		639	134
		879	224
		880	124
		1113	366
		973	3
		974	210
		975	8
		988	156
		989	8
		1307	37.5
		1229	480
		<b>Sub-total</b>	<b>3482.1</b>

Note: ML = Megalitres.

During the next reporting period, MACH Energy will continue to manage its existing WALs and acquire new licences, as required.

## 2.1 MANAGEMENT PLANS

Development Consent DA 92/97 requires MACH Energy to submit management plans and strategies prior to carrying out any development on-site. The currently approved MPO management plans are summarised in Table 4.

**Table 4**  
**Approved Management Plans**

Plan	Relevant Development Consent DA 92/97 Condition	Approval Date
Mining Operations Plan and Rehabilitation Management Plan (MOP) (Amendment A) <sup>1</sup>	Schedule 3, Condition 56	30 June 2018
Noise Management Plan (NMP)	Schedule 3, Condition 9	15 February 2018
Air Quality and Greenhouse Gas Management Plan (AQGGMP)	Schedule 3, Condition 23	31 January 2018
Aboriginal Heritage Management Plan (AHMP)	Schedule 3, Condition 36	5 July 2017
Water Management Plan (WMP)	Schedule 3, Condition 28	9 July 2018 <sup>2</sup>
Blast Management Plan (BMP)	Schedule 3, Condition 17	14 January 2019
Landscape Management Plan (LMP)	Schedule 3, Condition 47	16 October 2018
Waste Management Plan (WasteMP)	Schedule 3, Condition 52	14 January 2019
Rehabilitation Strategy	Schedule 3, Condition 54	23 July 2012 <sup>3</sup>
Biodiversity Management Plan	Schedule 3, Condition 32	19 October 2018
Environmental Management Strategy	Schedule 5, Condition 1	14 January 2019

<sup>1</sup> The approved MOP meets the requirements for a Rehabilitation Management Plan (RMP) (Condition 56, Schedule 3 of Development Consent [DA 92/97]).

<sup>2</sup> Note that MACH Energy updated the Ground Water Management Plan within the WMP on 21 December 2018 to include information regarding the final void.

<sup>3</sup> A revised and updated Rehabilitation Strategy was prepared and is currently subject to consultation.

A summary of updates approved for the listed management plans during the reporting period is provided below:

- MOP (Amendment A) included contemporary information on the MPO's current mine planning, including construction, mine development, topsoil management and rehabilitation. The MOP term was updated to 30 June 2018 to 30 June 2019.
- An updated NMP incorporated revised site monitoring locations to reflect revised monitoring locations.
- A revised WMP included description of the Surface Water Management Procedure in the Surface Water Management Plan (SWMP).
- The approved LMP provided a contemporary outline of MACH Energy's proposed visual treatment of the MPO.
- An updated Biodiversity Management Plan provides a contemporary outline of MACH Energy's proposed biodiversity management measures for the MPO.

In accordance with Condition 4, Schedule 5 of Development Consent DA 92/97, MACH Energy will review, and if necessary, revise, the strategies, plans and programs required under the consent within three months of the submission of this Annual Review, to the satisfaction of the Secretary of the DPE.

### **3 OPERATIONS SUMMARY**

#### **3.1 MINING OPERATIONS**

MACH Energy commenced substantial works at the MPO on 25 November 2016. During 2018, MACH Energy completed the following construction activities on site, including:

- construction completion of the Mine Infrastructure Area (MIA) buildings, including offices, maintenance workshop, tire and fuel bay, bath houses, Sewage Treatment Plant, car park and water tanks;
- construction completion of the following areas:
  - rail loop and spur;
  - Bengalla Link Road Bridge;
  - Hunter River Pump Station and Pipeline;
  - 66kV powerline relocation;
  - substation and switchyard; and
  - Mine Water Dam (MWD), ED2, Clean Water and Fine Rejects Dams.
- construction completion and wet commissioning of the Coal Handling and Preparation Plant (CHPP) Separable Portion 1, including bypass, reclaim and Fire Water and Train Load Out Systems;
- continuing construction of the CHPP, including the rejects system.

All buildings constructed on-site were constructed in accordance with the Building Code of Australia (BCA) and the Subsidence Advisory NSW (SANSW). All works were undertaken within standard hours as defined by the EPA's Interim Construction Noise Guideline (ICNG).

Off-site coal transport also commenced in 2018 using the rail infrastructure in accordance with Development Consent DA 92/97 (Condition 7, Schedule 2).

Mining related activities which occurred during the reporting period included:

- continued development of Pit A to prepare for coal extraction;
- commenced development of Pit D;
- continued construction of haul road; and
- commencement of rehabilitation.

During the reporting period, a total of 0.14 Mt of ROM coal was produced. Coal was first mined in July 2018, which formed the base of the ROM stockpile. With the pending commissioning of the bypass circuit in the CHPP, coal mining recommenced in November 2018.

The MOD 3 application was approved on 24 August 2018. The MOD 4 application was approved on 16 November 2018.

The MPO increased the fleet capacity at the mine in 2018. The production roster was also modified in April 2018 by changing the production roster from 10.5 hour (hr) day shifts, 5 days a week to 12 hr day shifts, 7 days a week. In December 2018, one operator crew transitioned to nightshift activities on a 12 hr night shift, 7 day basis.



A number of mine-owned dwellings along Collins Lane within Noise Assessment Group (NAG) 7 were vacated in the reporting period and most of these were demolished. All demolition was carried out in accordance with Australian Standard (AS) 2601-2001: *The Demolition of Structures*.

The amounts of waste rock, overburden, ROM coal, coarse reject, fine reject and product coal produced during the previous reporting period, current reporting period and forecast for the next reporting period, are outlined in Table 5.

**Table 5**  
**Production Summary**

Material	Approved Limit	2017 Reporting Period (Actual)	2018 Reporting Period (Actual)	2019 Reporting Period (Forecast)
Waste Rock/Overburden (Mbcm)	N/A	0	8.78	19.3
ROM Coal (Mt)	10.5 Mt per calendar year <sup>1</sup>	0	0.15	6.5
Coarse Reject (Mt)	N/A	0	0	1.2
Fine Rejects (Mt)	N/A	0	0	0.3
Saleable Product (Mt)	N/A	0	0.03	4.9

Note: Mbcm = million bank cubic metres, N/A = not applicable and Mt = million tonnes.

<sup>1</sup> Condition 6, Schedule 2 of Development Consent DA 92/97 relevantly states:

*The Applicant must not extract more than 10.5 million tonnes of ROM coal from the site in a calendar year.*

### 3.2 OTHER OPERATIONS

Other relevant operational conditions outlined in Development Consent DA 92/97 and their corresponding compliance status during the reporting period are outlined in Table 6.

**Table 6**  
**Other Operational Conditions Met**

Operational Condition from Development Consent DA 92/97		Condition Met?	Comment
Limits on Consent (Condition 5, Schedule 2)	5. <i>The Applicant may carry out mining operations on the site until 22 December 2026.</i> <i>Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Secretary and DRG. Consequently this consent will continue to apply in all other respects - other than the right to conduct mining operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.</i>	Yes	-
Coal Extraction (Condition 6, Schedule 2)	6. <i>The Applicant must not extract more than 10.5 million tonnes of ROM coal from the site in a calendar year.</i>	Yes	ROM coal extraction did not exceed 10.5 Mt during 2018.
Coal Transport (Condition 7, Schedule 2)	7. <i>Product coal may only be transported from the site by rail.</i>	Yes	Product coal was transported from the site by rail only.
Train Movement (Condition 8, Schedule 2)	8. <i>The Applicant must ensure that train movements at the site (ie arrival or dispatch) do not exceed:</i> (a) <i>a maximum of 18 per day; or</i> (b) <i>6 per day, averaged over each calendar year.</i> <i>Note: In this condition, "day" means any 24-hour period.</i>	Yes	Train movements at the site did not exceed 18 movements in one day, or six movements on average per day.

**Table 6 (Continued)**  
**Other Operational Conditions Met**

Operational Condition from Development Consent DA 92/97		Condition Met?	Comment
Structural Adequacy (Condition 9, Schedule 2)	<p>9. <i>All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the development, must be constructed in accordance with:</i></p> <p>(a) <i>the relevant requirements of the BCA; and</i></p> <p>(b) <i>any additional requirements of SA NSW where the building or structure is located on land within a declared Mine Subsidence District.</i></p> <p><u>Notes:</u></p> <ul style="list-style-type: none"> <li><u>Under Part 6 of the EP&amp;A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works;</u></li> <li><u>Part 8 of the EP&amp;A Regulation sets out the requirements for the certification of the development;</u></li> <li><u>The development is located in the Muswellbrook Mine Subsidence District. Under Section 21 of the Mine Subsidence Compensation Act 2017, the Applicant is required to obtain the Chief Executive of SA NSW's approval before carrying out certain development in a Mine Subsidence District.</u></li> </ul>	Yes	All buildings constructed during the reporting period were constructed in accordance with the BCA and the SANSW.
Demolition (Condition 10, Schedule 2)	<p>10. <i>The Applicant must ensure that all demolition work on site is carried out in accordance with AS 2601-2001: The Demolition of Structures, or its latest version.</i></p>	Yes	Demolition work was carried out in accordance with AS 2601-2001.
Protection of Public Infrastructure (Condition 11, Schedule 2)	<p>11. <i>Unless the Applicant and the applicable authority agree otherwise, the Applicant must:</i></p> <p>(a) <i>repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and</i></p> <p>(b) <i>relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development,</i></p> <p><u>Note: This condition does not include matters that are expressly provided for in the conditions of this consent, such as the maintenance of public roads.</u></p>	Yes	During the reporting period, mine affected properties were vacated and their electricity was disconnected. This included removal of associated power poles and wires services. MACH Energy incurred the full costs of these removals.
Operation of Plant and Equipment (Condition 12, Schedule 2)	<p>12. <i>The Applicant must ensure that all plant and equipment used on site, or to transport coal from the site, is:</i></p> <p>(a) <i>maintained in a proper and efficient condition; and</i></p> <p>(b) <i>operated in a proper and efficient manner.</i></p>	Yes	All plant and equipment in use at the MPO is regularly serviced in accordance with the relevant Industry & Investment NSW Mining Design Guidelines, to ensure plant and equipment is maintained in suitable condition. All plant and equipment are operated in a proper and efficient manner.

### **3.3 ACTIVITIES FORECAST FOR THE NEXT REPORTING PERIOD**

The following construction activities are forecast to be undertaken during the 2019 reporting period:

- progression of construction in DMS 1 and Reject system;
- progression of construction in DMS 2;
- commencement of Flocculant and Magnetite system;
- stage 2 of bypass system increasing its capacity from 750 tonnes per hour (t/hr) to 1500 t/hr;
- progression of final Ausgrid Tie-In for permanent power;
- commencement of Rail Loop, Train Load Out and Hunter River Pump Station relocation; and
- progressive rehabilitation of temporary construction areas and mining areas.

The following mining related activities are forecast to be undertaken during the 2019 reporting period:

- steady-state coal extraction within Pits A and D;
- commencement of development into Pits B, C, E and F;
- commencement of project engineering on the rail loop triggered by MOD 4 approval;
- completion of the construction of the wash modules in the CHPP;
- completion of associated dams and drains to manage sediment control and water infrastructure in the new pits; and
- progressive rehabilitation to final landform profiles.

Further information regarding proposed construction and mining activities in 2019 is provided in the approved MOP.

## 4 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

A reconciliation of the actions required by the DPE, the previous Annual Review and actions taken in response by MACH Energy during the reporting period are outlined in Table 7.

**Table 7**  
**Actions Required by the DPE and 2017 Annual Review**

Action	Requested by	Action Taken by Operator	Section Reference
<i>Please include the MPO project boundary, as per Appendix 2 of the approval, in all relevant figures.</i>	DPE	The Development Consent boundary has been included on relevant figures within this Annual Review.	Figure 2
<i>Please provide all water take data as per Table 7 of the Annual Review Guideline.</i>	DPE	Relevant data has been added to the water take section within this Annual Review.	Section 6.4
<i>Please provide a comprehensive review of the Site Water Balance for the reporting period, and compare these results with the previous reporting period and relevant predictions in the Environmental Impact Statement (EIS) and Environmental Assessments (EA) for the MPO.</i>	DPE	The review has been added to the Site Water Balance section within this Annual Review.	Section 6.5
<i>Please list the post rehabilitation land uses identified in the EIS and EAs for the MPO in the Annual Review.</i>	DPE	Provisional post-mining land use domains are shown and described in the section within this Annual Review.	Section 7
<i>Please provide a discussion on complaint trends, in comparison to previous years.</i>	DPE	Complaint trends have been discussed and addressed in the Communication section within this Annual Review.	Section 8.1
<i>Please include a table listing all agreed IEA actions and the status of each action at the completion of the reporting period.</i>	DPE	The status of all agreed Independent Environment Audit actions is outlined in the Independent Environmental Audit section within this Annual Review.	Section 9
<i>Key management measures proposed to be implemented during the next reporting period from these management plans include:</i> <ul style="list-style-type: none"> <li><i>updating the Land Management Plan and the Biodiversity Management Plan;</i></li> </ul>	MACH Energy 2017 Annual Review	The Biodiversity Management Plan was updated and submitted to the DPE on 15 October 2018 and approved on 19 October 2018. The Landscape Management Plan was updated and submitted to the DPE on 15 October 2018 and approved on 16 October 2018.	Section 5.5 & Section 7.2
<ul style="list-style-type: none"> <li><i>updating the AQGGMP and NMP to revise the location of monitoring locations (Section 5.4.2);</i></li> </ul>	MACH Energy 2017 Annual Review	The AQGGMP was updated and approved on 31 January 2018 with revised location of A-HV2 and A-PF2. The NMP was updated and approved on 15 February 2018 with revised location of N-B02 and N-WM2.	Section 5.4
<ul style="list-style-type: none"> <li><i>commencement of TDS surface water monitoring (Section 6.1);</i></li> </ul>	MACH Energy 2017 Annual Review	The SWMP updated and approved on 16 March 2018 includes Total Dissolved Solids (TDS) monitoring.	Section 6.1

**Table 7 (Continued)**  
**Actions Required by the DPE and 2017 Annual Review**

Action	Requested by	Action Taken	Section Reference
<ul style="list-style-type: none"> <li><i>review of the pH and EC trigger levels if groundwater sites continue to show monitoring data outside the trigger levels (Section 6.2.3); and</i></li> </ul>	MACH Energy 2017 Annual Review	<p>Following review of trigger levels in early 2018, a number of bores were found to show elevated readings of some parameters. This triggered the Surface and Ground Water Response Plan (SGWRP), which was approved on 3 August 2017. A preliminary investigation letter was distributed to the DPE, EPA and DoI - L&amp;W outlining the sites outside the trigger values.</p> <p>The groundwater sites showing elevated readings for Electrical Conductivity (EC) included:</p> <ul style="list-style-type: none"> <li>6500F00M;</li> <li>6500F500L;</li> <li>4500F500; and</li> <li>5500D000.</li> </ul> <p>The groundwater sites showing readings outside of the range for pH included:</p> <ul style="list-style-type: none"> <li>WRA1L;</li> <li>WRA2L;</li> <li>WRA3L;</li> <li>WRA5U;</li> <li>WRA5L;</li> <li>WRA6U;</li> <li>WRA6L;</li> <li>MPBH3;</li> <li>3500C500L;</li> <li>3500C500S;</li> <li>5000D000;</li> <li>5500D000;</li> <li>6000C000S;</li> <li>6500F500L;</li> <li>6500F500M;</li> <li>6500F500U; and</li> <li>7500F000.</li> </ul> <p>MACH Energy is currently in the process of reviewing the trigger levels as part of the WMP update required by MOD 4. MACH Energy is required to update the WMP by 30 June 2019.</p>	Section 6.2
<ul style="list-style-type: none"> <li><i>updating the MOP to reflect a new MOP term from 30 June 2018 – 30 June 2019.</i></li> </ul>	MACH Energy 2017 Annual Review	An amended MOP was submitted to the DRG on 20 August 2018 and was approved on 10 October 2018. The updated MOP is approved until 30 June 2019.	-

## 5 ENVIRONMENTAL PERFORMANCE

### 5.1 METEOROLOGY

Meteorological monitoring was undertaken during the reporting period at the mine meteorological station along Kayuga Road (M-WS4) (Figure 3). Data collected included 10 minute, hourly and 24 hourly wind speed, wind direction, sigma, temperature, humidity solar radiation and rainfall measurements. Data collected during the reporting period has been summarised for rainfall, temperature and wind in the following subsections.

#### 5.1.1 Rainfall

During the reporting period, 372.0 millimetres (mm) of rain was recorded over 35 wet days at the MPO weather station M-WS4. The highest daily rainfall was 36.0 mm on 4 October 2018.

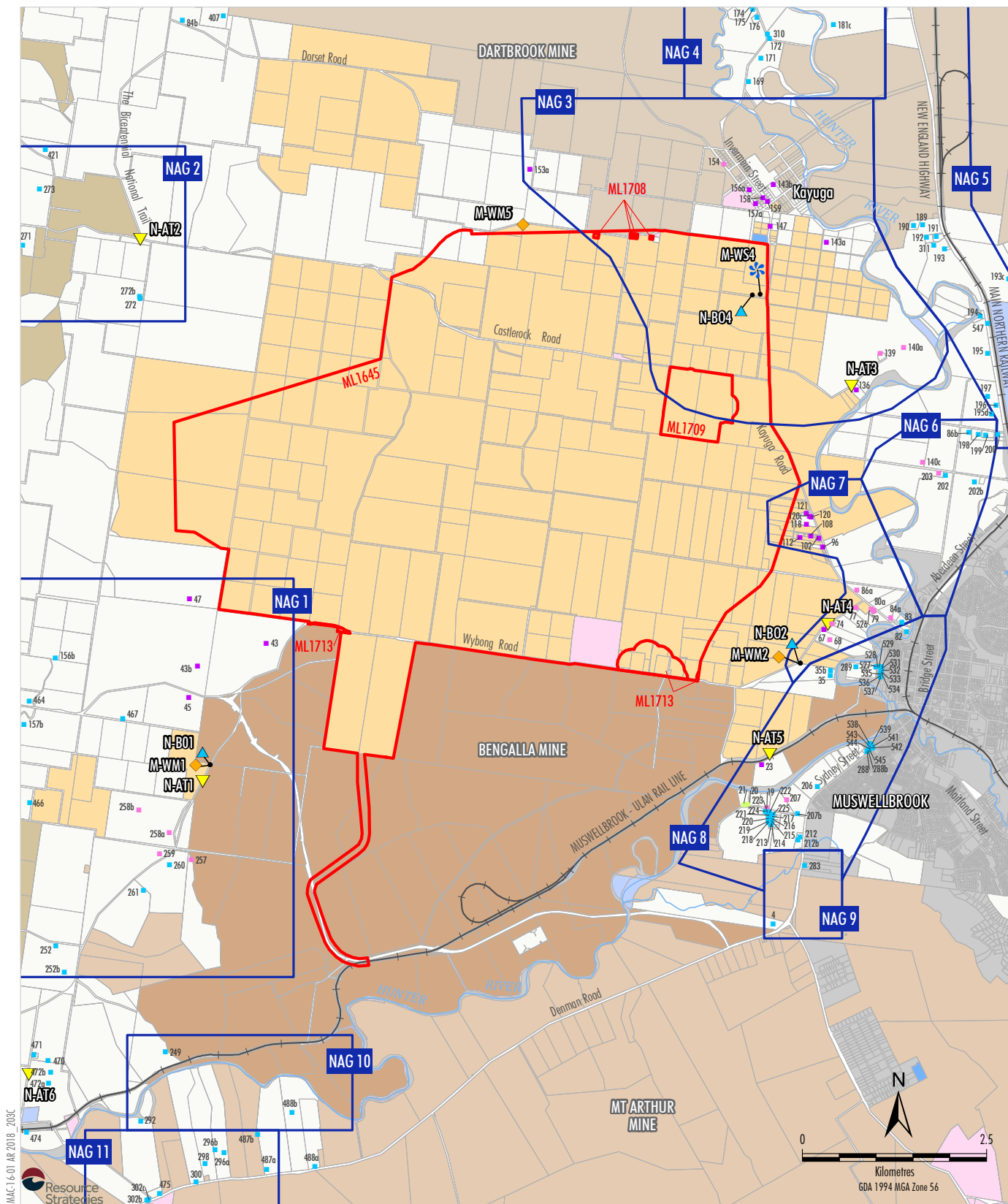
Cumulative rainfall and the number of wet days during the reporting period remained consistent with the recorded data in 2017 (377.4 mm and 37 days, respectively). Monthly rainfall during October, November and December during the reporting period roughly doubled compared with the previous recording period (MACH Energy, 2018b).

The monthly rainfall distribution, number of wet days and cumulative rainfall is summarised in Table 8. Monthly rainfall records and cumulative rainfall over the reporting period are shown in Chart 1.

**Table 8**  
**Rainfall Summary 2018**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Rainfall (mm)	8.0	43.0	38.2	9.8	7.0	27.6	0.6	21.0	13.4	67.6	47.6	88.2
Cumulative Rainfall (mm)	8.0	51.0	89.2	99.0	106.0	133.6	134.2	155.2	168.6	236.2	283.8	372.0
Wet Days*	1	3	5	1	1	3	0	3	3	5	4	6

\* Note: Wet days are classified as days receiving rainfall greater than 2 mm.



- LEGEND**
- Mining Lease Boundary
  - Privately-owned Residence - MPO Acquisition on Request
  - Privately-owned Residence - MPO Mitigation/Acquisition on Request \*
  - Privately-owned Residence - MPO Mitigation on Request
  - Other Privately-owned Residence
  - Noise Assessment Group (NAG) (DA 92/97)
  - ▼ Monitoring Sites
  - ▲ Attended Noise
  - ▲ Real-Time Noise
  - ◆ Weather Mast
  - ✱ Weather Station

- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- Crown/State of NSW
- The State of NSW
- Muswellbrook Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

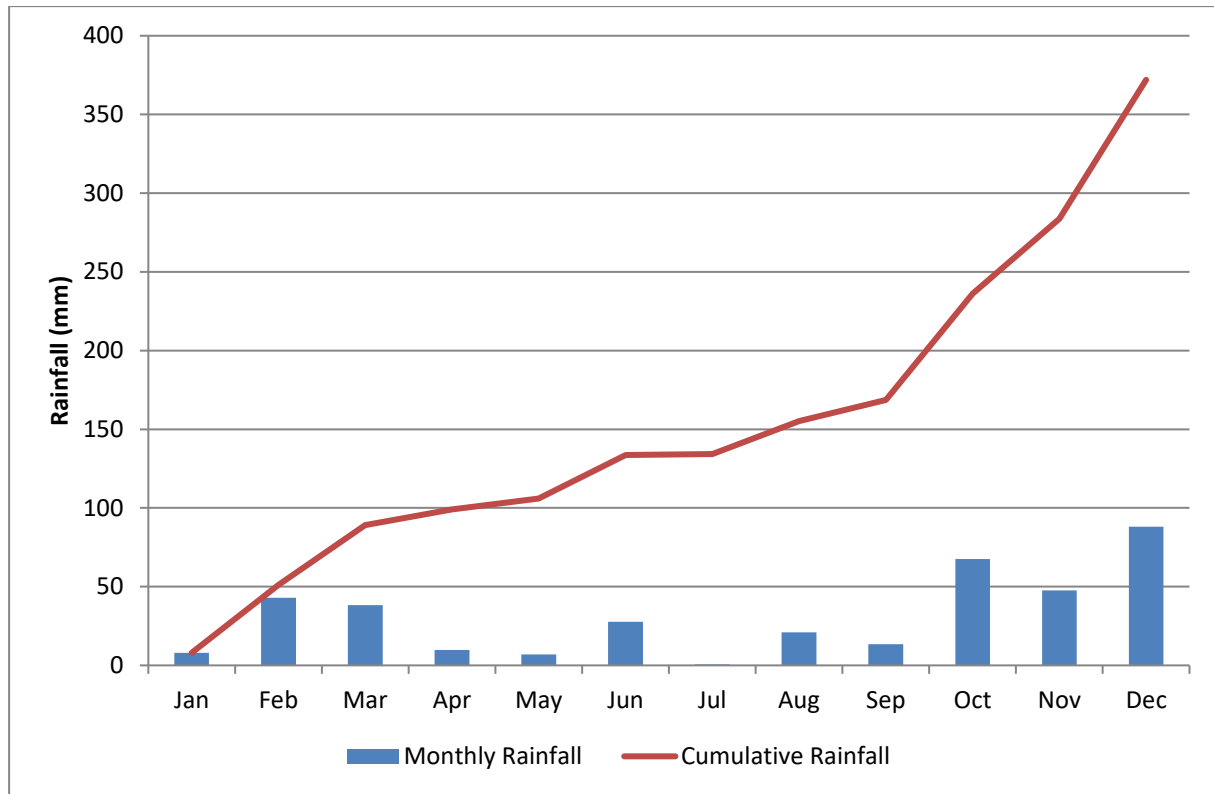
Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2019)

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Noise and Meteorological  
Monitoring Sites

\* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

**Figure 3**





**Chart 1: MPO Monthly and Cumulative Rainfall 2018**

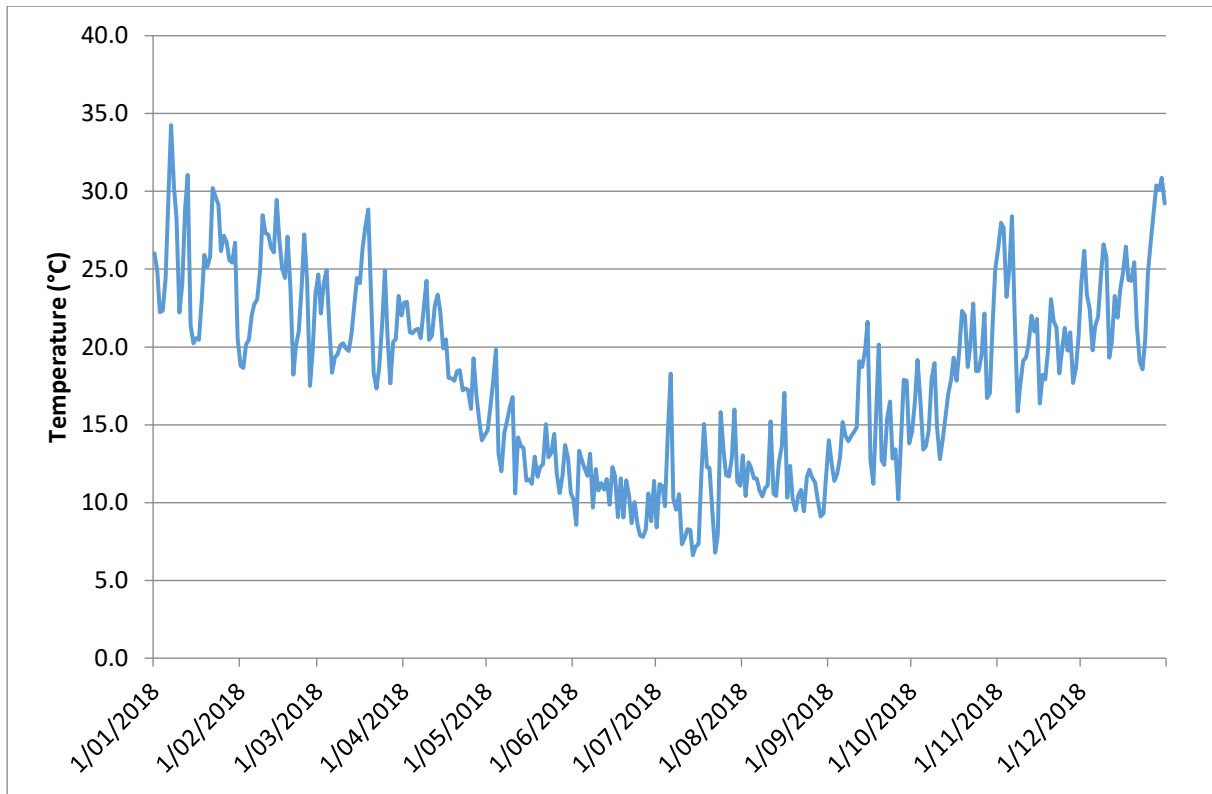
### 5.1.2 Temperature

During the reporting period, the maximum temperature recorded at M-WS4 was 41.3 degrees Celsius (°C) (7 January) and the minimum temperature recorded was -2.4°C (23 July). Monthly minimum and maximum temperatures derived from hourly temperature measurements are presented in Table 9. Daily mean temperatures are shown in Chart 2.

**Table 9  
Temperature Summary 2018**

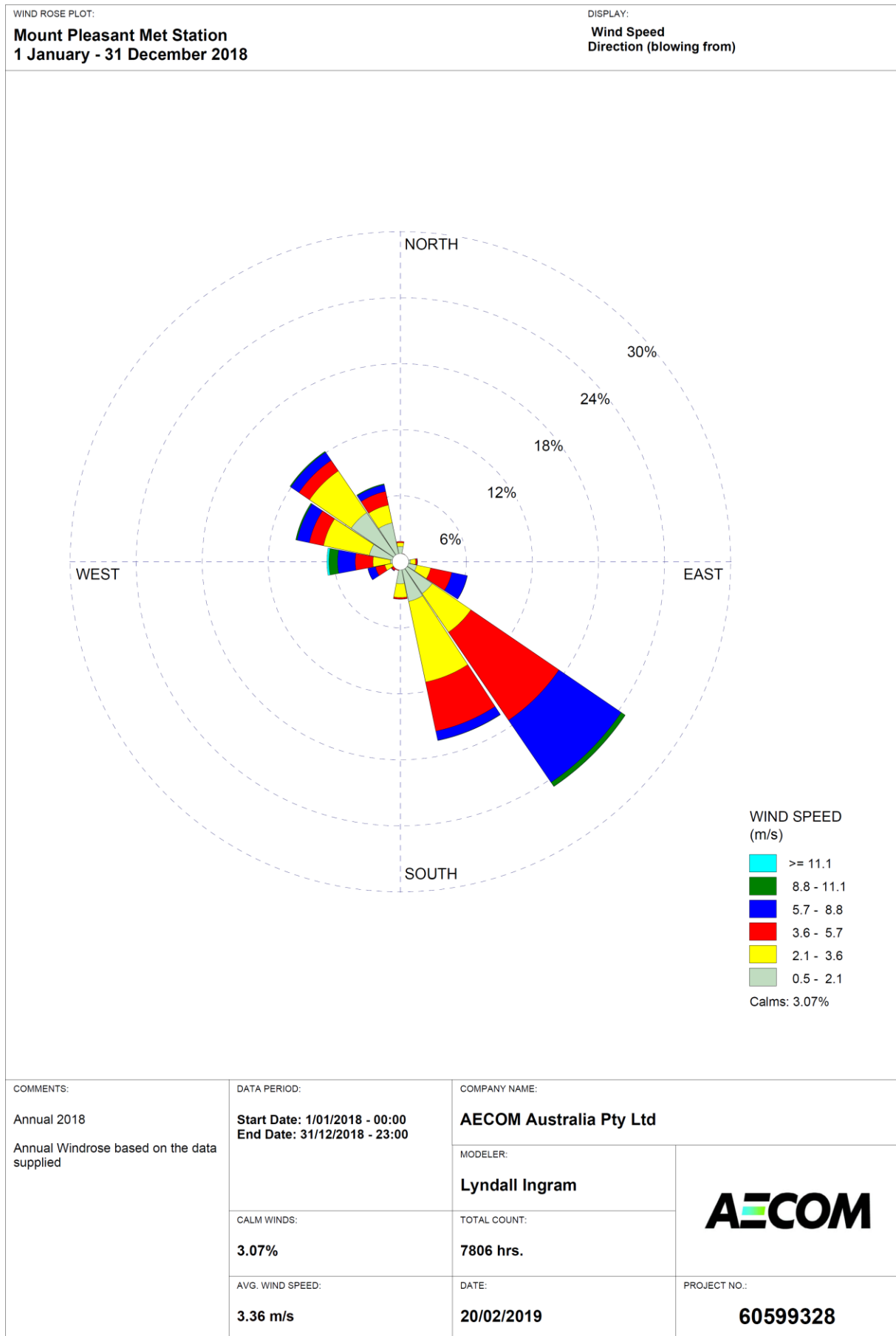
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum Temperature (°C)	11.1	13.2	10.2	8.3	2.0	-0.6	-2.4	0.5	2.7	6.3	9.0	11.3
Maximum Temperature (°C)	41.3	38.1	37.9	32.5	26.4	19.8	23.8	23.2	30.8	34.2	37.7	39.5



**Chart 2: MPO Daily Mean Temperature 2018**

### 5.1.3 Wind Speed and Direction

During the reporting period, the majority of prevailing winds were from the south-southeast and north-west. Only a very minor percentage of winds were generated from the south-west and almost none were generated from the north-east. This is consistent with trends observed in previous Annual Reviews (Coal & Allied, 2014, 2015 and 2016; MACH Energy, 2017b; MACH Energy, 2018). An annual wind rose is presented in Chart 3.



**Chart 3: MPO Annual Wind Rose 2018**

## 5.2 NOISE

Key noise criteria for the MPO are defined in Tables 3 and 5 of Development Consent DA 92/97 (Conditions 3 and 5, Schedule 3) and EPL 20850 (Condition L2). Additional noise conditions relating to land acquisition, noise mitigation upon request, rail noise, noise monitoring and preparation of the NMP are also detailed in these approval documents.

### 5.2.1 Approval Criteria and Management Plan Requirements

#### Development Consent DA 92/97 and EPL 20850

The Noise Impact Assessment Criteria defined in Table 3 of Development Consent DA 92/97 (Condition 3, Schedule 3) is provided in Table 10.

**Table 10**  
**Noise Impact Assessment Criteria (dBA)**

Location	Day	Evening	Night	
	L <sub>Aeq</sub> (15min)	L <sub>Aeq</sub> (15min)	L <sub>Aeq</sub> (15min)	L <sub>A1</sub> (1min)
68, 74	43	42	42	45
86a	42	42	42	45
35, 35b, 77	42	41	41	45
79, 80a, 140c, 526	41	41	41	45
289	41	40	40	45
84a, 139, 154, 203, 257, 258a	40	40	40	45
83	40	39	39	45
86b, 140a, 202, 259	39	39	39	45
198, 202b	38	38	38	45
260, 261	37	37	37	45
169, 272	36	36	36	45
NAG 5 - All privately-owned land	41	40	39	45
NAG 6 - All privately-owned land	37	37	37	45
NAG 7 - All privately-owned land	40	37	37	45
NAG 8 - All privately-owned land	41	39	39	45
NAG 9 - All privately-owned land	39	38	37	45
NAG 11 - All privately-owned land	37	36	35	45
All other privately-owned land	35	35	35	45

Source: Development Consent DA 92/97 and EPL 20850.

Notes: dBA = A-weighted decibels.

L<sub>Aeq</sub> = A-weighted equivalent continuous noise level.

The cumulative noise criteria defined in Table 5 of Development Consent DA 92/97 (Condition 5, Schedule 3) are provided in Table 11.

**Table 11**  
**Approval Criteria for Cumulative Noise (dBA)**

Location	Day	Evening	Night
	L <sub>Aeq</sub> (period)	L <sub>Aeq</sub> (period)	L <sub>Aeq</sub> (period)
NAG 8, 9	55	45	40
All other privately-owned land	50	45	40

Note: L<sub>Aeq</sub>(period) = equivalent continuous noise level over a measured period.

Noise criteria and other noise related conditions stipulated in EPL 20850 are generally consistent with those prescribed in Development Consent DA 92/97.

### **Noise Management Plan**

During the reporting period, MACH Energy prepared the NMP which was approved on 15 February 2018.

The NMP describes the following construction and operational noise controls to be implemented to limit construction and operational noise:

- Plant will operate in less exposed areas during the more sensitive evening/night period.
- Lesser noise generating construction activities (e.g. welding and electrical works) will be conducted during the evening/night-time period.
- Vegetation clearance will be limited to daytime hours.
- “Quackers” will be used in place of reverse beepers.
- Noise suppression will be provided on major operational mobile plant.
- Temporary cessation of work within an area, or from a particularly noisy piece of equipment, will be considered when adverse weather conditions are present.
- All plant and machinery used on-site will be maintained regularly to minimise noise generation.
- All plant and machinery used on-site will be operated in a proper and efficient manner (e.g. at correct speed) to minimise noise generation.
- Regular communication and updates will be provided to local residents on the status and nature of site construction and operational activities.
- In the event of a complaint from a local resident, MACH Energy will implement the complaints response process.

The following performance indicators are specified in the NMP to track the performance of the MPO:

- effective implementation of the Real-time Response Protocol for noise;
- results of operator attended noise monitoring, conducted and assessed in accordance with the *NSW Industrial Noise Policy* (EPA, 2000) and *Noise Policy for Industry* (NPfI) as relevant, are compliant with the noise criteria in Table 11; and
- complaints are minimised and appropriate management actions are implemented following receipt of a complaint.

## 5.2.2 Performance During the Reporting Period

### ***Operator attended Noise Monitoring***

Operator attended monitoring was undertaken quarterly by Global Acoustics Pty Ltd from January – September 2018 and monthly thereafter during day, evening and/or night periods, in accordance with the NMP and EPL 20850. Operator attended monitoring was undertaken at six locations selected to represent the NAGs identified in Development Consent DA 92/97, as shown on Figure 3 and Table 12.

**Table 12**  
**Noise Monitoring Locations**

Monitoring Location				Justification
Site ID	Description	Easting	Northing	
N-AT1	South-west of the MPO	291465	6427182	Representative of dwellings to the south-west
N-AT2	North-west of the MPO	290608	6434490	Representative of dwellings to the north-west
N-AT3	East of the MPO	300270	6432503	Representative of dwellings to the north-east and east (e.g. NAG 5)
N-AT4	South-east of the MPO	299947	6429264	Representative of dwellings to the east (i.e. NAGs 6 and 7)
N-AT5	South-east of the MPO	299161	6427503	Representative of dwellings to the south-east (i.e. NAGs 8 and 9)
N-AT6	South-west of the MPO	289092	6423155	Representative of dwellings to the south-southwest (e.g. NAG 11)

During the reporting period, MACH Energy complied with all statutory conditions relating to noise. MACH Energy also complied with all additional noise requirements detailed in the NMP.

Monitoring was undertaken in accordance with EPL 20850 and Australian Standard AS1055 '*Acoustics, Description and Measurement of Environmental Noise*'.

All applicable  $L_{Aeq(15min)}$  measured noise levels attributable to the MPO were compliant with the relevant noise criteria from Development Consent DA 92/97 and EPL 20850 during the reporting period. Results of the operator attended noise monitoring for each monitoring round during the reporting period are available in the monthly reporting on the MACH Energy website (<https://machenergyaustralia.com.au/mount-pleasant/documentation/>).

### **Real-time Noise Monitoring**

Real-time monitoring systems were installed at three locations in November 2016 prior to construction work commencing on-site (Figure 3). Real-time noise monitoring was undertaken at these three locations (N-BO1, N-BO2 and N-BO4) 24 hours per day, seven days per week for the duration of the reporting period. This real-time noise monitoring was not used to assess compliance with noise criteria, but instead was used for ongoing performance assessment and to assist in avoiding potential non-compliances.

During the reporting period, a number of low order (i.e. green and amber) real-time noise monitoring triggers occurred, which prompted the implementation of real-time response management actions, consistent with the Real-time Response Protocol outlined in the NMP.

### **Complaints**

A total of 35 noise related complaints were received by MACH Energy during 2018 (see Complaints Summary 2018: <https://machenergyaustralia.com.au/mount-pleasant/documentation/>). In response to the complaints, the noise monitors were reviewed and the External Relations Manager (ERM) organised the cessation of noise intensive works where necessary. In all cases the ERM made further contact with the complainant to provide an update of the noise activities.

#### **5.2.3 Trends and Key Management Implications**

Noise levels from the MPO continued to comply with the relevant criteria at all monitoring sites during the operator attended monitoring surveys in 2018.

No environmental performance or management issues arose in regard to noise during the reporting period.

Noise related complaints increased in 2018 compared to 2017 due to the commencement of mining operations.

#### **5.2.4 Implemented or Proposed Management Actions**

All noise management measures outlined in the NMP and summarised in Section 5.2.1 were undertaken during the reporting period. In particular, MACH Energy implemented the following specific management measures:

- real-time noise monitoring was continued at the three real-time noise monitoring locations and the Real-time Response Protocol was implemented where appropriate;
- following an update of the EPL 20850 (October 2018), operator attended noise monitoring changed from being undertaken quarterly to monthly; and
- Muswellbrook Shire Council, CCC, and surrounding residents were notified of the change from 5 to 7 days per week operations, along with a notification of moving to 24/7 operations.

### **5.3 BLASTING**

Airblast overpressure and ground vibration assessment criteria for the MPO are defined in Table 7 of Development Consent DA 92/97 (Condition 10, Schedule 3) and EPL 20850 (Conditions L3.1, L3.2, L3.3, L3.4, L3.5 and L3.6). Additional conditions relating to blasting hours and frequency, property inspections and investigations, monitoring locations, measurement methodology, operating conditions and preparation of the BMP, are also detailed in these approvals.

During the reporting period, MACH Energy prepared a BMP in accordance with Condition 17, Schedule 3 of Development Consent DA 92/97, which was approved on 14 January 2019. During the reporting period, the MPO operated in accordance with the previous version of the BMP approved on 3 August 2017.

### 5.3.1 Approval Criteria and Management Plan Requirements

#### *Development Consent DA 92/97 and EPL 20850*

A summary of the approval criteria for blasting is included in Table 13.

**Table 13**  
**Assessment Criteria for Blasting**

Location	Airblast Overpressure (dB[Lin Peak])	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
Historic heritage sites	-	10	0%
All public infrastructure	-	50	0%

Source: Table 7 of Development Consent DA 92/97 (Condition 10, Schedule 3).

Note: mm/s = millimetres per second; dB = decibels.

Conditions L3.3, L3.4, L3.5 and L3.6 of EPL 20850 contain the same blasting assessment criteria for residences on privately-owned land as specified in Table 14. However, EPL 20850 requires that monitoring does not exceed these criteria at monitoring site B-VOC rather than at all residences on privately-owned land (Figure 4).

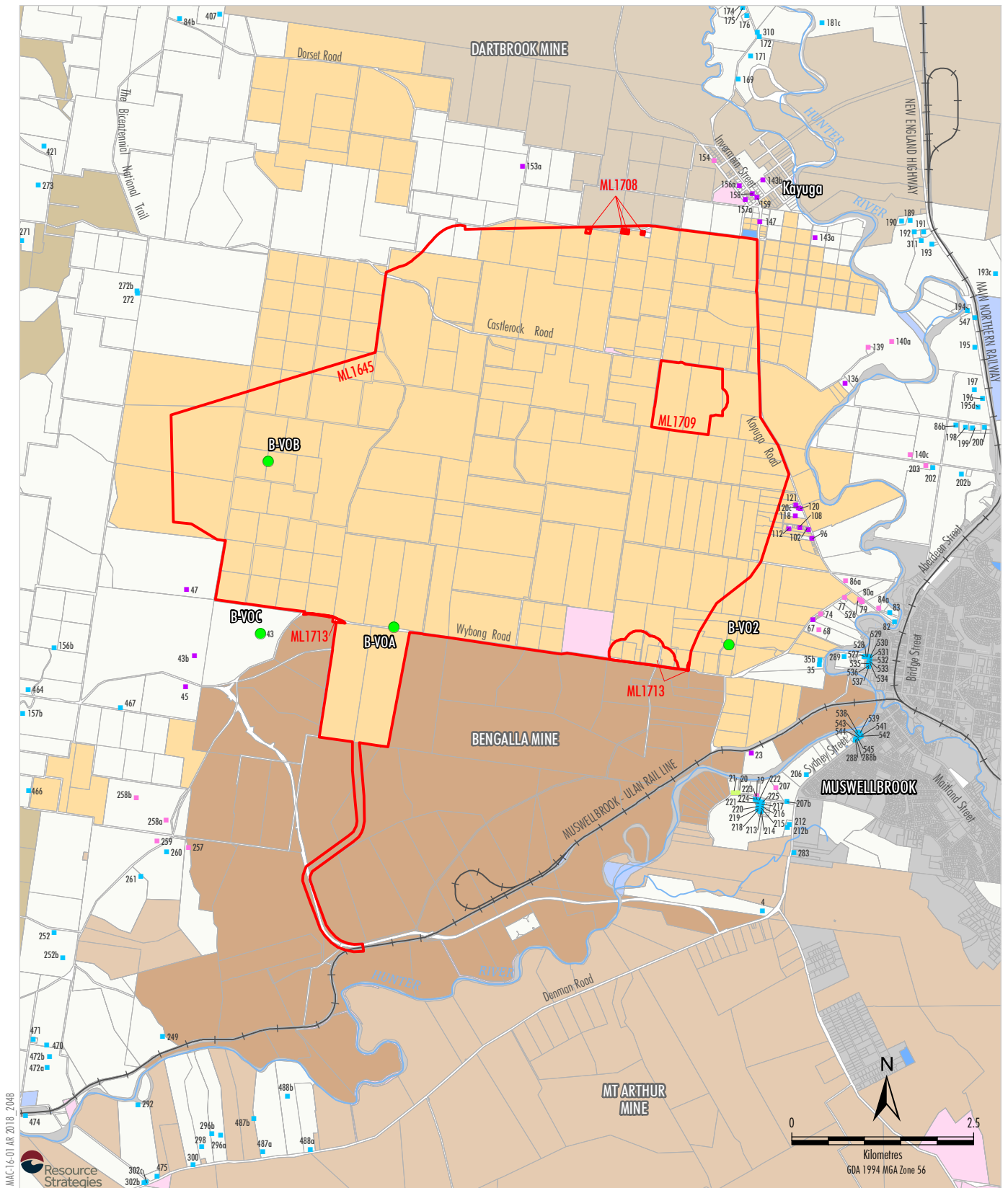
Airblast overpressure, ground vibration and fume monitoring were conducted for every blast event at the blast monitoring sites shown on Figure 4. This is with the exception of monitoring at site B-VOC which hasn't yet been installed as construction of the Fine Rejects Dam is yet to be finalised. Once construction of the Fine Rejects Dam is completed, blast monitoring at B-VOC will commence.

### 5.3.2 Performance During the Reporting Period

A total of 92 blasts occurred during the reporting period as shown in Appendix A. All recorded blast measurements were in accordance with the relevant blasting criteria (Section 5.3.1). A comparison of MPO's blast performance against the MOD 3 predictions is summarised in Table 14.

While Table 14 provides a comparison of MOD 3 predictions to the airblast overpressure and ground vibration levels recorded in 2018 at a number of sensitive receivers located around the MPO, the majority of the sensitive receivers are located significant distances from the blast monitors. It is therefore difficult to draw conclusions regarding how the recorded levels compare to the MOD 3 predictions. Monitor B-VOC, however, is located in close proximity to Receiver 43 and therefore the MOD 3 predictions and the levels recorded at B-VOC can be realistically compared.





- LEGEND**
- Mining Lease Boundary
  - Privately-owned Residence - MPO Acquisition on Request
  - Privately-owned Residence - MPO Mitigation/Acquisition on Request \*
  - Privately-owned Residence - MPO Mitigation on Request
  - Other Privately-owned Residence
  - Blast Monitoring Site (Vibration/Overpressure)

\* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- Crown/State of NSW
- The State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2019)

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MOUNT PLEASANT OPERATION  
Blast Monitoring Sites

Figure 4



The slight differences in recorded and predicted levels at Receiver 43/B-VOC (i.e. slightly lower airblast overpressure records and slightly elevated ground vibration records) may be due to a difference in site conditions compared to the empirical data used to establish the predictions. Once sufficient blast monitoring data is available, a site specific empirical prediction model will be developed to assist blast planning and performance review.

**Table 14**  
**Comparison of MOD 3 Predictions and 2018 Monitoring Data**

Closest Receiver ID	MOD 3 Predictions		Closest Blast Monitoring Site to Land Holder	Maximum Recorded Level in 2018	
	Airblast Overpressure (dBL [in Peak])	Ground Vibration (mm/s)		Airblast Overpressure (dBL [in Peak])	Ground Vibration (mm/s)
43	111.6 to 112.4	0.9 to 1.4	B-VOC	109.9	1.68
272	111.1 to 111.2	0.5 to 0.6	B-VOC	109.9	1.68
153	111.3 to 111.5	0.6 to 0.8	B-VOA	113.6	2.51
147	111.3 to 111.8	0.7 to 1	B-VO2	114.5	2.67
136	111.7 to 112.8	0.9 to 1.6	B-VO2	114.5	2.67
121	112.6 to 115.7	1.5 to 3.7	B-VO2	114.5	2.67
112	112.8 to 116.4	1.6 to 4.3	B-VO2	114.5	2.67
67	112.9 to 115.4	1.6 to 3.5	B-VO2	114.5	2.67
23	113.3 to 115.2	1.9 to 3.3	B-VO2	114.5	2.67

Source: Table 8-1 of MPO MOD 3 Noise & Blasting Assessment.

Note: mm/s = millimetres per second; dB = decibels.

## Complaints

A total of 16 blasting related complaints were received by MACH Energy during 2018 (see Complaints Summary 2018: <https://machenergyaustralia.com.au/mount-pleasant/documentation/>). In response to the complaints, blasting activities were reviewed for compliance with compliance limits. Following the investigation, the ERM made further contact with the complainant to provide an update of the blasting activities.

### 5.3.3 Trends and Key Management Implications

There were 92 blasts recorded during 2018, compared with 4 in 2017. Air blast overpressure and ground vibration levels recorded during 2018 were similar to those recorded in 2017.

All blasting activities from the MPO complied with the relevant criteria at all monitoring sites during the reporting period in 2018.

Blasting related complaints increased in 2018 compared to 2017 due to the commencement of mining operations.

### 5.3.4 Implemented or Proposed Management Actions

Notifications of upcoming blasts were provided on MACH Energy's and Muswellbrook Shire Council's website. In addition, MACH Energy notified private landholders or residents who expressed an interest in being informed of the MPO blasting schedule and were therefore on the MPO pre-blast notification register.

Any blasts within 500 m from Wybong, Kayuga, Castlerock and Dorset Road triggered the road closure and implementation of relevant mitigation measures. In 2018, 43 road closures occurred on Wybong Road due to blasting activities within Pit A.

## 5.4 AIR QUALITY

Air quality criteria for the MPO are presented in Tables 8, 9 and 10 of Development Consent DA 92/97 (Condition 20, Schedule 3) and EPL 20850 (Condition O3.5). Additional conditions relating to operating conditions, greenhouse gas emissions, odour, acquisition criteria and preparation of the AQGGMP are also provided in Development Consent DA 92/97 and EPL 20850.

### 5.4.1 Approval Criteria and Management Plan Requirements

#### *Development Consent DA 92/97 and Environment Protection Licence 20850*

A summary of the approval criteria for air quality is included in Table 15. Criteria for particulate matter less than or equal to 2.5 micrometres in diameter (PM<sub>2.5</sub>) were incorporated as part of the MOD 3 in August 2018.

**Table 15**  
**Approval Criteria for Particulate Matter**

	Pollutant	Averaging Period	<sup>d</sup> Criterion
Long-term Impact Assessment Criteria	TSP	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>
	PM <sub>10</sub>	Annual	<sup>a</sup> 25 µg/m <sup>3</sup>
	PM <sub>2.5</sub>	Annual	<sup>a</sup> 8 µg/m <sup>3</sup>
	Deposited Dust <sup>d</sup>	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month <sup>a</sup> 4 g/m <sup>2</sup> /month
Short-term Impact Assessment Criteria	PM <sub>10</sub>	24 hour	<sup>b</sup> 50 µg/m <sup>3</sup>
	PM <sub>2.5</sub>	24 hour	<sup>b</sup> 25 µg/m <sup>3</sup>

Source: Development Consent DA 92/97 (Condition 20, Schedule 3).

Note: TSP = Total Suspended Particulates;

PM<sub>10</sub> = particulate matter less than or equal to 10 micrometres in diameter;

µg/m<sup>3</sup> = micrograms per cubic metre; g/m<sup>2</sup>/month = grams per square metre per month.

<sup>a</sup> Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);

<sup>b</sup> Incremental impact (i.e. incremental increase in concentrations due to the development on its own);

<sup>c</sup> Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

<sup>d</sup> Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Air quality criteria and other air quality related conditions stipulated in EPL 20850 are generally consistent with those prescribed in Development Consent DA 92/97, with the exception of Conditions O3.4 to O3.8, which state:

#### **O3 Dust**

...

*O3.4 The licensee must cease all dust generating activities during adverse conditions being the occurrence of both the adverse wind conditions set out in Condition O3.5 (b) and the adverse PM<sub>10</sub> concentrations set out in Condition O3.5(c).*

*O3.5 For the purpose of Condition O3.4 the following definitions apply.*

- (a) 'dust generating activities' means drilling, blasting, earthworks, construction activities, all hauling activities on unsealed haul roads, all overburden and coal extraction operations including loading and dumping activities and grader, loader, dozer and dragline operations.
- (b) 'adverse wind conditions' means a rolling 1-hour average wind direction between 270 degrees and 360 degrees (inclusive) measured at the meteorological station (EPA Identification No.4). Australian Standard AS3580.14-2014 is to be used to calculate the rolling 1 hour average wind direction
- (c) 'adverse PM<sub>10</sub> concentrations' means a rolling 24-hour average PM<sub>10</sub> concentration of equal to or greater than 44 micrograms per cubic metre measured at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.
- (d) Operation of watercarts is permitted at all times.

O3.6 Shutdown of dust generating activities required by Condition O3.4 must be completed within 1 hour of receiving data that triggers action required by Condition O3.4.

O3.7 The licensee may resume dust generating activities at the premises when:

- (a) adverse wind conditions as defined in Condition O3.5(b); or
- (b) adverse PM<sub>10</sub> concentrations as defined in Condition O3.5(c) are not measured for a minimum time period of 1 hour from the time that cessation of dust generation activities is completed.

O3.8 The licensee must cease dust generating activities at the premises at any time when there is no access to the meteorological monitoring data required by Condition M5.1 and / or when there is no access to the PM<sub>10</sub> monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

*Note: An alternate PM<sub>10</sub> monitor location and associated trigger value is to be negotiated with the EPA. This alternate monitor and PM<sub>10</sub> trigger value is to be used for Condition O3.5(c), in the event that there is no access to the PM<sub>10</sub> monitoring data at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network.*

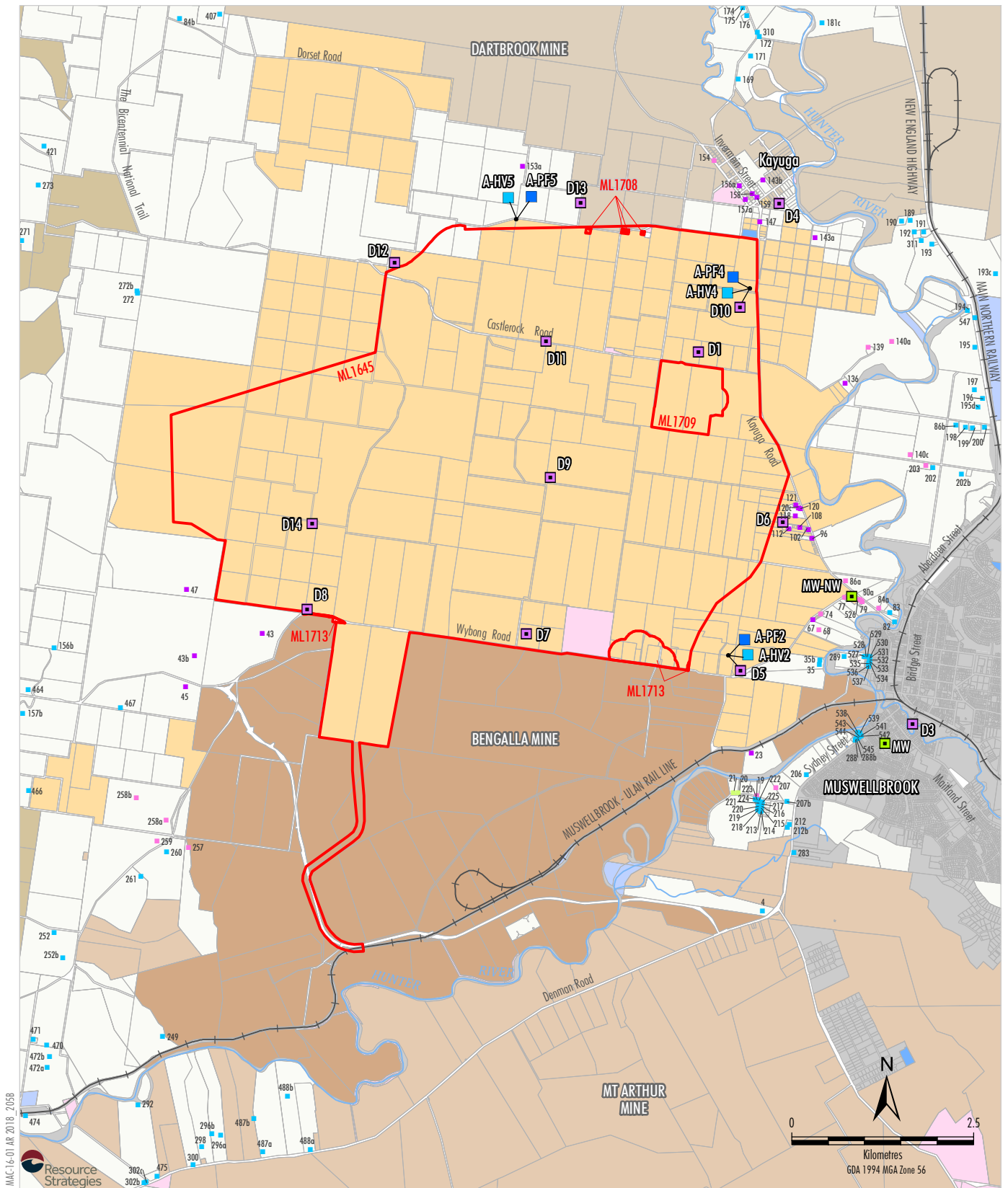
MACH Energy prepared an AQGGMP during the previous reporting period, which was approved on 31 January 2018.

The AQGGMP outlines specific management measures for adverse weather conditions, dust management, predictive modelling, real-time response protocols, odour and fume management, greenhouse gas emissions and cumulative air quality management.

## 5.4.2 Performance During the Reporting Period

### ***Dust Deposition***

During the reporting period, dust deposition levels were collected at 13 dust deposition gauges situated around the MPO boundary (Figure 5). The gauges were sited in accordance with AS 3580.1.1:2007 and analysed for mass of total insoluble matter and ash in accordance with AS 3580.10.1-2003.



\* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1  
Crown  
Crown/State of NSW  
The State of NSW  
Muswellbrook Shire Council  
Upper Hunter Shire Council  
Mount Pleasant Controlled  
Bengalla Controlled  
Dartbrook Controlled  
Mt Arthur Controlled  
Other Mining/Resource Company Controlled  
Privately Owned Land

Figure 5

Annual average levels of insoluble solids (i.e. dust deposition) are presented in Chart 4. Chart 5 provides a comparison between annual average dust deposition levels at each of the monitoring sites from 2014 to 2018.

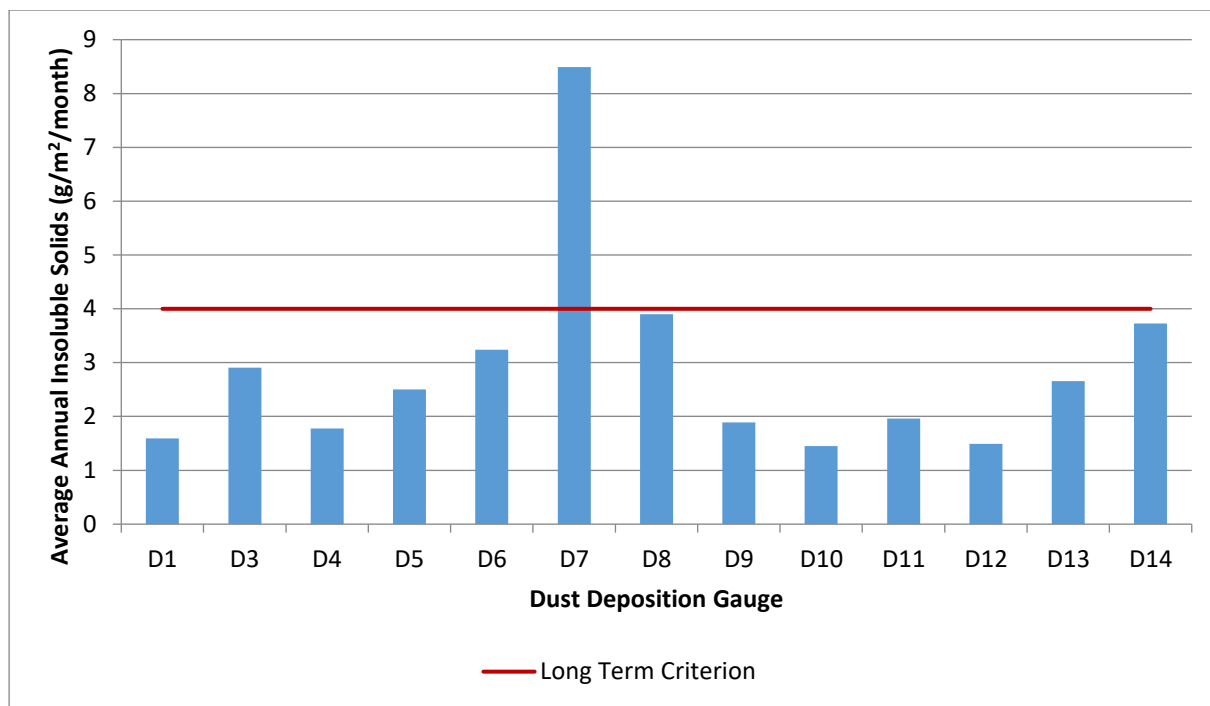


Chart 4: 2018 Annual Average Insoluble Solids

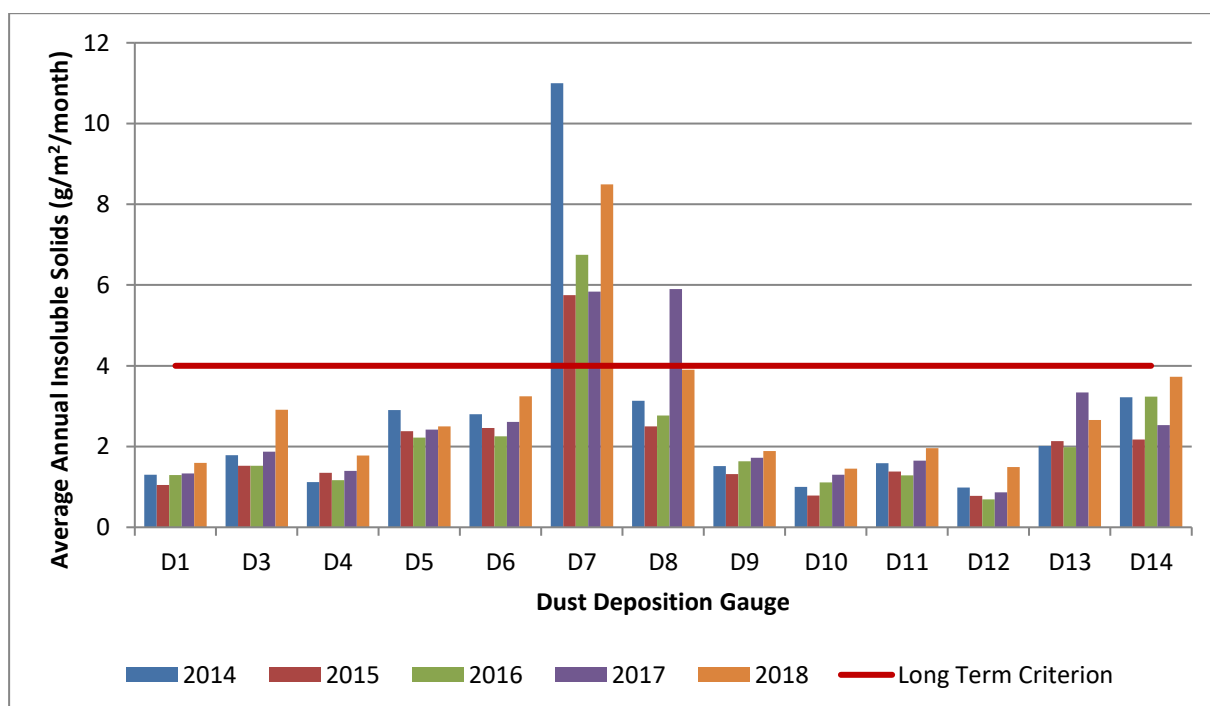
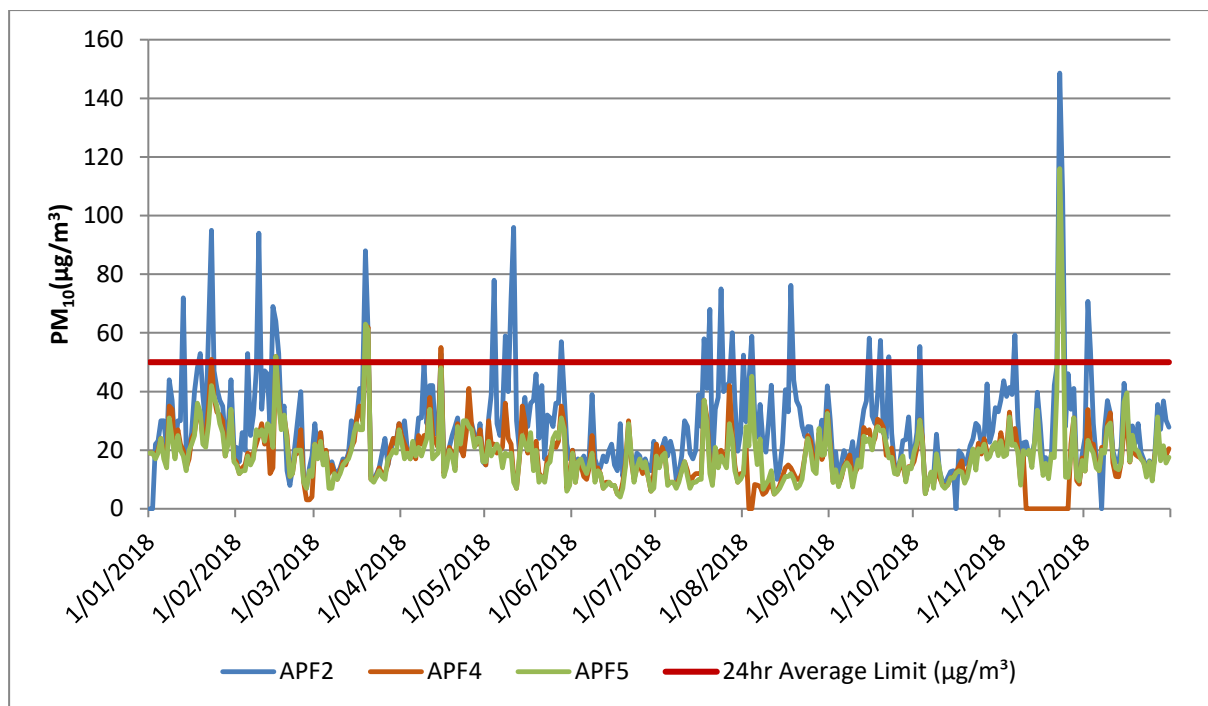
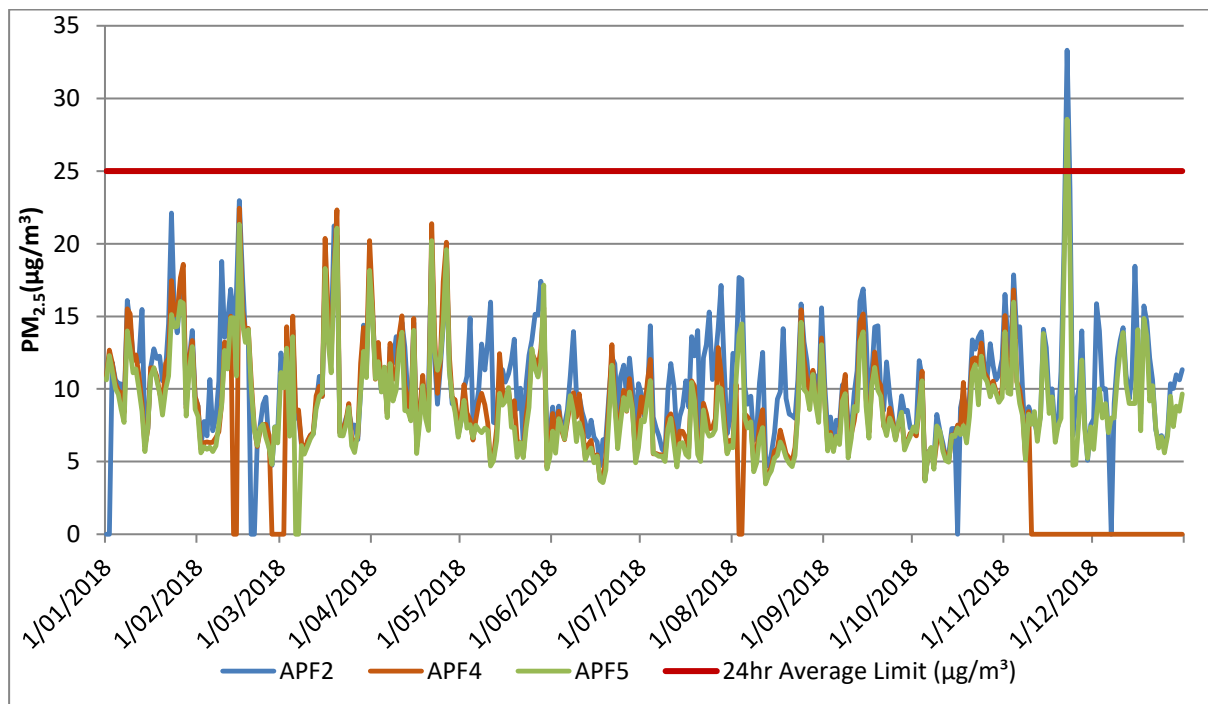
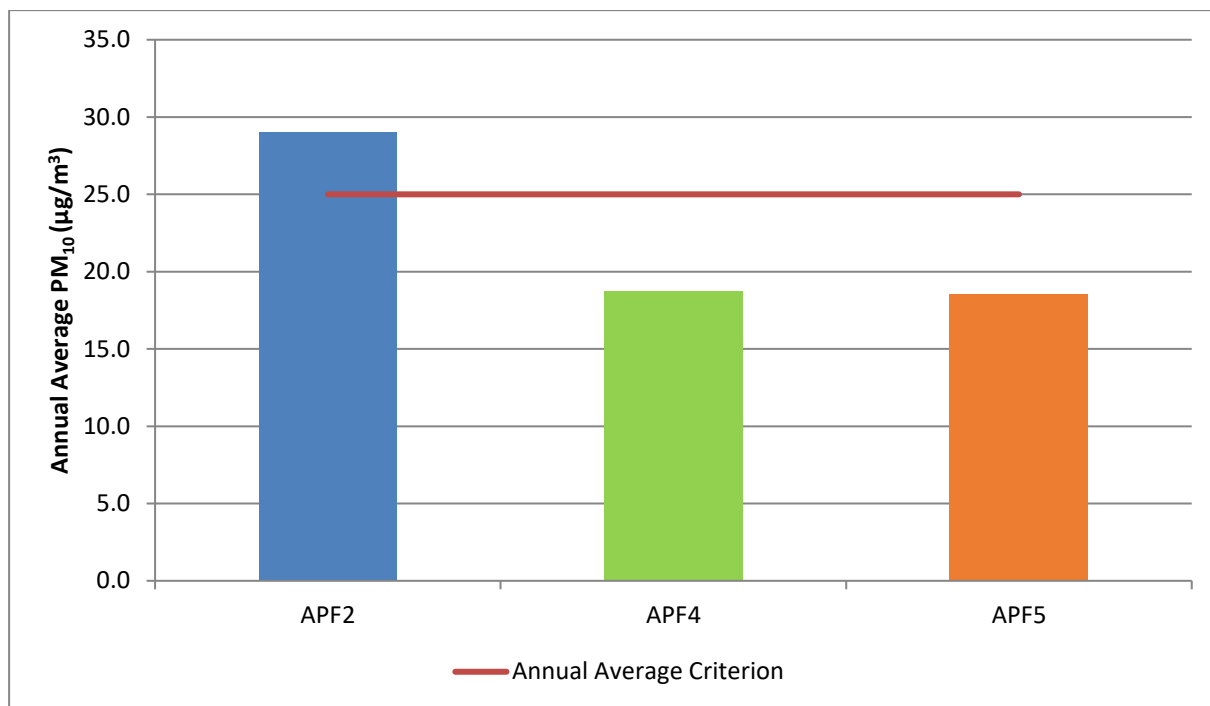
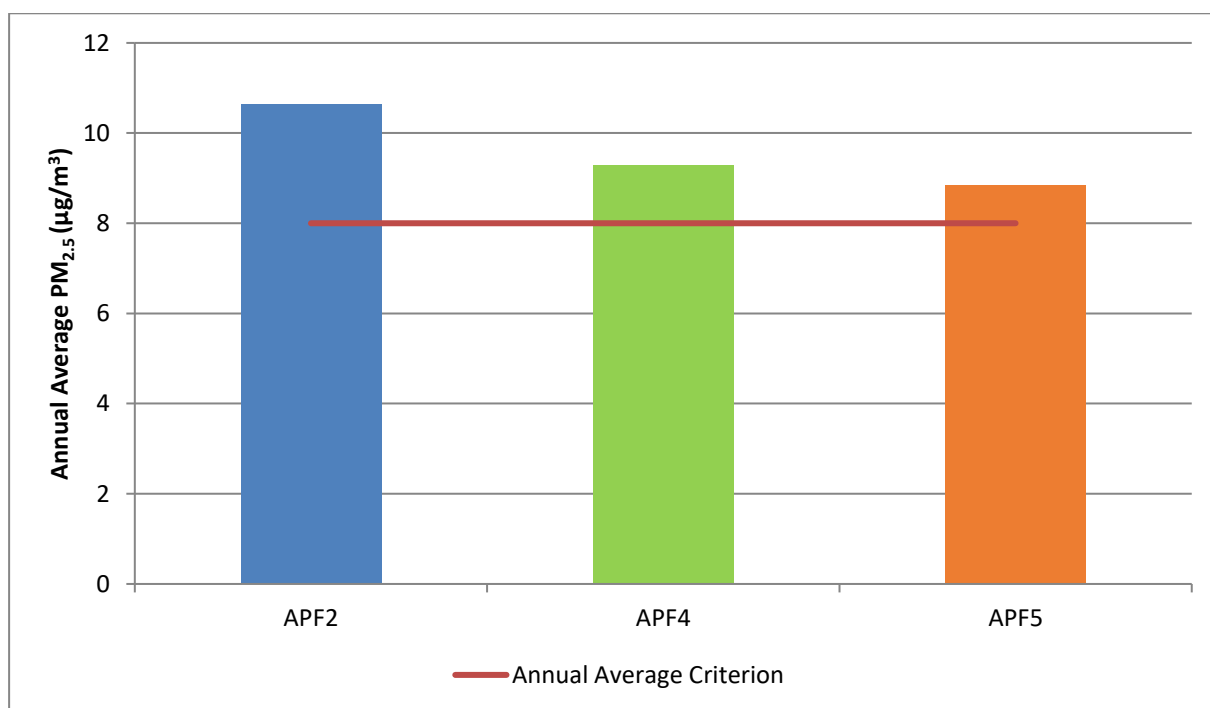


Chart 5: 2014 - 2018 Annual Average Insoluble Solids

***PM<sub>10</sub> and PM<sub>2.5</sub>***

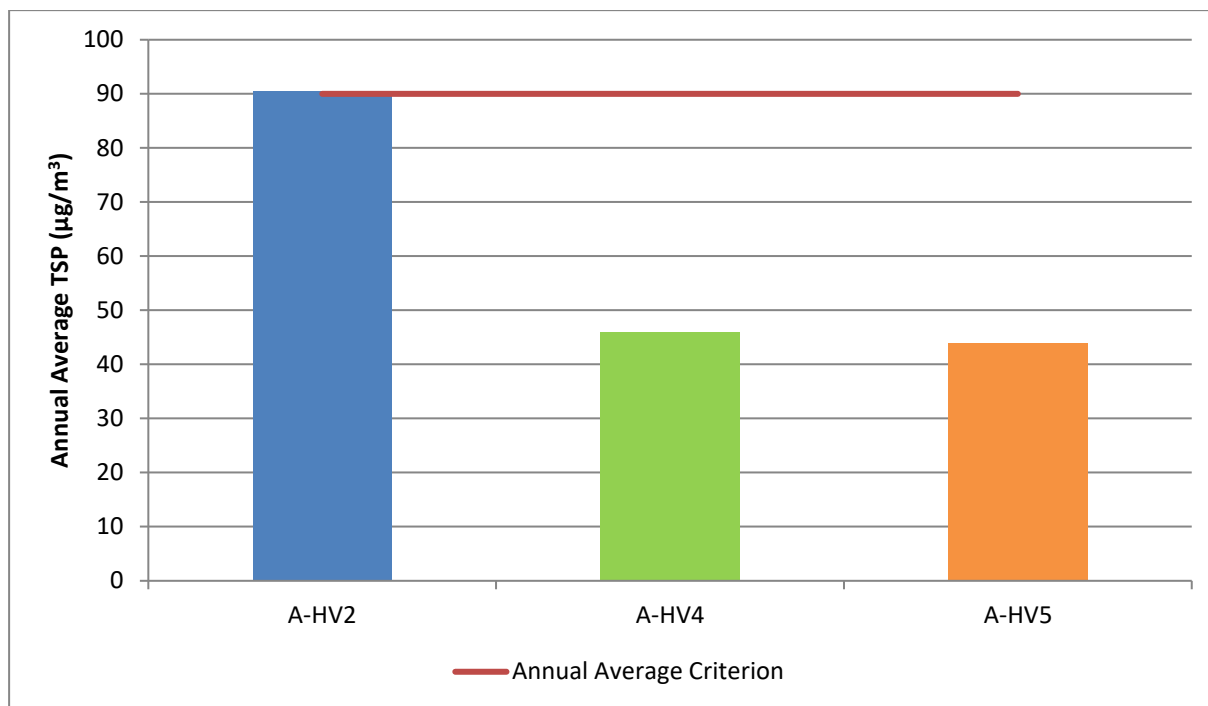
Palas Fidas monitoring systems were installed at three locations (Figure 5) in late 2016. The Palas Fidas systems collected PM<sub>10</sub> and PM<sub>2.5</sub> data continuously, which was averaged over 24 hours (Chart 6 and Chart 7) and annually (Chart 8 and Chart 9). One of the Palas Fidas units (APF4) was under maintenance for several months of 2018, and was temporarily replaced by a tapered element oscillating microbalance (TEOM) unit.

**Chart 6: 24 hour Average PM<sub>10</sub> Levels****Chart 7: 24 hour Average PM<sub>2.5</sub> Levels**

**Chart 8: Annual Average PM<sub>10</sub> Levels****Chart 9: Annual Average PM<sub>2.5</sub> Levels*****Total Suspended Particulate***

TSP levels were recorded at the three High Volume Air Sampler (HVAS) systems (A-HV2, A-HV4 and A-HV5) located adjacent to the three Palas Fidas monitors (Figure 5). These HVAS systems were sited in conjunction with the Palas Fidas monitors in late 2016. Annual average TSP levels are presented in Chart 10.





**Chart 10: Annual Average TSP Levels**

#### 5.4.3 Trends and Key Management Implications

Dust deposition levels stayed relatively consistent between 2017 and 2018, with the exception of D3, D7, D8 and D14. Annual average levels of deposited dust were recorded below the Long-term Impact Assessment Criteria of 4 g/m<sup>2</sup>/month at all dust gauges, with the exception of D7.

D7 is located within the MPO boundary between the MPO and Bengalla Mine operations. Due to its proximity to the northern boundary of the Bengalla Mine main pit, D7 is heavily influenced by both the MPO and the Bengalla Mine operations. Therefore, whilst this site has continued to be monitored, it is not used to assess compliance or to represent residential receivers in the area.

D3 recorded a slight increase compared to previous years, although it did not record an exceedance of the annual average criterion. The majority of works at the MPO during the reporting period were undertaken in the south-eastern quadrant of the MPO area, away from D3. D3 is located further east of the MPO area than D5, which did not record a corresponding increase. Therefore, it is reasonable to assume that the increase at D3 was not due to MPO activities, but rather from other local and regional sources of dust.

D14 also recorded a slight upward trend since 2017, however it did not exceed the annual average criterion in 2018. Dust deposition gauge D14 is located to the south-west of the MPO mining area and within the MPO boundary, between D9 and D8. Monitoring records show that D14 has fluctuated regularly in previous years, indicating yearly fluctuations are common at the site.

D12 recorded a marked increase in dust levels from 2017 to 2018, however it did not exceed the annual average criterion. D12 is located to the north-west of the MPO area and D9. As the operation activities were localised within the south-eastern quadrant of the MPO area during the reporting period and there was no corresponding increase recorded at D9, it is reasonable to assume that the increase at D12 was not due to MPO activities.



The 24 hour average PM<sub>10</sub> level was generally below the relevant criteria during the reporting period, with the exception of some elevated readings of the 24 hour average PM<sub>10</sub> levels mainly occurring at monitor APF2. Notwithstanding, APF2 is located on MACH Energy owned land and not privately-owned land and therefore the elevated readings were not considered to be non-compliances.

The largest elevated PM<sub>10</sub> readings were recorded on 22 and 23 November, with daily readings recorded as 55.2 µg/m<sup>3</sup> and 276.1 µg/m<sup>3</sup>, respectively. The operation was shut down on the morning of 22 November and did not restart until 24 November. This elevated reading was reported in the November Monthly Environmental Monitoring Report and was attributed to a significant state-wide dust storm (MACH Energy, 2018a). A number of other elevated readings also occurred due to regional dust events (i.e. 23 January, 4 May and 5 September). In all cases the operation was shut down and dust mitigation actions implemented. These elevated readings are therefore not considered as non-compliances.

In accordance with Conditions O3.4 and O3.5 from EPL 20850, all dust generating activities at the MPO must be ceased when specific adverse conditions are identified at the on-site meteorological station and/or at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor.

Dust generating activities were discontinued on a number of occasions during 2018 in accordance with Conditions O3.4 and O3.5 of EPL 20850. MACH Energy engaged with the EPA regarding the requirements of EPL 20850 and the discussions were ongoing throughout the reporting period.

In addition to ceasing operations due to elevated monitoring results in accordance with Conditions O3.4 and O3.5 of EPL 20850, operations were ceased on a number of occasions in response to the generation of visible dust.

During the reporting period, 24 hour average PM<sub>10</sub> levels at APF2 fluctuated between approximately 10 and 80 µg/m<sup>3</sup> at the beginning of 2018 and between approximately 10 and 60 µg/m<sup>3</sup> in the second half of the reporting period, when APF2 was relocated to closer to sensitive receivers to better reflect the impacts of the MPO. PM<sub>10</sub> levels at both APF4 and APF5 ranged between roughly 10 and 40 µg/m<sup>3</sup> in 2018 and no outstanding change was apparent during the year. Compared with the last reporting period, PM<sub>10</sub> levels observed at APF2 have generally increased while the levels at APF 4 and APF5 generally stayed consistent.

Real-time monitoring of PM<sub>2.5</sub> was undertaken during the reporting period at the three Palas Fidas monitors (Figure 5). The 24 hour average PM<sub>2.5</sub> level was generally below the relevant criteria during the reporting period, with the exception of the exceedance on 22 November 2018. Similar to PM<sub>10</sub> elevated reading on the same day, this was due to a significant state-wide dust storm.

As recording of PM<sub>2.5</sub> levels only commenced in late 2017 following the submission of MOD 3, it is not possible to compare results with previous years. During the next reporting period a comparison between current and previous PM<sub>2.5</sub> levels will be undertaken.

The annual average TSP levels were compliant with the annual average TSP criterion during the reporting period, with the exception of A-HV2, which showed elevated readings above the criterion by 0.5 µg/m<sup>3</sup>. However, as A-HV2 is located within MPO mine owned land and is located more than 1 km from the nearest privately-owned receiver, the elevated readings do not indicate non-compliance with the assessment criterion at any privately-owned receivers.

MOD3 predictions for air quality were modelled for three scenarios during the mine life (i.e. Year 2018, Year 2021 and Year 2025). Monitored annual average levels of insoluble solids were generally consistent with the MOD 3 Scenario 1 predictions, with the exception of monitoring site D8, which had slightly elevated insoluble solids levels. Annual average of PM<sub>2.5</sub> levels in 2018 were above the MOD 3 predicted levels, while PM<sub>10</sub> levels were generally consistent with the MOD 3 predictions. Annual average TSP concentrations recorded at monitoring site A-HV2 were above the predicted TSP concentration for Scenario 1 in MOD 3.

The inconsistencies observed between the monitoring results and the MOD 3 predictions are likely to be due to a lack of sensitive receptors located in close proximity to the MPO monitoring sites. The receptors are also generally located further away from the mine site compared with the monitoring sites.

#### **5.4.4 Implemented or Proposed Management Actions**

In order to more accurately represent private receivers in the vicinity of the Muswellbrook NW Upper Hunter Air Quality Monitoring Network monitor, MACH Energy commenced relocation of site APF2 approximately 400 m south-east of its previous position in early 2018. The relocated site is due to come online in early 2019. In the interim, air quality is measured at the old location.

All appropriate steps to reduce dust generation were undertaken in accordance with the MPO AQGGMP. MACH Energy will continue to implement these dust mitigation measures.

Site inductions undertaken in the reporting period included consideration of air quality requirements to ensure employee and contractor awareness of potential dust impacts, especially with respect to the nearest sensitive receptors. All contractors operated in compliance with the approved MPO AQGGMP.

### **5.5 BIODIVERSITY**

In accordance with Condition 32, Schedule 3 of Development Consent DA 92/97, MACH Energy prepared a Biodiversity Management Plan for the MPO in 2018, which was approved on 19 October 2018.

#### **5.5.1 Approval Criteria and Management Plan Requirements**

MACH Energy implements biodiversity management actions in accordance with the approved Biodiversity Management Plan. In order to ensure appropriate management actions are applied and to evaluate the vegetation and fauna habitat condition at the MPO, the Biodiversity Management Plan implements a Biodiversity Monitoring Program. The program includes the following components:

- noxious and environmental weed monitoring;
- vertebrate pest monitoring;
- monitoring of access; and
- rehabilitation monitoring.

### 5.5.2 Implemented or Proposed Management Actions

In 2018, the following biodiversity related management actions were undertaken:

- Weed control measures carried out by Hunter Land Management, Enright Land Management and Blackrock Industries on various properties within MPO and adjoining properties. Noxious weeds found on the properties were sprayed. These included Boxthorn, Prickly Pear, Creeping Acacia and St Johns Wart.
- Pest control measures implemented by Enright Land Management. These included pig and wild dog trapping as well as kangaroo culls.
- Pre-clearance surveys undertaken by an ecologist from Narla Environmental, including:
  - Surveys for diversion drainage infrastructure and topsoil stockpile areas carried out in August 2018.
  - Survey undertaken for part a Ground Disturbance Permit (GDP) for the MOD 3 additional disturbance areas on 10 October 2018.
  - Surveys undertaken prior to disturbance as part of all GDPs throughout 2018.
- Clearing supervision by a Narla Environmental ecologist, who was engaged to undertake fauna management (i.e. spotter catching), including habitat tree felling for drainage diversion lines, Pit D topsoil stockpile and Pit D extensions at the MPO.
- One threatened fauna species, a Squirrel Glider, was recorded during clearing activities. Management was undertaken in accordance with the Biodiversity Management Plan.
- Annual, bi-annual and regular monitoring carried out by MACH Energy.

## 5.6 HERITAGE

MACH Energy manages Aboriginal heritage on-site in accordance with Aboriginal Heritage Impact Permit #C0002053 (AHIP #C0002053) and AHIP #C0002092 issued by the Office of Environment and Heritage (OEH), and in accordance with the approved AHMP, prepared in accordance with Condition 36, Schedule 3 of Development Consent DA 92/97.

### 5.6.1 Approval Criteria and Management Plan Requirements

During the reporting period, all Aboriginal heritage management activities were carried out in accordance with MACH Energy's AHMP. The AHMP contains a range of management measures related to recording and surface collection, archaeological excavation, artefact analysis, artefact management, scarred tree removal, archaeological salvage and archaeological monitoring.

### 5.6.2 Implemented or Proposed Management Actions

During the reporting period, the following on-ground management measures relevant to heritage (Aboriginal and historic heritage) were undertaken at the MPO:

- Various heritage specialists were engaged to assist in the preparation of conservation advice for the Negoa Homestead.
- The MPO Aboriginal Site Database and Geographic Information System (GIS) data were revised and updated. This included reassessment of every Aboriginal site on multiple MPO data sets, GIS data, original reports, mapping and OEH AHIMS data.

- Archaeological salvage for Aboriginal artefacts was commenced within AHIP #C0002092 area in December 2018. This was followed by a preparation for excavation works planned to commence between January and February 2019.

During the next reporting period, MACH Energy anticipates undertaking the following heritage works:

- Progression of conservation management planning for the Negoa Homestead, including consideration of structural repairs and remnant non-heritage components.
- Commencement of archaeological excavation works in January/February 2019 within AHIP #C0002092 area, in accordance with the AHMP and relevant report recommendations.

## 5.7 EXPLORATION

MACH Energy completed a pre-production drilling program for the first several years of mining, with 57 boreholes being drilled in ML 1645 and ML 1750 within the reporting period. Drilling was undertaken using the water injection method, which generates minimal dust and noise emissions. The majority of boreholes were located within the open cut/overburden emplacement area footprint and involved open hole (non core) drilling. Further pre-production drilling programs will continue in 2019.

## 5.8 WASTE

Operational waste data was collected during the reporting period by Remondis Australia and is presented in Table 16.

**Table 16**  
**MPO Waste Data**

Waste	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
General Waste (t)	36.3	40.86	47.1	40.2	68.4	54.4	53.1	57	21	29.4	19.9	17.01	484.63
Asbestos <sup>1</sup> (t)	0	0	0	0	0	0	0	0	0	0	0	0	0
Recycled Waste (t)	10.44	21.33	16.7	8.8	32.4	20.1	19.8	25.57	18.1	17.8	24.23	6.38	221.58
Liquid Effluent (kL)	102.7	107.5	126	160	123	96	198	177.5	79.1	54.4	88.5	49.1	1361.3

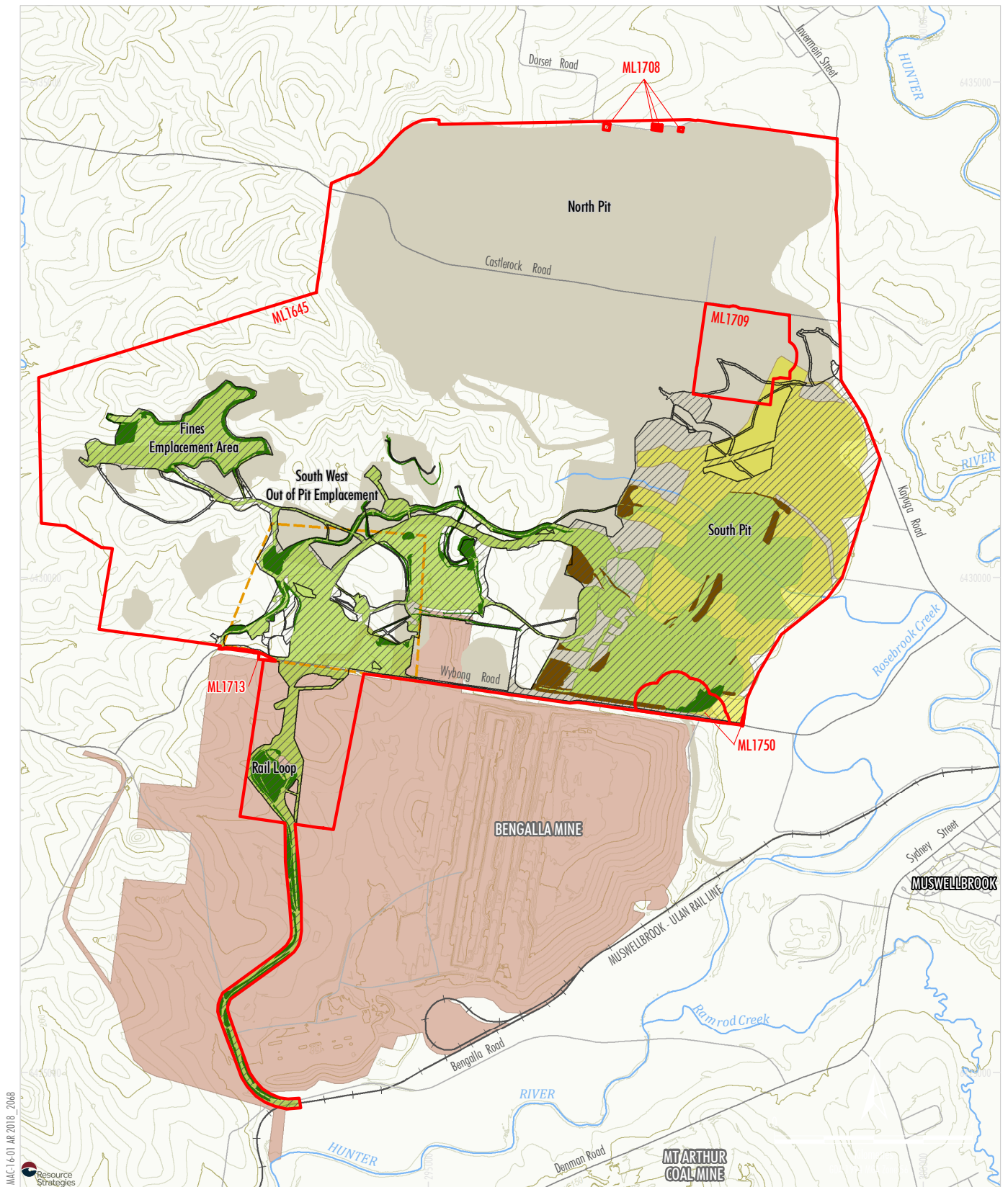
Note: t = tonnes; kL = kilolitres.

<sup>1</sup> Asbestos is managed in accordance with an internal Asbestos Control Plan. All asbestos removal work is handled with appropriate respiratory protective equipment and is supervised by a competent person approved by SafeWork NSW. Asbestos is transported off-site and disposed of at a lawful disposal facility licensed by EPA.

During the reporting period, a WasteMP was prepared by MACH Energy and submitted to DPE for approval. The WasteMP contains management measures on waste storage, segregation, transport and disposal, as well as provisions for waste monitoring. Waste operations during the reporting period, however, were undertaken in accordance with the previous version of the WasteMP approved on 29 September 2017.

## 5.9 TOPSOIL MANAGEMENT

During the reporting period, topsoil stockpiles were located adjacent to active disturbance areas including Pit A and D and areas to be rehabilitated, as shown on Figure 6. A total of approximately 297,700 m<sup>3</sup> of topsoil was stored in stockpiles during the reporting period. A topsoil register with individual volumes for each stockpile is kept and maintained on-site.



IMAC-14-01 AR 2018\_2068



#### LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- MOP Footprint +
- End 2018 Active Disturbance Area
- End 2018 Topsoil Stockpile Location
- End 2018 Rehabilitation Area
- 2019 Forecast Additional Disturbance Area
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

#### Notes:

- \* Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, off-site coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.
- + Mount Pleasant Operation Mining Operations Plan and Rehabilitation Management Plan - Amendment C (April 2017)

Source: NSW Division of Resources & Energy (2016); NSW Land & Property Information (2016); Department of Planning & Environment (2016); MACH Energy (2019)

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MOUNT PLEASANT OPERATION  
Topsoil Stockpile Locations

Figure 6



Topsoil is stripped ahead of disturbance activities and where possible, placed onto rehabilitation areas immediately. Where it is impractical to respread topsoil immediately, topsoil is stockpiled, sign posted, and seeded with a cover crop (e.g. native grass) where the stockpile will be in place for greater than 3 months. The topsoil stockpiles are managed to maintain seed reserves and microbial soil associations.

Plate 1 provides an example topsoil stockpile at the MPO. Further descriptions of topsoil stockpile management options are outlined in the approved MOP.



**Plate 1: Example Topsoil Stockpile**

## **5.10 VISUAL AMENITY AND LIGHTING**

During the reporting period, MACH Energy prepared a LMP which was approved on 16 October 2018. The LMP describes MACH Energy's management approach to minimising visual amenity and lighting impacts on surrounding receivers.

Visual landscaping activities were undertaken during the reporting period. These included:

- tree screen planting along key roads with views of the MPO such as Kayuga and Dorset roads;
- screen planting along MPO controlled land east of the site and west of Kayuga Road;
- implementation of visual bunding/tree screen planting along Wybong Road on the southern edge of the MPO; and
- targeted replanting of previously planted tree screening areas.

Due to abnormally dry conditions in 2018, visual landscaping growth rates were lower than expected.

One complaint relating to lighting from the MPO was received during the reporting period. After reviewing the operation, a lighting plant was turned off at the end of the shift and relocated the next day. The ERM made contact with the complainant after the lighting plant was turned off to provide an update on operations.

#### **5.11 CONTAMINATED LAND**

No contaminated land that posed a potential or material threat to the environment was encountered during the reporting period.

#### **5.12 SPONTANEOUS COMBUSTION MANAGEMENT**

There were no spontaneous combustion incidents at the MPO during the reporting period. Inspections of coal stockpiles for spontaneous combustion were undertaken regularly.

## 6 WATER MANAGEMENT

A WMP was prepared and approved on 16 March 2018, which included the following monitoring network (Figure 7):

- 15 surface water monitoring locations (W1 – W15); and
- five stream health monitoring locations (Hunt 585, Hunt 854, Hunt 571, Hunt 506 and Sandy 1).

Mining activities in 2018 were undertaken in accordance with the erosion and sediment control provisions of the approved WMP.

There were no water discharges from the MPO in 2018. Any future discharges of mine water will be undertaken in accordance with Development Consent DA 92/97 (Condition 26, Schedule 3), Development Consent SSD-5170 (i.e. Bengalla Mine's Development Consent) and EPL 20850.

### 6.1 SURFACE WATER

#### 6.1.1 Approval Criteria

##### *Surface Water Quality*

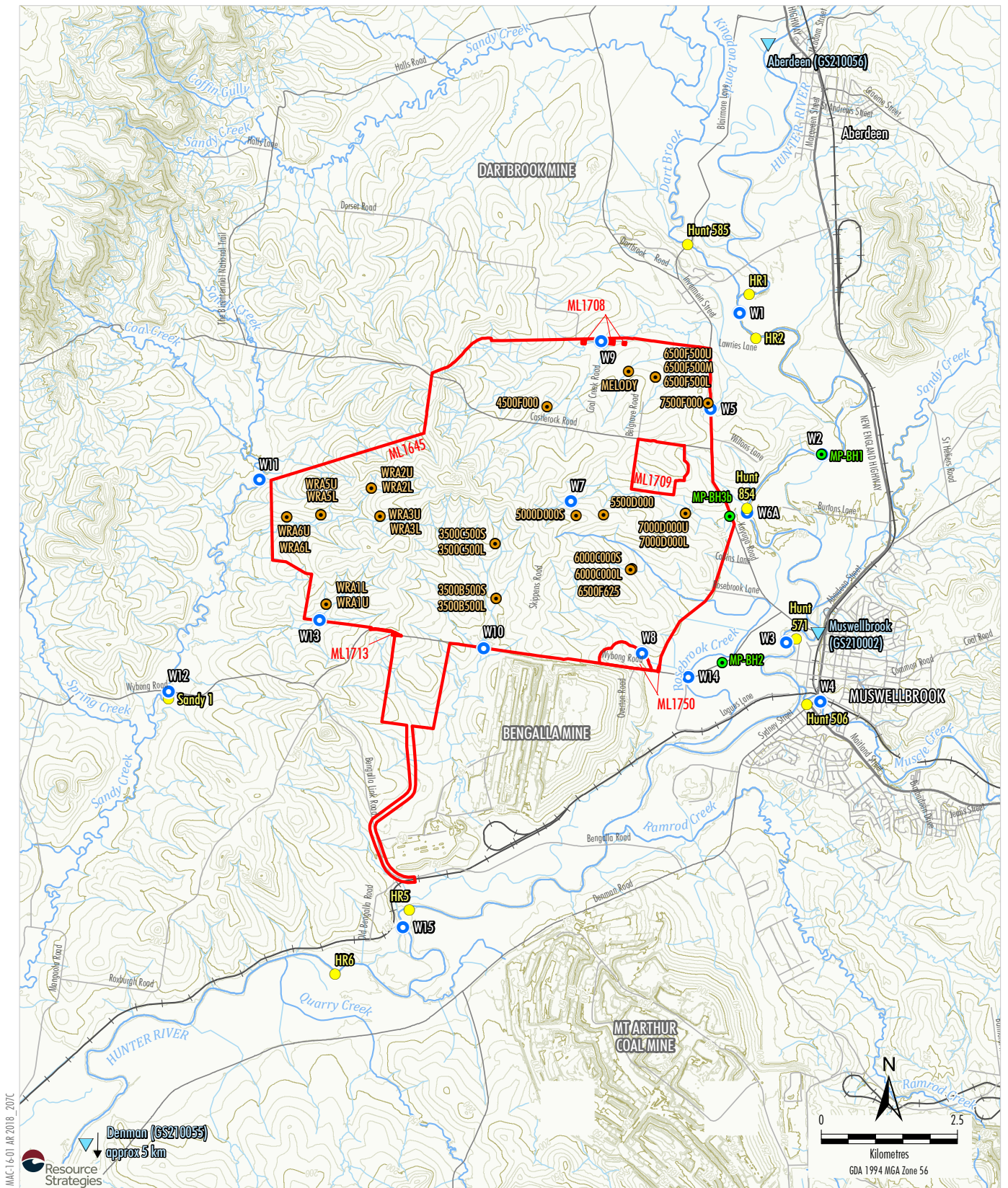
Surface water monitoring is undertaken monthly and/or event based at 15 locations (Figure 7) for pH, EC, Total Suspended Solids (TSS) and TDS. Water samples are also collected quarterly at these sites for laboratory analysis.

Prior to the reporting period, surface water monitoring undertaken at the MPO focused on establishing the baseline condition of key watercourses prior to the commencement of coal extraction. Monitoring data has been reviewed against site-specific surface water quality triggers, developed using the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand [ANZECC & ARMCANZ], 2000).

Trigger levels have not been established for sites upstream of the MPO (i.e. W1 and W4) because these cannot be affected by the MPO. Sites located on the Hunter River and the unnamed drainage line (monitored adjacent to Wybong Road) (i.e. W2, W6 and W8) contain sufficient data to develop trigger levels (with the exception of TDS trigger levels for these sites). Some sites (i.e. W5, W7, W8, W9 and W10) are located on ephemeral drainage lines which are frequently dry and do not have sufficient data to develop site-specific trigger levels. ANZECC & ARMCANZ (2000) default trigger levels for these sites have been adopted, until such time as sufficient data is available to develop site-specific triggers.

Trigger levels for the remaining water monitoring sites (i.e. W11-W15 [Figure 7]) will also be established once sufficient monitoring data has been collected at these sites.





#### LEGEND

- Mining Lease Boundary
- Contour (10 m Intervals)
- ▼ DPI Water Gauging Station
- Surface Water Monitoring
- Stream Health Monitoring Site
- Groundwater Monitoring
- Standpipe
- Standpipe - Alluvium

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); NSW Department of Primary Industries - Water (2016); Bengalla Mining Company (2015); Mangool Coal Operations Pty Ltd (2014); MACH Energy (2019)

**MACHEnergy**  
MOUNT PLEASANT OPERATION  
Surface Water and Groundwater  
Monitoring Locations

Figure 7

The site-specific trigger levels are listed in Table 17.

**Table 17**  
**Surface Water Quality Trigger Levels**

Site	pH	EC (µS/cm)	TSS (mg/L)
	20 <sup>th</sup> – 80 <sup>th</sup> Percentile Trigger Levels	80 <sup>th</sup> Percentile Trigger Level	80 <sup>th</sup> Percentile Trigger Level
<b>Site Specific Trigger Levels</b>			
W2	7.8 – 8.3	539	18
W6A*	7.8 – 8.4	496	19
W8	6.9 – 7.6	318	672
<b>Default Trigger Levels<sup>^</sup></b>			
W5	6.5 – 7.5	350	-
W7	6.5 – 7.5	350	-
W8	6.5 – 7.5	350	-
W9	6.5 – 7.5	350	-
W10	6.5 – 7.5	350	-

Note: µS/cm = microsiemens per centimetre and mg/L = milligrams per litre.

\* Due to safe access no longer being available at site W6, triggers developed for this site will now be used at the new monitoring location W6A, approximately 500 m downstream of W6, as described in Section 7.3.

<sup>^</sup> Default trigger levels are based on the ANZECC & ARMCANZ (2000) guideline values for upland rivers in south-east Australia. ANZECC & ARMCANZ (2000) does not provide guideline values for TSS.

Trigger levels are not regarded as assessment criteria, rather they are used as an indicator of potential impacts and to initiate investigations into the surface water quality as reported by the monitoring program.

An investigation is triggered when both:

- a water quality indicator at a downstream receiving water monitoring location is above (or outside the range of) the trigger levels for three consecutive sampling events; and
- a water quality indicator at a downstream receiving water monitoring location is above (or below in event of a trigger of the lower pH limit) the indicator of the corresponding upstream monitoring location (where such a monitoring location exists) sampled on the same day.

The majority of sites are located on ephemeral drainage lines and therefore do not regularly experience flow for sampling. During the reporting period, sites W5, W7, W9, W10, W13 and W14 had insufficient water for manual sampling and are therefore not presented in Section 6.1.2.

Site W8 was mined through during the reporting period.

### **Stream Health**

Stream health monitoring continued during the reporting period at four sites outlined in the WMP located on the Hunter River (Hunt 585, Hunt 854, Hunt 571 and Hunt 506), as well as five additional sites located on Sandy Creek (Sandy 1) and the Hunter River (HR1, HR2, HR5, HR6) (Figure 7). Two rounds of monitoring were undertaken during the reporting period, in May 2018 (autumn) and November 2018 (spring).

Stream health is monitored bi-annually during spring and autumn using the Australian River Assessment System (AusRivAS) aquatic invertebrate monitoring protocol. In addition to the aquatic macro invertebrate sampling, monitoring also includes: fish observations, site water quality, stream condition and presence of aquatic and riparian edge plants.

Trigger levels have been developed at two of the Hunter River stream health monitoring sites, as outlined in Table 18.

**Table 18**  
**Stream Health Trigger Levels**

Site ID	Baseline Band of Impairment Score	Trigger Level (O/E Taxa)
Hunt 571	B	0.54
Hunt 854	A	0.84

O/E = Observed/Expected.

Should a measured O/E taxa value at a particular site deteriorate below the range for its baseline band of impairment score at two successive monitoring rounds, the stream health investigation protocol (refer to the WMP) would be initiated.

### 6.1.2 Performance During the Reporting Period

#### **Surface Water Monitoring**

Surface water monitoring for the reporting period has been split into three groups:

- monitoring in the Hunter River (sites W1, W2, W3, W6A and W15);
- monitoring in Sandy, Muscle and Rosebrook Creeks (sites W4, W11, W12, W13 and W14); and
- monitoring in ephemeral creeks and gullies (no data was recorded during the reporting period due to drought conditions).

Additional event-based monitoring was carried out in November, resulting in two monitoring records instead of one (27 November and 29 November).

#### *Hunter River*

Monitored pH values for the Hunter River monitoring sites during the reporting period are shown in Chart 11. Additionally, a comparison between 2016, 2017 and 2018 pH values is provided in Chart 12.

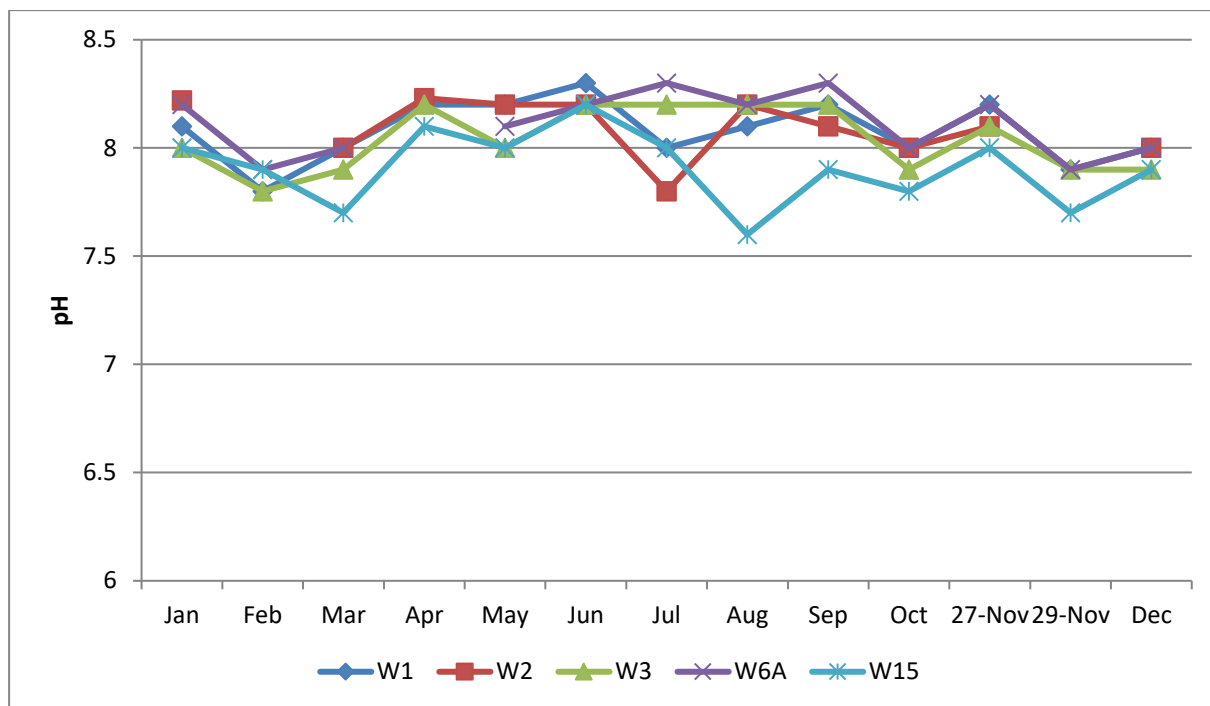


Chart 11: Hunter River pH Levels 2018

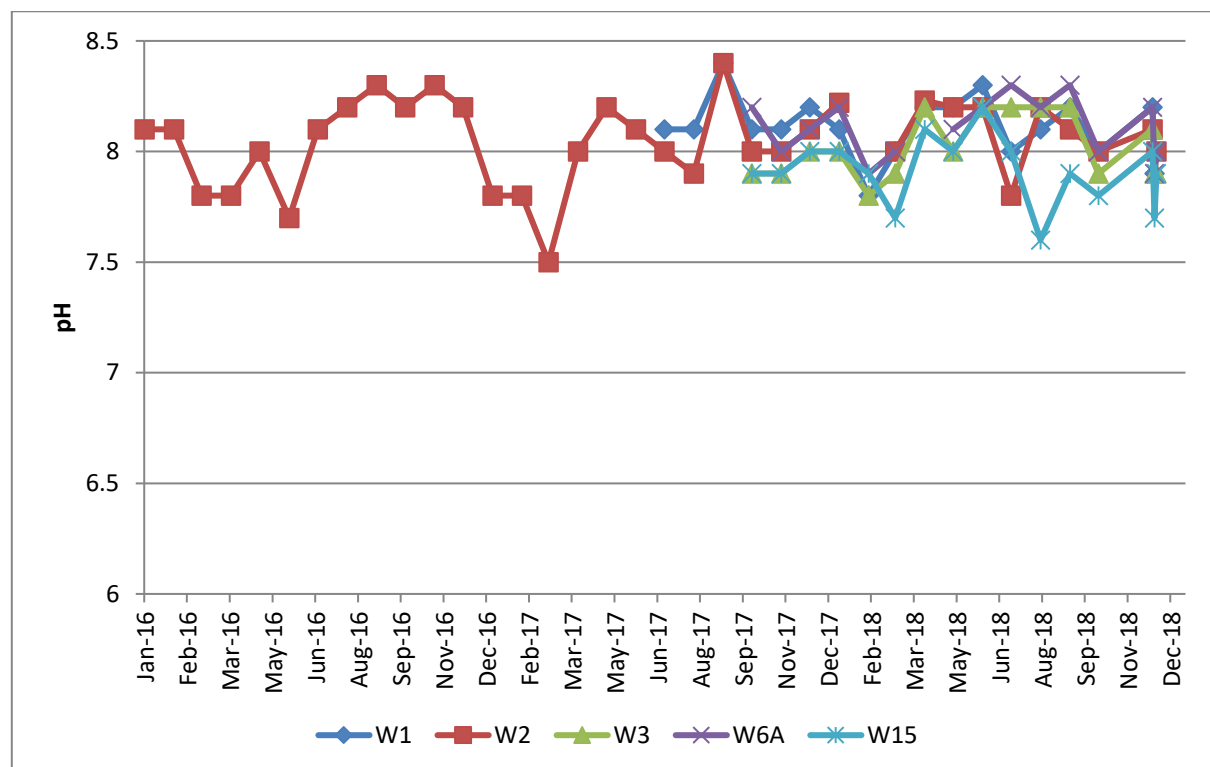
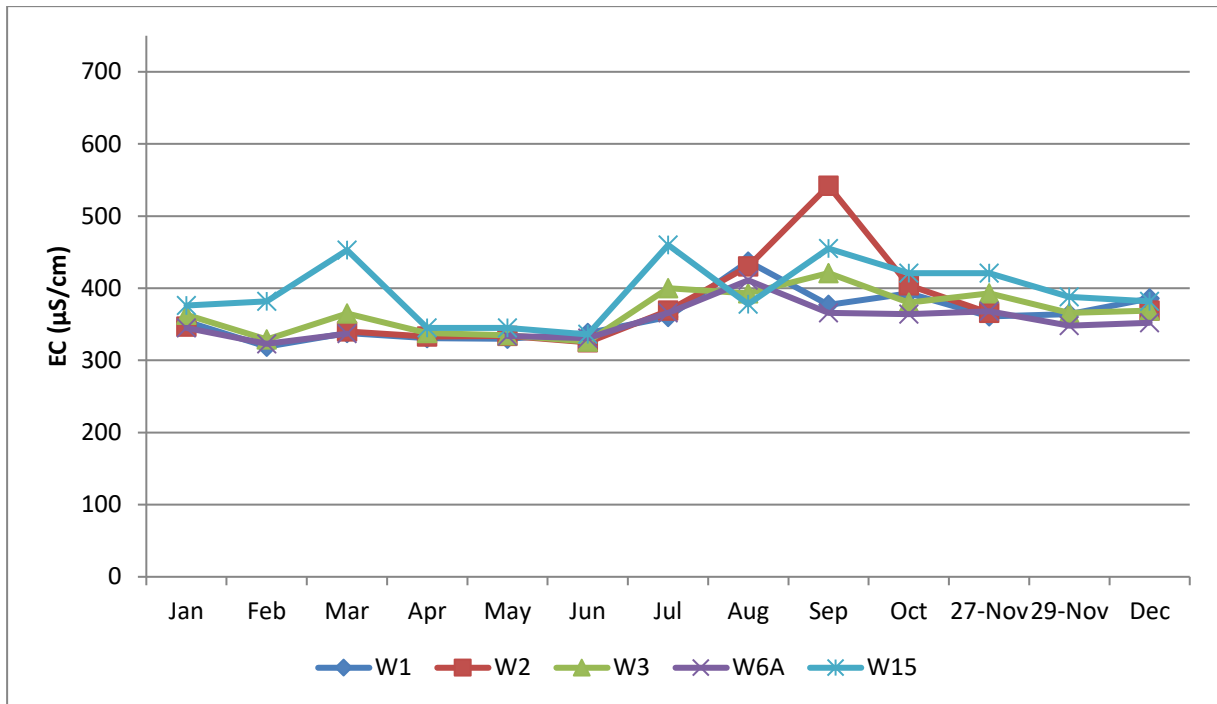
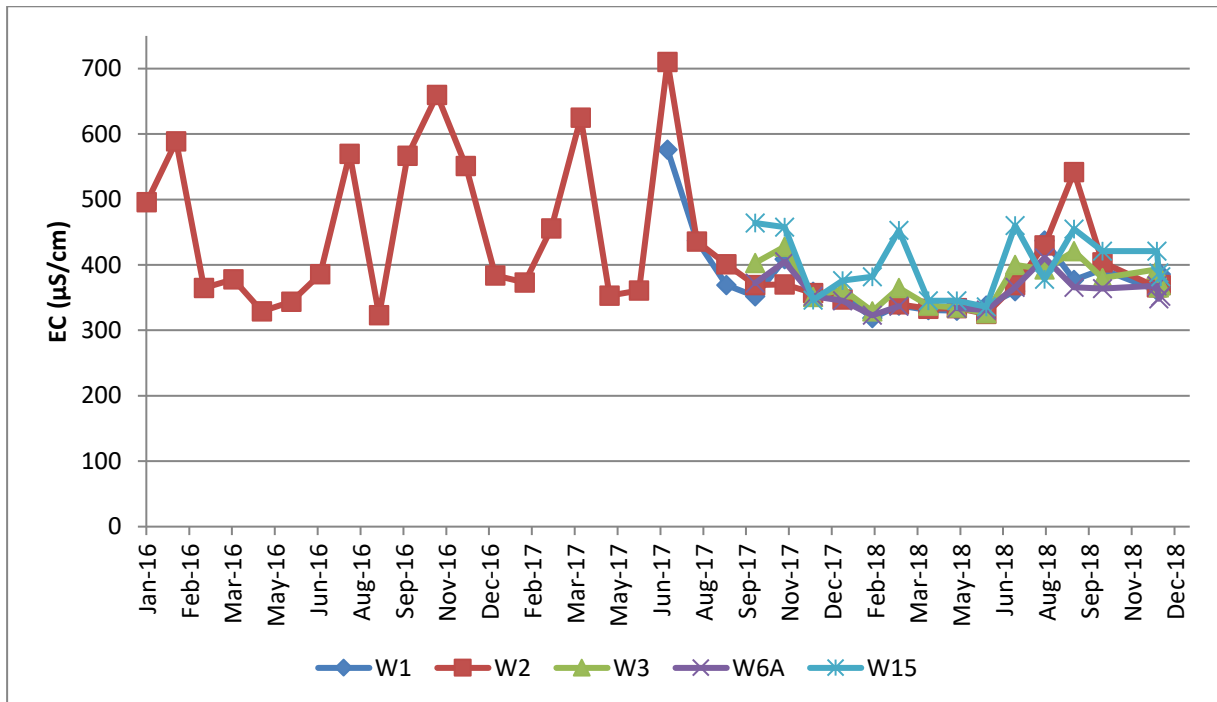


Chart 12: Hunter River pH Levels 2016 – 2018

EC values for the 2018 monitoring period are shown in Chart 13. Additionally, a comparison between 2016, 2017 and 2018 EC values is provided in Chart 14.



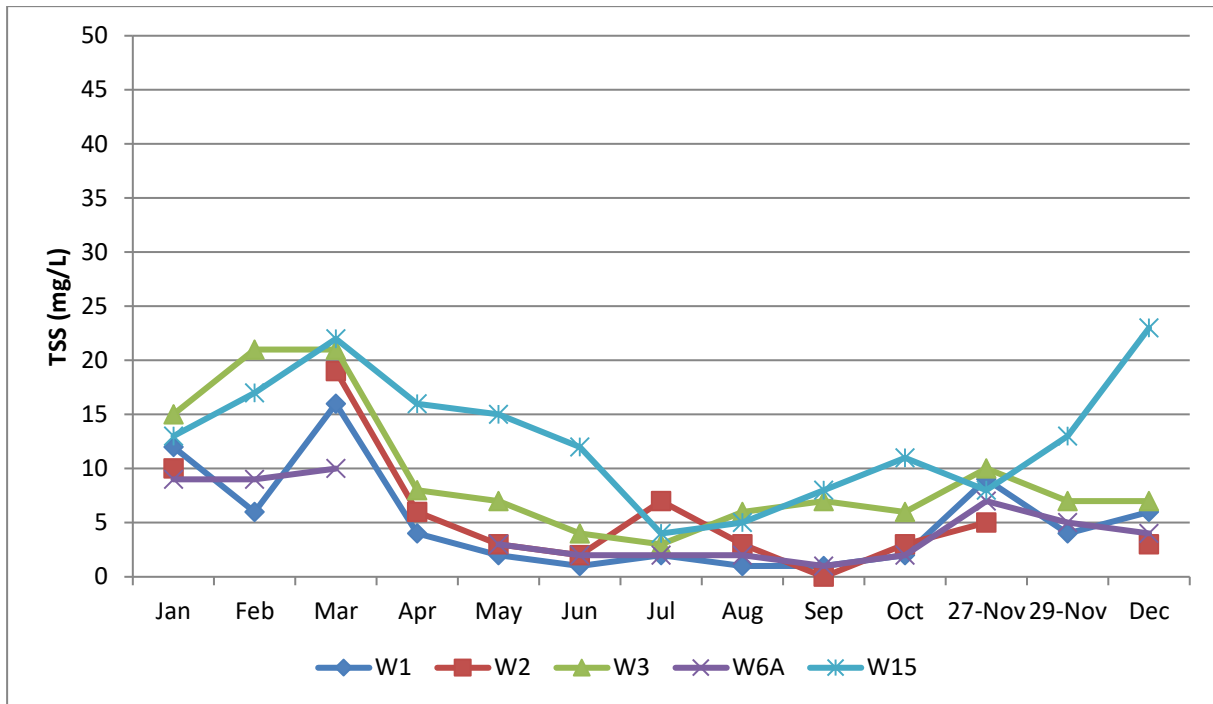
**Chart 13: Hunter River EC Levels 2018**



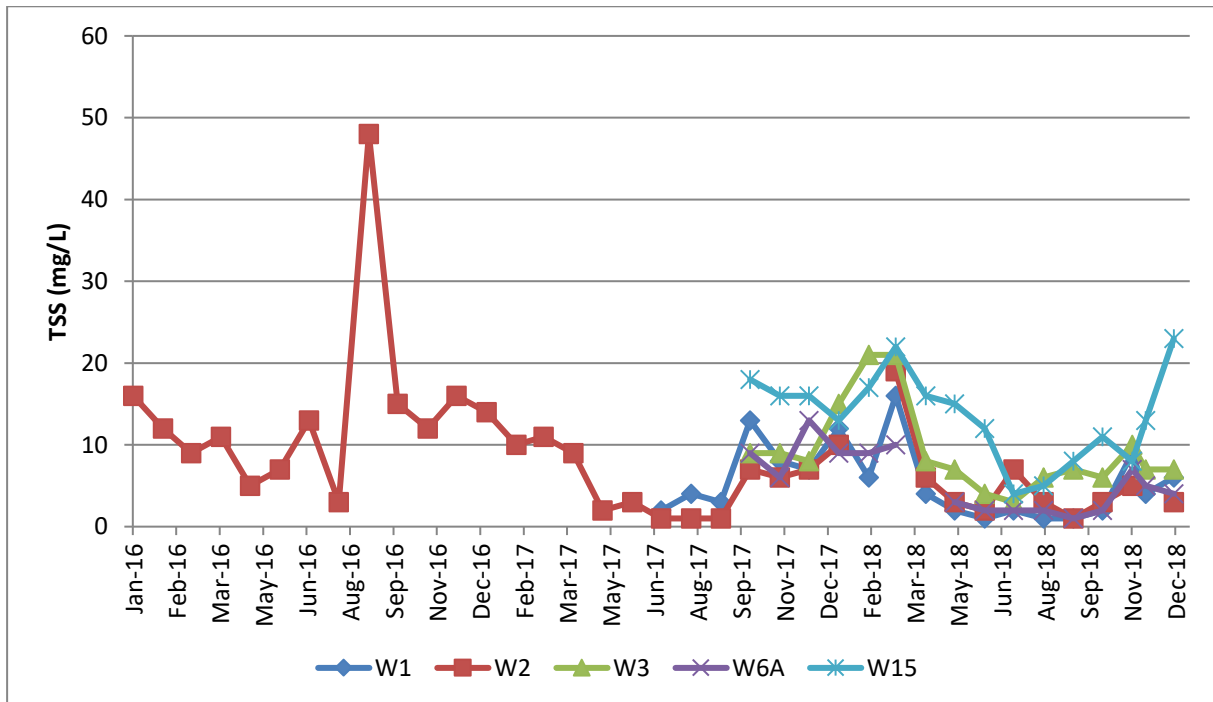
**Chart 14: Hunter River EC Levels 2016 – 2018**

TSS values for the 2018 monitoring period are shown in Chart 15. Additionally, a comparison between 2016, 2017 and 2018 TSS values is provided in Chart 16.



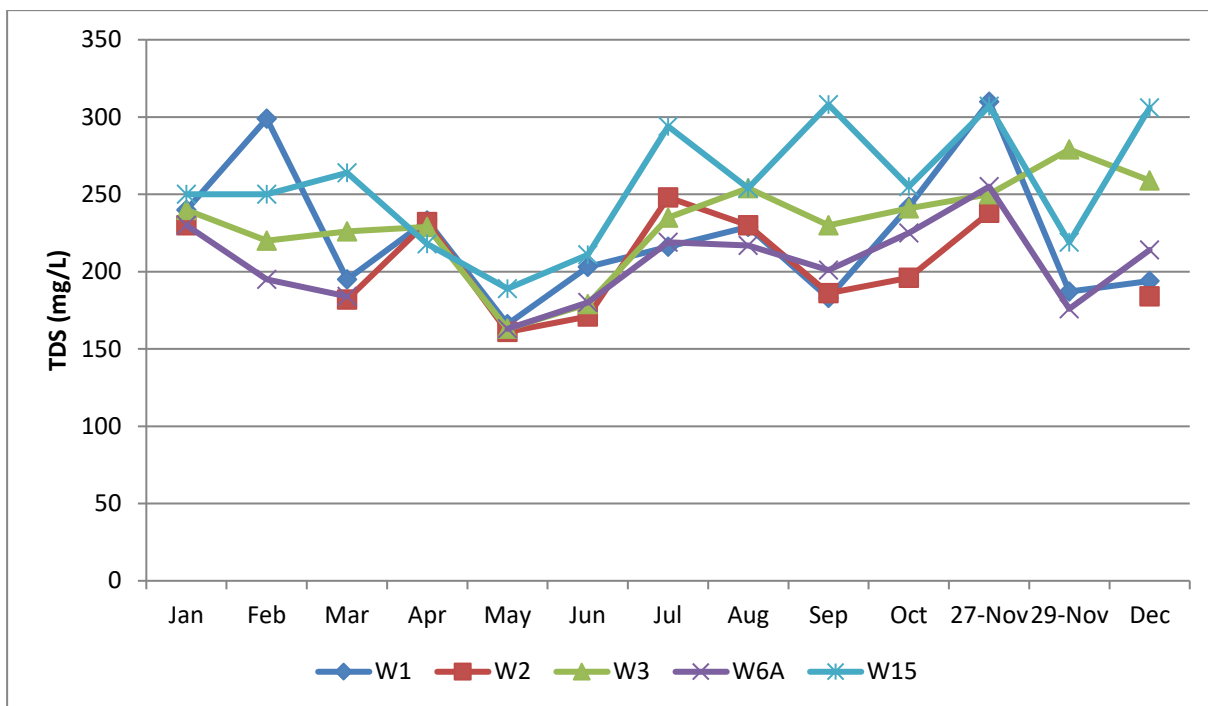


**Chart 15: Hunter River TSS Levels 2018**



**Chart 16: Hunter River TSS Levels 2016 - 2018**

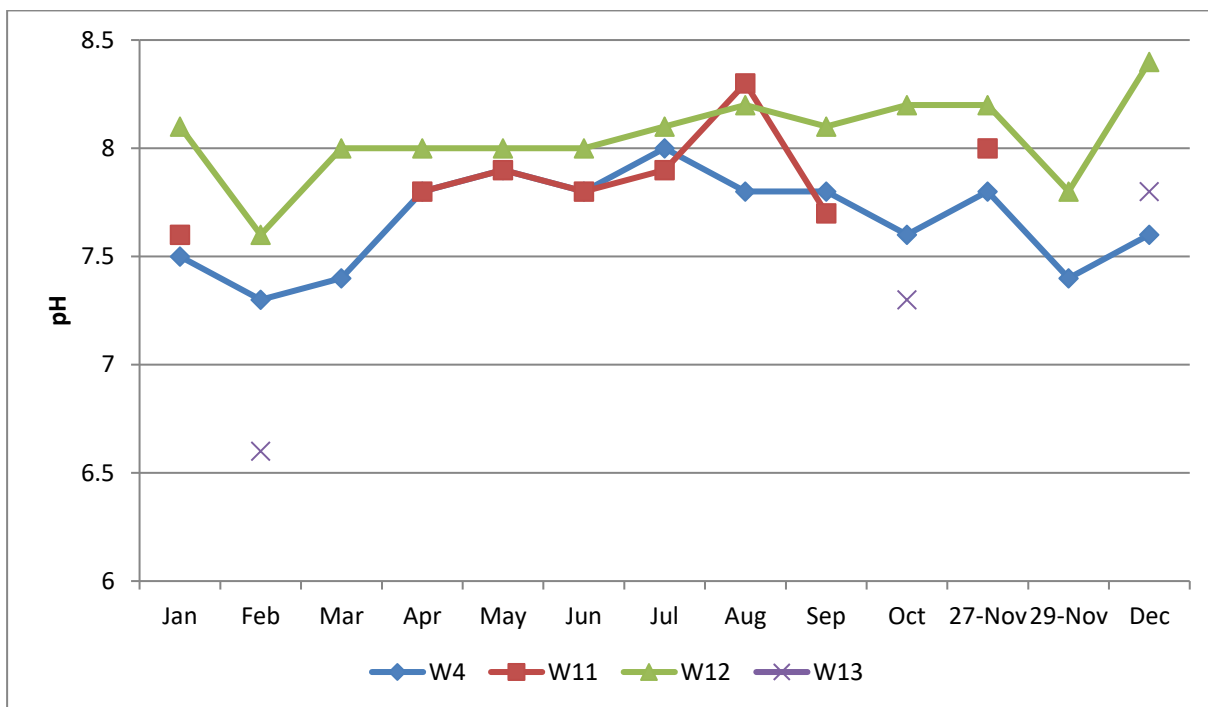
TDS values for the 2018 monitoring period are shown in Chart 17. As TDS monitoring commenced in 2018, there is insufficient data to undertake a long-term comparison of the values.



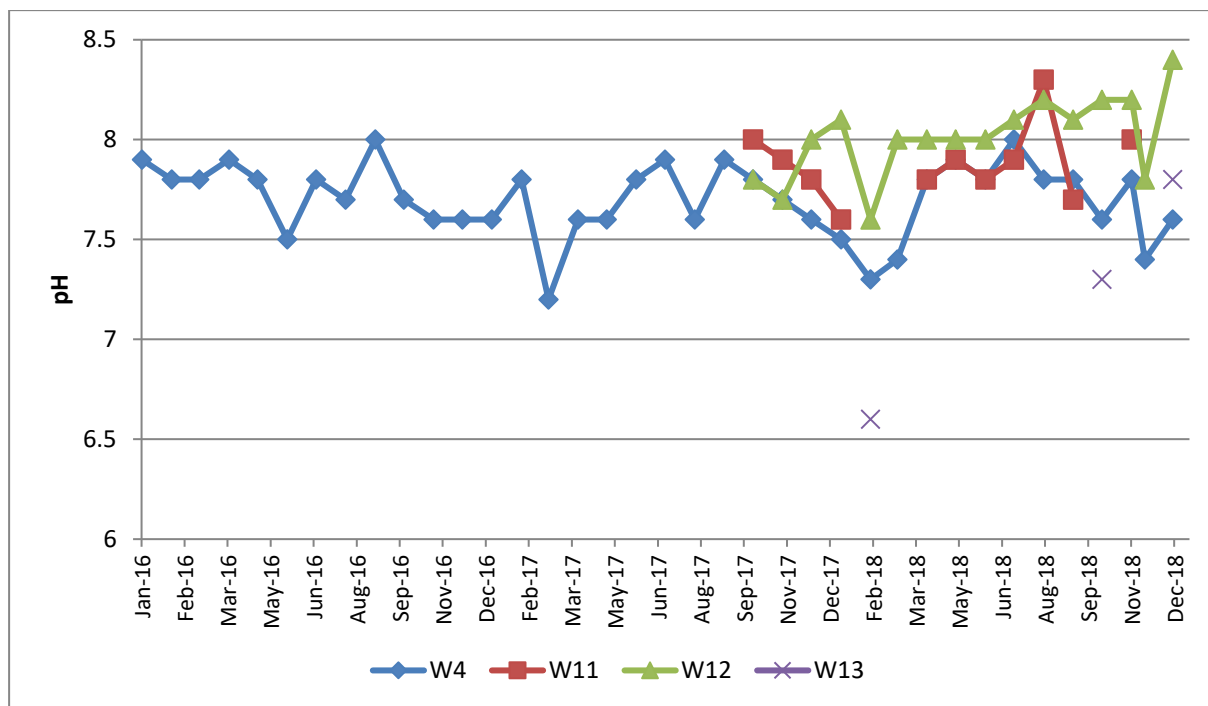
**Chart 17: Hunter River TDS Levels 2018**

*Sandy, Muscle and Rosebrook Creeks*

Monitored pH values for the Sandy, Muscle and Rosebrook Creek monitoring sites during the reporting period are shown in Chart 18. Additionally, a comparison between 2016, 2017 and 2018 pH values is provided in Chart 19.

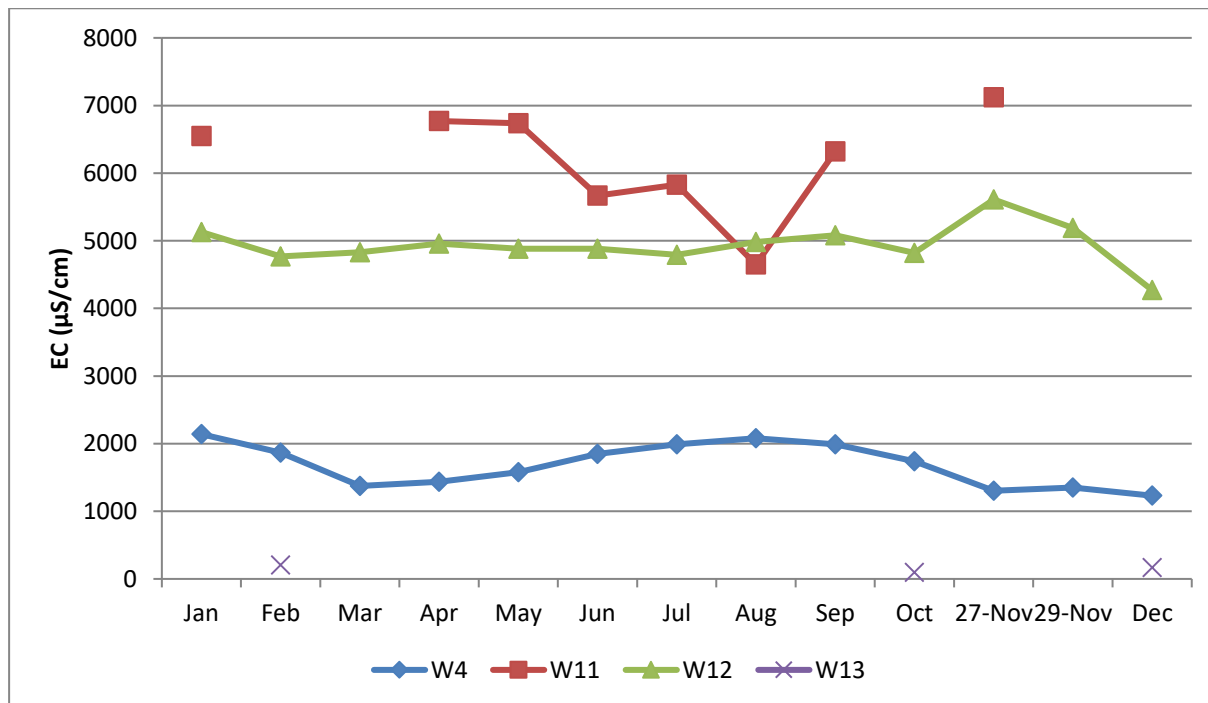


**Chart 18: Sandy, Muscle and Rosebrook Creeks pH Levels 2018**



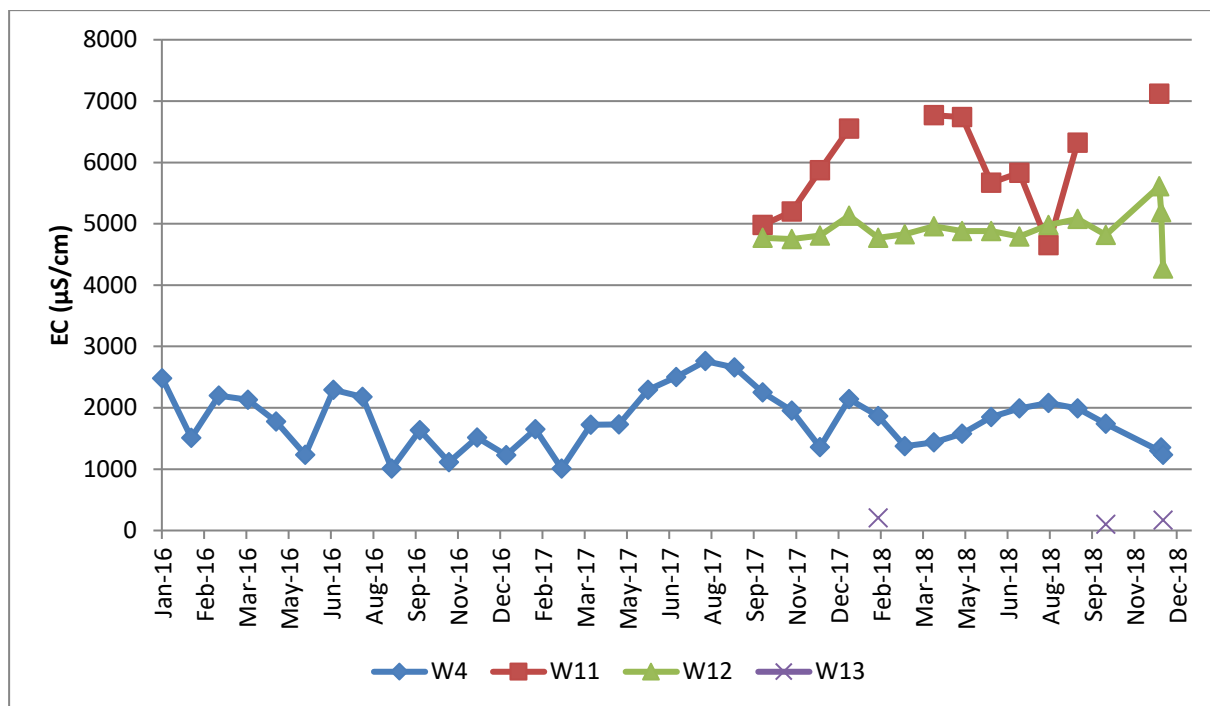
**Chart 19: Sandy, Muscle and Rosebrook Creeks pH Levels 2016 - 2018**

EC values for the 2018 monitoring period are shown in Chart 20. Additionally, a comparison between 2016, 2017 and 2018 EC values is provided in Chart 21.



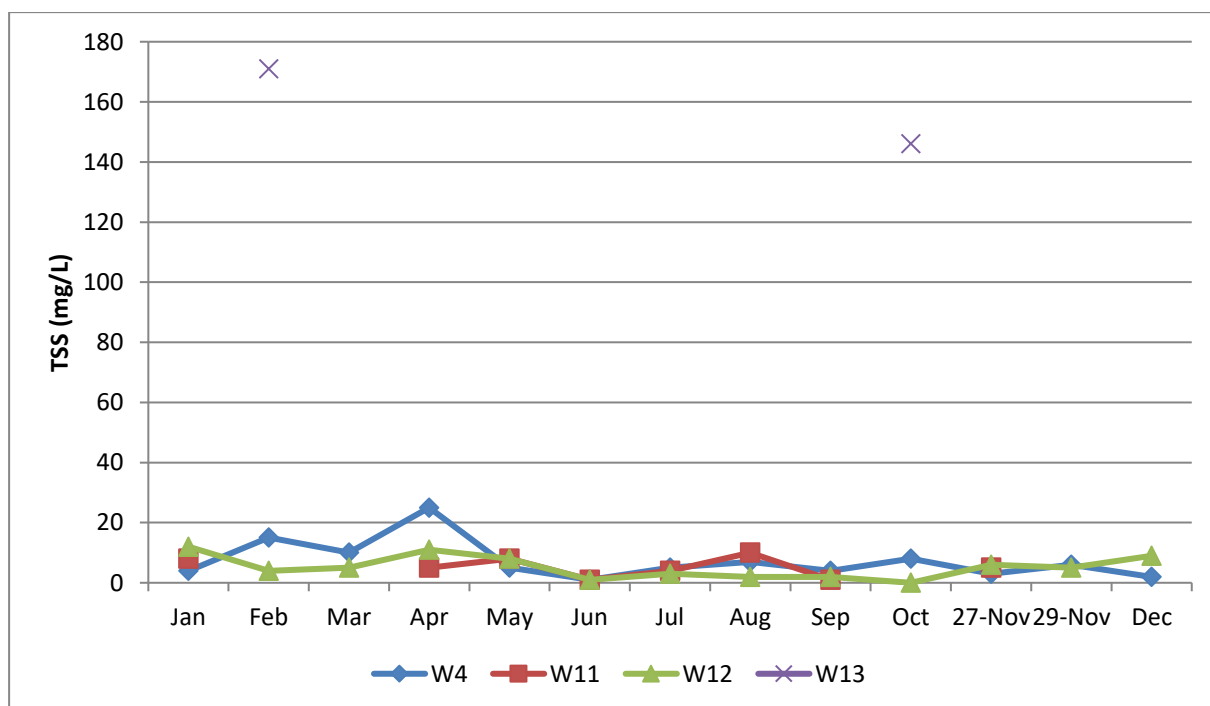
**Chart 20: Sandy, Muscle and Rosebrook Creeks EC Levels 2018**





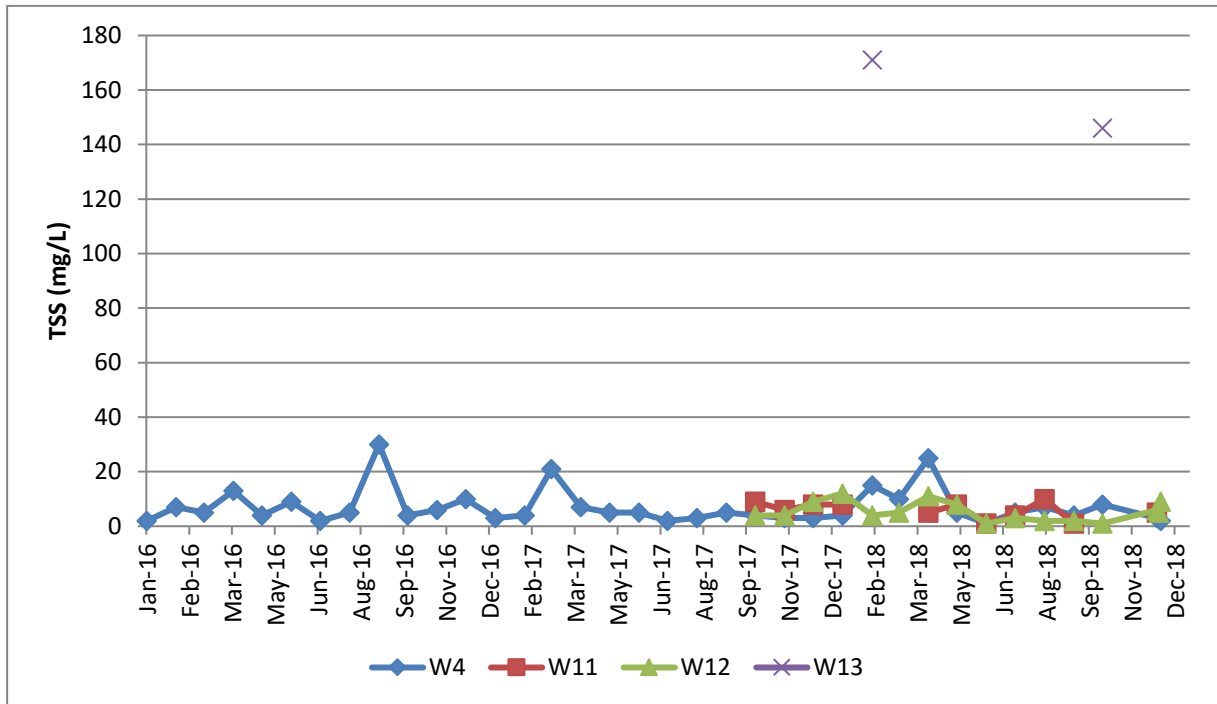
**Chart 21: Sandy, Muscle and Rosebrook Creeks EC Levels 2016 - 2018**

TSS values for the 2018 monitoring period are shown in Chart 22<sup>1</sup>. Additionally, a comparison between 2016, 2017 and 2018 TSS values is provided in Chart 23.



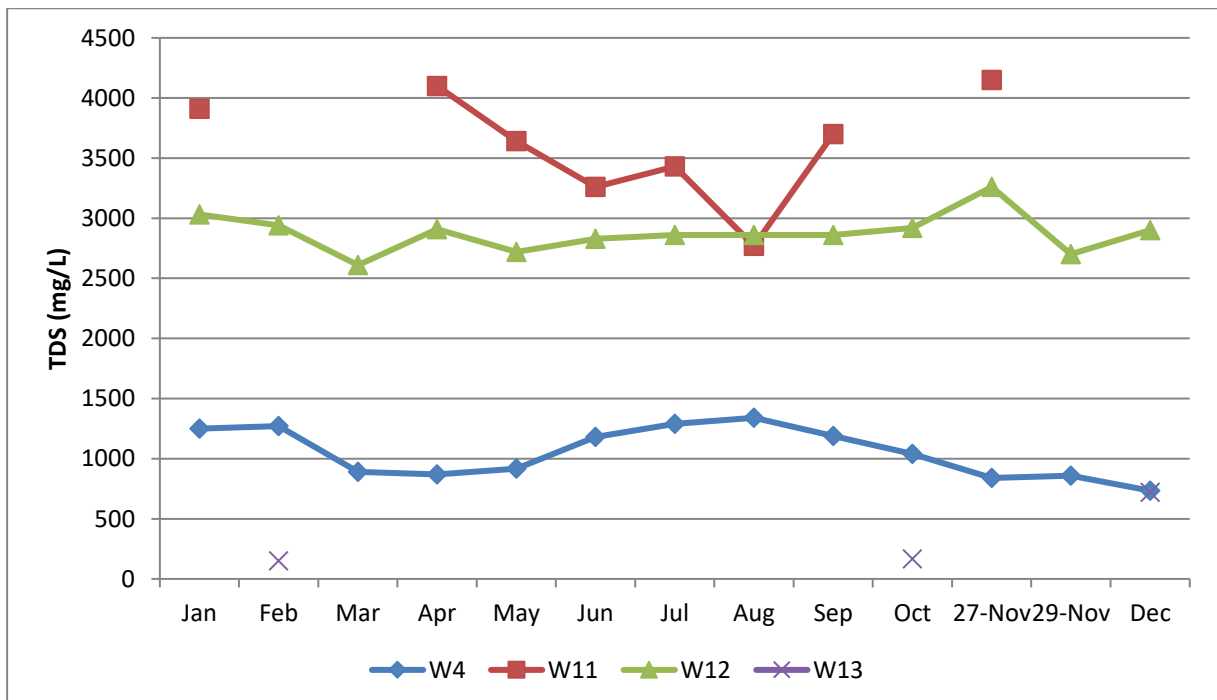
**Chart 22: Sandy, Muscle and Rosebrook Creeks TSS Levels 2018**

<sup>1</sup> An elevated TSS sample was obtained from W13 in December 2018, where a turbid sample was obtained from pooled water. This sample is not shown on Charts 22 and 23.



**Chart 23: Sandy, Muscle and Rosebrook Creeks TSS Levels 2016 - 2018**

Recorded TDS values for the 2018 monitoring period are shown in Chart 24.



**Chart 24: Sandy, Muscle and Rosebrook Creeks TDS Levels 2018**

### 6.1.3 Trends and Key Management Implications

#### **Surface Water Monitoring**

##### *Hunter River Sites (W1, W2, W3, W6A & W15)*

During the reporting period, pH levels at the Hunter River sites ranged from 7.6 to 8.3. Sites W2 and W6A stayed within their relevant pH trigger levels during the reporting period. Only site W2 has been consistently monitored for water quality since 2015. A comparison with 2016 and 2017 pH levels shows that pH levels have stayed consistently between 7.4 and 8.4 to date.

EC monitoring results for site W2 remained relatively consistent, with the exception of one elevated reading above the EC trigger levels in September. EC values at W2 returned to values below the trigger levels in subsequent monitoring rounds. EC at sites W3, W6A and W15 were stable and stayed within relevant trigger levels.

TSS levels for all Hunter River sites were consistently low over the reporting period and stayed within all relevant trigger levels except for a slight exceedance recorded at all sites in March 2018 (including upstream of MPO). TDS levels for all Hunter River sites were generally consistent throughout the reporting period, fluctuating between 150 mg/L and 300 mg/L.

##### *Sandy, Muscle and Rosebrook Creek Sites (W4, W11, W12, W13 & W14)*

Monitored pH values during the reporting period at the Sandy, Muscle and Rosebrook Creek sites ranged from 6.6 to 8.4. Only site W4 has been consistently measured for water quality since 2016. Monitoring since 2016 shows generally consistent values of pH for site W4.

EC monitoring results remained consistent at site W4, W11 and W12. Since 2016, EC at site W4 has consistently fluctuated between approximately 1,000 and 3,000  $\mu\text{S}/\text{cm}$ . Site W13 was dry most of the reporting period, resulting in a limited number of samples collected. Its monitored EC levels were significantly lower than other sites within Sandy, Muscle and Rosebrook Creek sites, ranging between roughly 100 to 200  $\mu\text{S}/\text{cm}$ .

TSS values were consistent at sites W4, W11 and W12 during the reporting period, with the exception of elevated measurement in site W4 during April 2018 (upstream of the MPO). A sample with high TSS was obtained from site W13 in December 2018, however the samples were taken from a shallow and turbid pool. Therefore, it is reasonable to assume that the high TSS values observed in site W13 was not due to MPO activities.

TDS values generally stayed consistent throughout the reporting period. The values recorded within site W13, however, were significantly lower than other monitored sites within the area.

The 2016 – 2018 trends for pH and TSS for site W4 were generally consistent with observations made in the EIS (ERM Mitchell McCotter, 1997). EC and TDS levels at site W4 have increased since recordings made in the EIS. This site is located on Muscle Creek within Muswellbrook (upstream of the MPO and therefore not due to MPO activities), which commonly has variable EC and TDS levels. This site has naturally occurring salts in surrounding soils and rocks, and data from previous annual reviews indicates that large fluctuations at this site are not unusual (Coal & Allied, 2016; MACH Energy, 2017b; MACH Energy, 2018b).

### **Stream Health Monitoring**

The Spring 2018 Stream Health Monitoring Report was prepared following the November 2018 monitoring round. The findings of the report were as follows:

- Aquatic habitat within the study area was generally good condition, as per previous surveys, although clearing, bank erosion and weed infestation was evident in the riparian zone.
- Sites within Dart Brook, Muscle Creek and Sandy Creek showed substantial hydrological disturbance, and weed infestation of riparian zone. Water quality data, particularly elevated salinity, reflects the condition of their catchments, which have been degraded by historical land use.
- No aquatic species of conservation significance were recorded at the monitoring sites.
- Results from the AusRivAS analyses indicate that macroinvertebrate assemblages at all of the sites sampled were dominated by pollution tolerant taxa.
- Band levels measured at control sites had declined.
- The aquatic macroinvertebrate fauna in the Hunter River and its tributaries appears to have experienced some degree of environmental stress prior to, and hence independent to, construction and operation of the MPO.

The stream health trigger levels established within the SWMP were exceeded on each of the three sampling occasions in spring 2017, and spring and autumn 2018. These consecutive exceedances trigger the stream health investigation protocol in accordance with the SGWRP. However, as stated in the Spring 2018 Stream Health Monitoring Report prepared by Bio-Analysis Pty Ltd, the investigation is not considered warranted as:

- the trigger levels developed within the SWMP are based on historical data presented in Hose and Turak (2004), which were collected on one sampling occasion at the sites;
- the MPO has been a nil discharge site in accordance with EPL 20850 throughout the monitoring period;
- external influences including rural and urban run-off, flow regulations and mining are likely to have impacted aquatic biota within the monitoring sites since the baseline survey was carried out; and
- seasonal variation of the structure of assemblages of macroinvertebrates (Stark and Phillips, 2009).

MACH Energy will continue to monitor stream health during autumn and spring in future monitoring periods. As recommended in the Spring 2018 Stream Health Monitoring Report, the corresponding data from these monitoring rounds will be used to refine the trigger levels for the existing stream health monitoring sites.

## **6.2 GROUNDWATER**

### **6.2.1 Approval Criteria and Management Plan Requirements**

Groundwater monitoring is undertaken at a network of bores which are broadly distributed across the MPO area (Figure 7) and which cover all major hydrogeological units.

Groundwater monitoring includes:

- manually monitoring water levels on a quarterly basis;
- quarterly sampling of pH and EC;

- annual sampling of a suite of laboratory parameters; and
- regular groundwater inflows as recorded from flow meters or recording of pumping times and rates.

Groundwater trigger levels have been developed for the MPO based on the NSW Aquifer Interference Policy and the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000). These trigger levels include standing water level (SWL) triggers for the eastern groundwater sites, and EC and pH for all sites, as presented in the WMP.

Beneficial use categories have been assigned to each monitoring bore based on its 80<sup>th</sup> percentile baseline EC and the EC ranges specified in the WMP. Should a measured EC value exceed the beneficial use quality range EC for a particular bore at three successive monitoring rounds (as defined in the WMP), the groundwater investigation protocol, as detailed in the SGWRP, would be initiated.

At any bore where a monitored pH value is outside the applicable baseline range at three successive monitoring rounds, the groundwater investigation protocol would be initiated.

Initial review of the groundwater monitoring undertaken earlier in the reporting period determined that several bores have been consistently exceeding the trigger values, for both groundwater level and quality triggers. This prompted a need to review and revise the current Groundwater Monitoring Triggers to meet regulatory requirements and to better reflect direct impact from the MPO. The DoI – L&W were notified of the review, and HydroSimulations (HS) were engaged to perform this review on 26 September 2018.

As a result of the review, site names of the nine bores were updated. These changes are summarised in Table 19 below.

**Table 19**  
**Updated Site Names for MPO Groundwater Bores**

Previous Site Name	Updated Site Name
3500C500 (L)	3500C500L
3500C500 (S)	3500C500S
7000D000 (L)	7000D000L
7000D000 (U)	7000D000U
MPBH3	MPBH3b
6000C000 (L)	6000C000L
6000C000 (S)	6000C000S
3500B500 (L)	3500B500L
3500B500 (S)	3500B500S

### 6.2.2 Performance During the Reporting Period

Monitoring bores are split into three categories:

- Groundwater Central Bores: representative of the hard rock aquifer (3500B500L&S, 3500C500L&S, 4500F000, 5500D000, 5000D000S, 6000C000L&S, 6500F500L, M&U, 7000D000L&U, 7500F000, 6500F625 and Melody).
- Groundwater Eastern Bores: representative of the alluvial aquifer (MPBH1, MPBH2 & MPBH3b).

- Groundwater Western Bores: representative of the hard rock aquifer in, or in the vicinity of, the Fine Rejects Dam (WRA1L, WRA1U, WRA2L, WRA2U, WRA3L, WRA3U, WRA5L, WRA5U, WRA6L and WRA6U).

Bores 3500B500L&S, 6000C000L&S and WRA2L&U were decommissioned prior to the reporting period. Notwithstanding, the data collected from these bores during previous years has been included to assist with trend analysis.

The results of monitoring SWL (measured in metres below ground level [mbgl], EC and pH from 2014 to 2018 for the groundwater central bores are shown in Charts 25, 26 and 27 respectively.

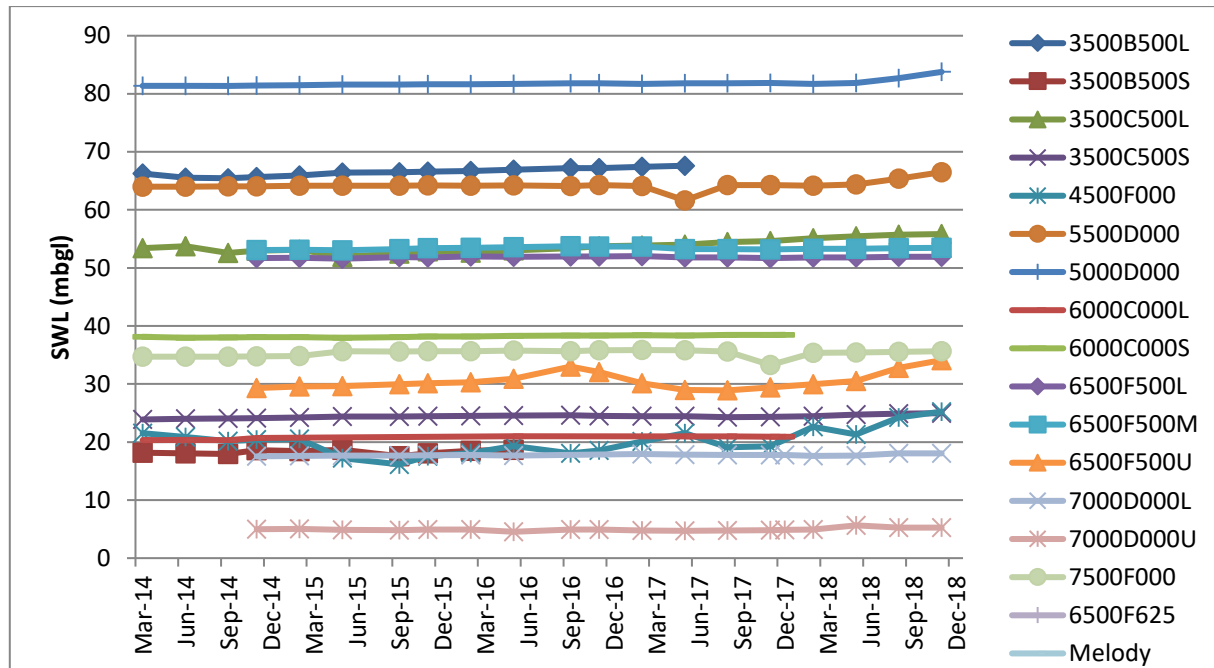


Chart 25: Groundwater Central Bores SWL 2014 – 2018



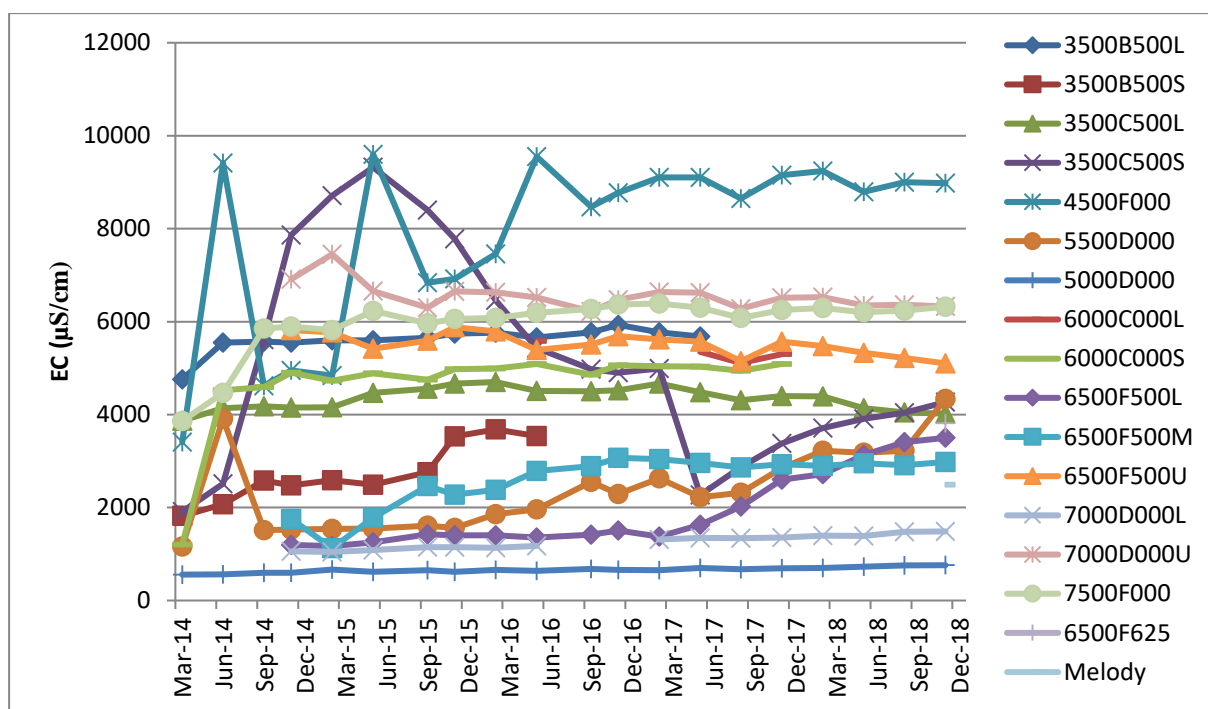


Chart 26: Groundwater Central Bores EC 2014 – 2018

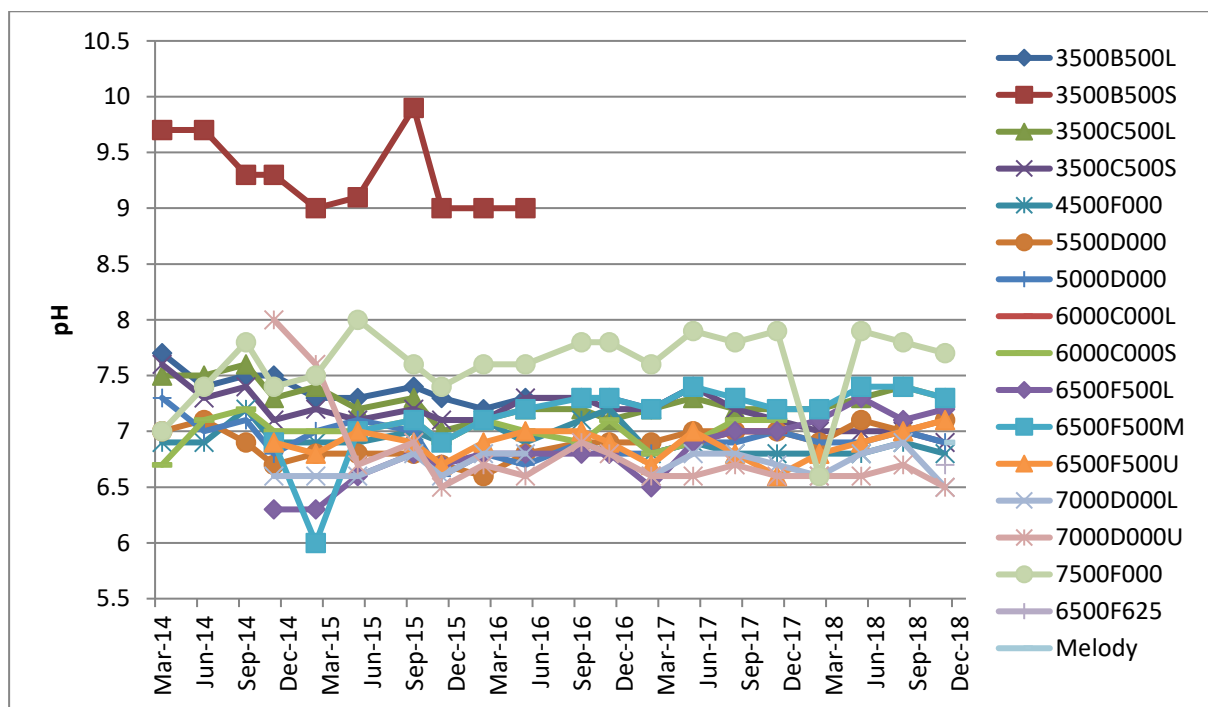


Chart 27: Groundwater Central Bores pH 2014 - 2018

The results of monitoring SWL, EC and pH from 2014 to 2018 for the groundwater eastern bores are shown in Charts 28, 29 and 30 respectively.

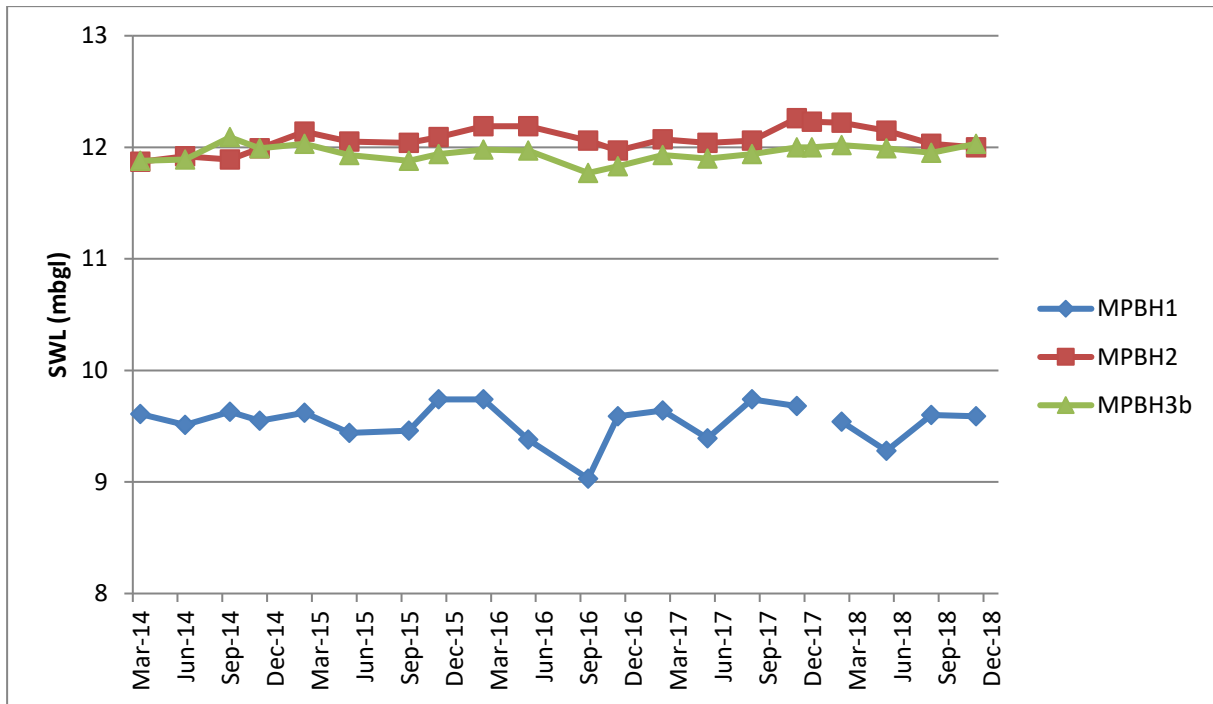


Chart 28: Groundwater Eastern Bores SWL 2014 - 2018

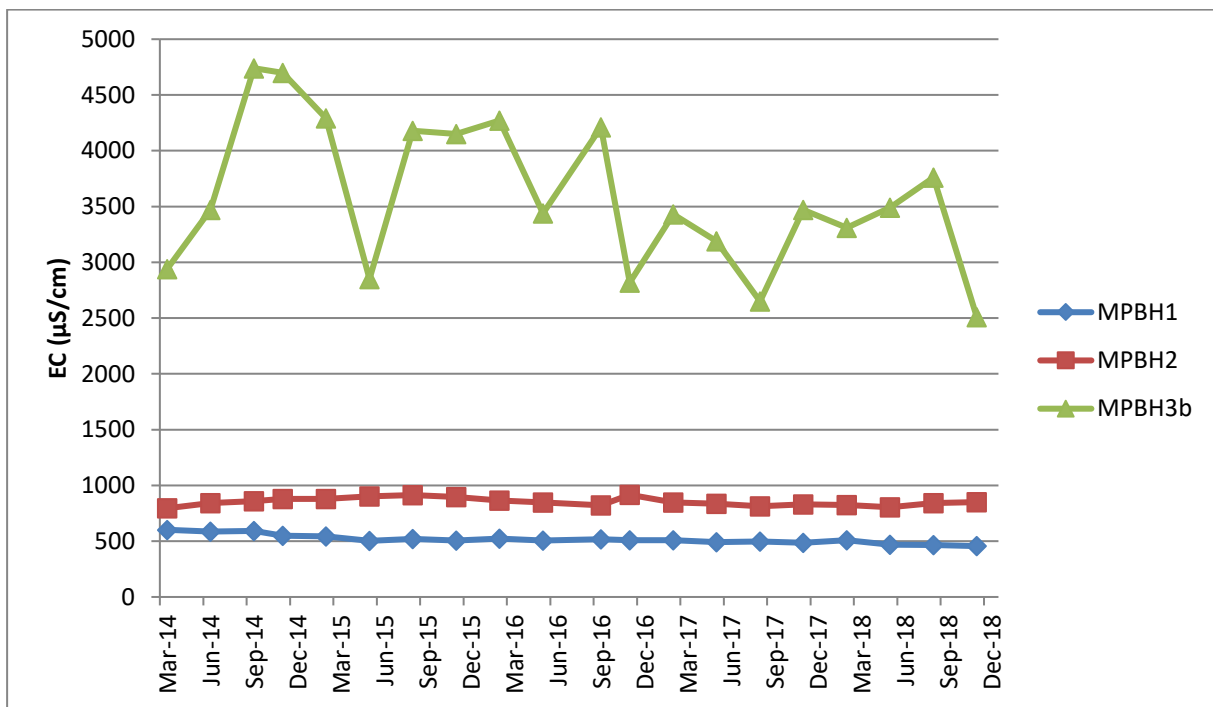
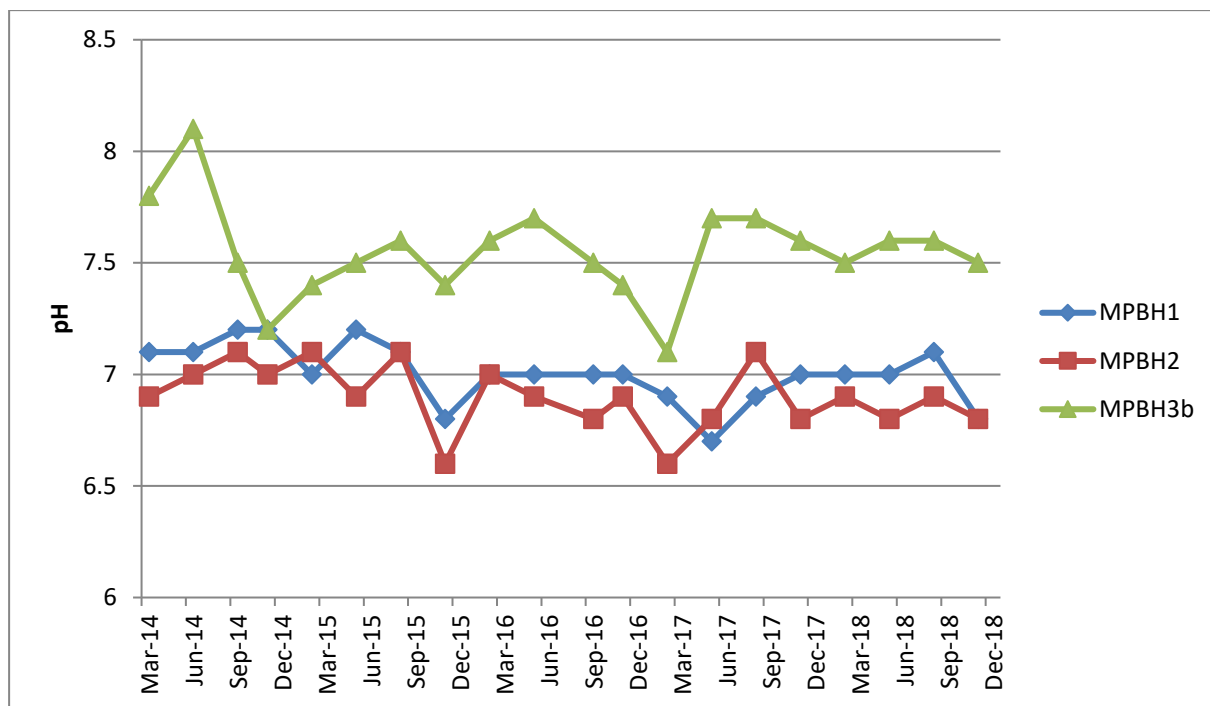
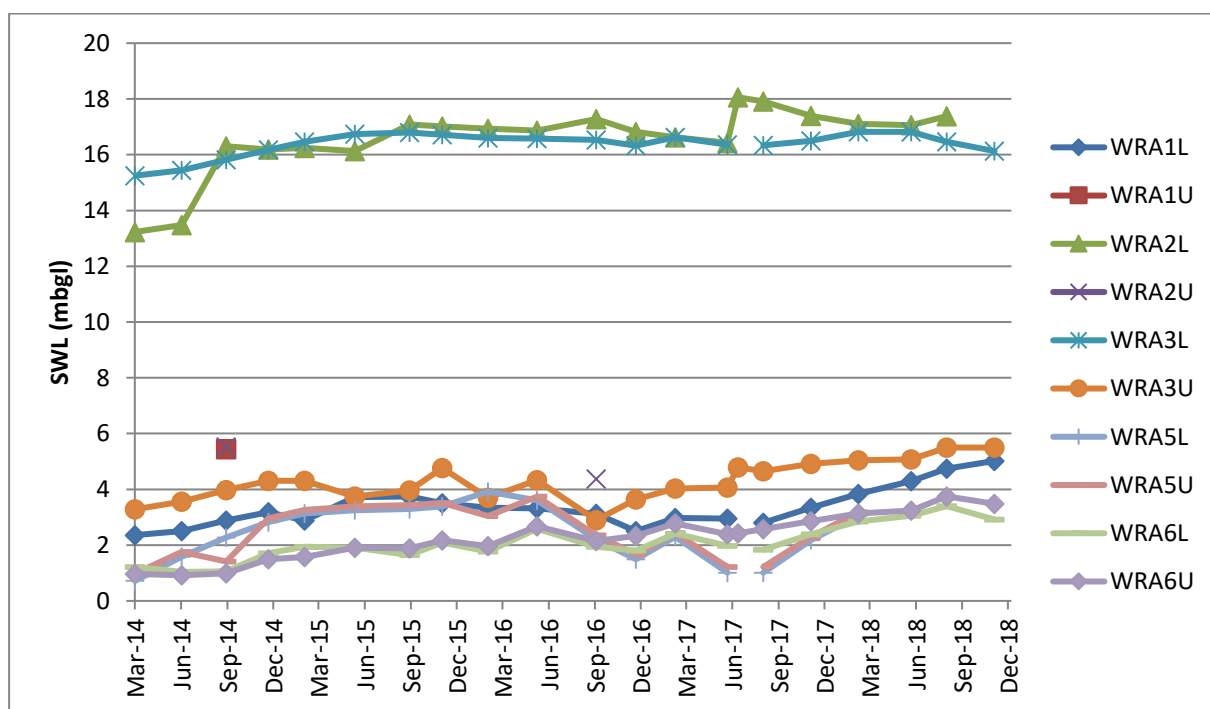


Chart 29: Groundwater Eastern Bores EC 2014 - 2018



**Chart 30: Groundwater Eastern Bores pH 2014 - 2018**

The results of monitoring SWL, EC and pH from 2014 to 2018 for the groundwater western bores are shown in Charts 31, 32 and 33 respectively.



**Chart 31: Groundwater Western Bores SWL 2014 - 2018**

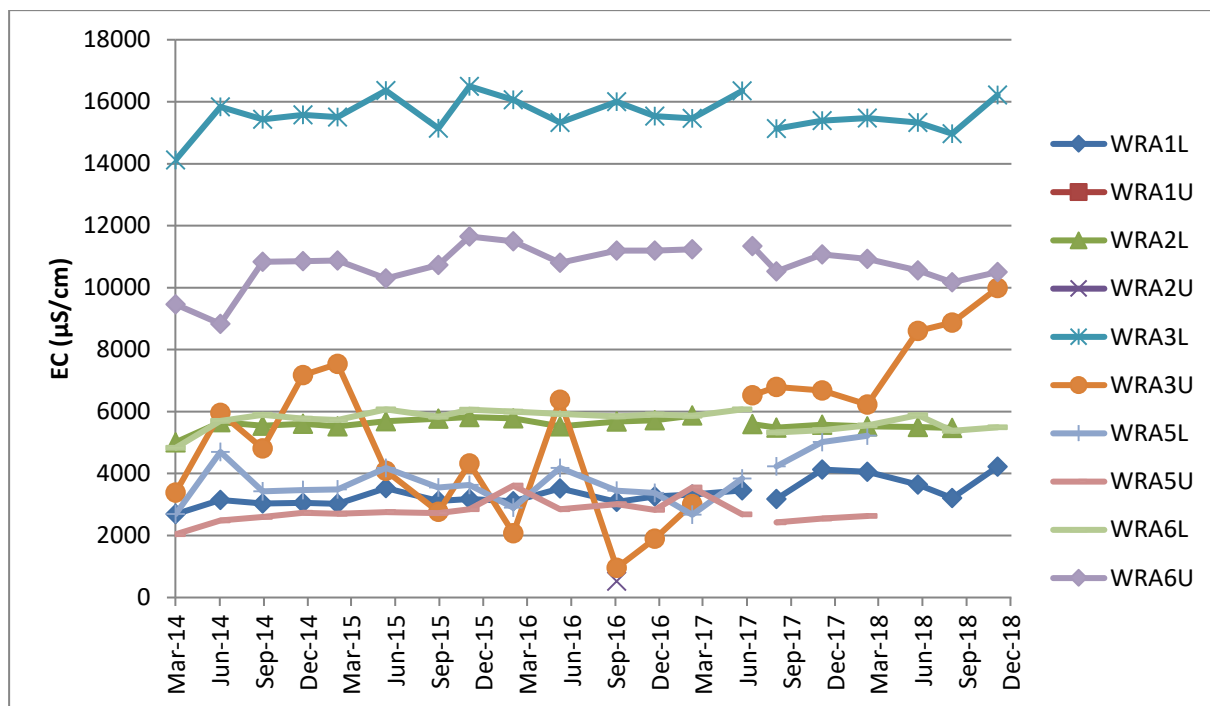


Chart 32: Groundwater Western Bores EC 2014 - 2018

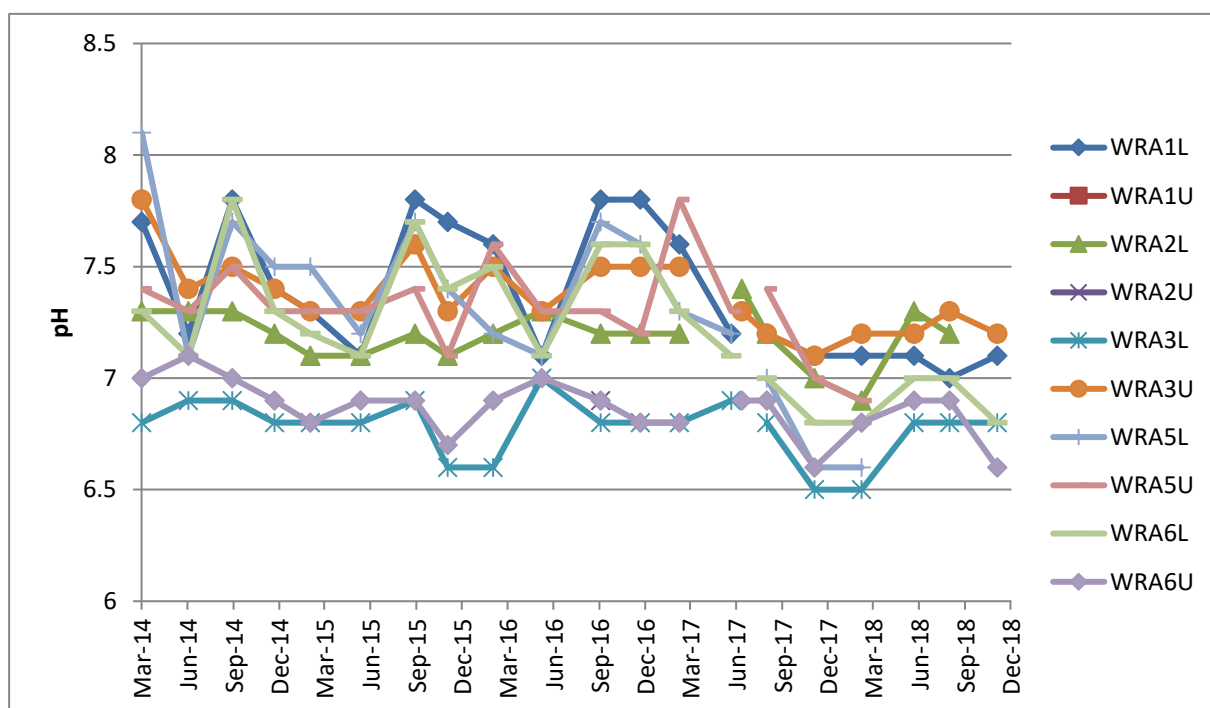


Chart 33: Groundwater Western Bores pH 2014 – 2018

During the reporting period, sites 3500B500L and 3500B500S continued to be blocked on all monitoring rounds. Monitoring was also not undertaken at 6000C000L due to insufficient water levels and at 6000C000S due to disturbance. Sites 6500F625 and Melody were newly added to the monitoring program in November 2018.

Western groundwater monitoring sites WRA1U and WRA2U were too dry to sample during any monitoring rounds in the reporting period. Additionally, sites WRA5L and WRA5U were both decommissioned before May 2018.

### 6.2.3 Trends and Key Management Implications

Monitored SWLs have stayed generally consistent from 2014 – 2018. SWL monitoring results remained consistent at all sites for the central and western bores. Although site WRA2L experienced a decline in water level in early 2014, the SWL for the site has since remained relatively stable. Since September 2017, groundwater levels recorded in WRA1L, WRA3U, WRA6L and WRA6U have experienced a slight upward trend.

Consistent with trends observed in the 2016 and 2017 Annual Reviews (MACH Energy, 2017b; MACH Energy, 2018b), the majority of EC values for the central bores have trended slightly upwards (Chart 26). This is with the exception of site 3500C500S, which peaked in May 2015 and has generally declined for the next two years. Site 4500F000, which has fluctuated regularly in previous years, generally stabilised during the reporting period. Monitored EC at site 5500D000 also rose during the reporting period.

Monitored EC values remained within historic ranges for the eastern bore sites.

EC values remained relatively stable throughout the reporting period for the western bores (Chart 32). Continuing from trends observed in the 2015, 2016 and 2017 Annual Reviews (Coal & Allied, 2016; MACH Energy, 2017b; MACH Energy, 2018), site WRA3U showed the most variation, increasing from measurements in early 2018. Long term trends at the western bores indicate that yearly fluctuations in EC are most common at the western bores compared to the eastern and central bores (Coal & Allied, 2016; MACH Energy, 2017b; MACH Energy, 2018b). Sites WRA6U and WRA3L showed higher EC levels than other western bores during the reporting period, which is consistent with recent years.

Consistent with trends observed in the 2015, 2016 and 2017 Annual Reviews (Coal & Allied, 2016; MACH Energy, 2017b; MACH Energy, 2018b), the pH values for the majority of sites have generally remained within the pH range of 6.5 to 8.0 during the reporting period.

As described in Section 6.2.1, trigger levels have been developed as part of the approved WMP for EC and pH for all groundwater bores. As defined in Appendix 5 of the WMP (i.e. the SGWRP), monitored values outside the range of trigger levels for three consecutive monitoring rounds initiate the groundwater investigation protocol.

MPO complied with all SWL criteria presented in the WMP during the reporting period. A number of bores had samples which were outside the trigger levels for pH for three consecutive monitoring rounds during the reporting period (3500C500S, 5500D000, 6500F500L, 6500F500M, 7500F000, WRA1L and WRA6L) as well as four bores which were outside the trigger levels for EC for three consecutive rounds (4500F000, 5500D000, 6500F500L and 6500F500M).

In accordance with the SGWRP, these consecutive exceedances triggered the Groundwater Quality Response Protocol. The outcomes of the protocol were a recommendation by HydroSimulations for the trigger levels to be refined to more accurately reflect variation in water quality due to outside influences. The proposed trigger values are outlined in Table 20 and 21 below.

**Table 20**  
**Proposed EC Trigger Values**

Bore	Previous EC Trigger Value	Previous Beneficial Use Category	New EC trigger value (µS/cm)	New Beneficial Use Category
6500F500M	2350	Marginal Potable	7800	Irrigation
6500F500L	2350	Marginal Potable	7800	Irrigation
4500F500	7800	Irrigation	22000	Saline
5500D000	2350	Marginal Potable	7800	Irrigation

**Table 21**  
**Proposed pH Trigger Values**

Bore	Previous Trigger Range	New Trigger Range
WRA1L	7.3 – 7.7	6 – 8.5
WRA2L	7.0 – 7.3	6 – 8.5
WRA3L	6.6 – 6.9	6 – 8.5
WRA5U	7.1 – 7.4	6 – 8.5
WRA5L	7.1 – 7.8	6 – 8.5
WRA6U	6.8 – 7.0	6 – 8.5
WRA6L	7.2 – 7.7	6 – 8.5
MPBH3	6.6 – 6.9	6 – 8.5
3500C500L	7.3 – 7.5	6 – 8.5
3500C500S	7.1 – 7.4	6 – 8.5
5000D000	6.6 – 7.0	6 – 8.5
5500D000	6.3 – 6.8	6 – 8.5
6000C000S	6.4 – 7.0	6 – 8.5
6500F500L	6.5 – 6.8	6 – 8.5
6500F500M	6.9 – 7.2	6 – 8.5
6500F500U	6.8 – 7.0	6 – 8.5
7500F000	6.7 – 7.2	6 – 8.5

The EC trigger values are proposed to be updated as the changes occurred during the baseline period (i.e. exclusive of potential effects from the MPO).

The proposed trigger range for pH encompass the neutral range of pH and complies with the ANZECC/ARMACNZ (2000) guidelines on Fresh and Marine Water Quality. Furthermore, the Australian Drinking Water Guidelines state that potable water should fall within a pH range of 6.5 – 8.5 (NHMRC, 2011; NRMCC, 2011). Therefore, movement between this range is believed to not have detrimental effects on water quality.

The proposed EC and pH trigger levels are being included in the WMP as part of current update and once applied will be reported against in future Annual Reviews.



#### 6.4 HUNTER RIVER SALINITY TRADING SCHEME DISCHARGES

MACH Energy has 15 credits under the Hunter River Salinity Trading Scheme (HRSTS), however, no discharges to the Hunter River occurred during the reporting period.

#### 6.5 WATER TAKE

A total of 681.7 ML of water was taken from Hunter Regulated River Water Source for use at the MPO during the water reporting period (1 July 2017 – 30 June 2018) (Table 22).

**Table 22**  
**MPO Water Take**

Water Sharing Plan	Water Licence Number	Entitlement	Total Pumping (ML)
Hunter Regulated River Water Source	1230	8	682
	1259	33	
	1227	99	
	1258	5	
	992	75	
	7808	36	
	702	267	
	1260	5	
	993	265	
	1308	15	
	604	183	
	605	8	
	677	24	
	1338	18	
	662	9	
	663	16	
	10775	243	
	41438	420	
	638	3	
	639	134	
	879	224	
	880	124	
	1113	366	
	973	3	
	974	210	
	975	8	
	988	156	
	989	8	
	1307	38	
	1229	480	

Note: ML=megalitres

During the Annual Review reporting period (i.e. 1 January 2018 to 31 December 2018), a total of 803 ML was used for dust suppression and construction.

## 6.6 SITE WATER BALANCE

The Site Water Balance for the reporting period is provided in Table 23 below.

**Table 23**  
**MPO Annual Water Balance**

Water Sources	Volume (ML/yr)
Surface Water Runoff	1,406
Groundwater	17
Fine Rejects Bleed Water	0
Hunter River Pumping (via WALs)	682
Water Usage	Volume (ML/yr)
CHPP Demand	0
Dust Suppression (Haul Road and Stockpiles)	1028
Vehicle Wash Demand	37
Water Loss	Volume (ML/yr)
Discharge to Hunter River (via HRSTS)	0
Evaporation	254
Non Sediment Dam Spillage	0
Sediment Dam Spillage	0

Note: ML/yr = Megaliters per year.

Recorded site water balance was generally consistent with MOD3 EA predictions.

## 7 REHABILITATION

Proposed rehabilitation activities for the MPO are defined in the approved MOP, which has been developed to meet the requirements for a RMP (Condition 56, Schedule 3 of Development Consent DA 92/97).

Details of the activities completed during the reporting period are outlined in Section 3.1. At the end of the reporting period, the total mine disturbance area was 618 hectares (ha), which was 457 ha less than the forecast disturbance area. The total rehabilitation area was 83 ha, which was 73 ha more than the forecast rehabilitation area. Table 24 presents these values, along with forecast for the 2019.

**Table 24**  
**Rehabilitation Status**

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2017	2018	2019
Total Mine Footprint <sup>1</sup>	27 ha	701 ha	1020 ha
Total Active Disturbance <sup>2</sup>	27 ha	618 ha	895 ha
Land being prepared for Rehabilitation <sup>3</sup>	0	3 ha <sup>3</sup>	40 ha
Land under active rehabilitation <sup>4</sup>	0	80 ha <sup>3</sup>	85 ha
Completed rehabilitation <sup>5</sup>	0	0	0

<sup>1</sup> Total mine footprint includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in DRG MOP/RMP Guidelines).

<sup>2</sup> Total active disturbance includes all areas ultimately requiring rehabilitation such as: on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).

<sup>3</sup> 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 (as defined in DRG MOP/RMP Guidelines).

<sup>4</sup> Land under active rehabilitation - includes areas under rehabilitation and being managed to achieve relinquishment - includes the following rehabilitation phases as described in the DRG MOP/RMP Guidelines – “ecosystem and land use establishment” (area seeded OR surface developed in accordance with final land use) and “ecosystem and land use sustainability” (revegetation assessed as showing signs of trending towards relinquishment OR infrastructure development).

<sup>5</sup> Completed rehabilitation – requires formal sign-off by DRG that the area has successfully met the rehabilitation land use objectives and completion criteria.

<sup>6</sup> Includes topsoil stockpiles that are managed in a rehabilitation state.

Rehabilitation of the Pit A Out of Pit Emplacement and the Wybong Road Visual Bund commenced in May 2018. Approximately 3.5 ha were rehabilitated (Plate 2), which included:

- topsoil spreading to a minimum depth of 100 mm;
- planting of approximately 1,000 trees per hectare; and
- hand seeding of cover crop (Japanese millet 5 kilograms per hectare [kg/Ha], Oats 3 kg/ha and Couch 1 kg/Ha).

Gypsum was also applied at a rate of 10 tonnes per hectare (t/ha) following topsoil spreading. Additionally, three habitat trees and two rockpiles were also installed during the reporting period.



**Plate 2: 2018 Pit A Out of Pit Emplacement Rehabilitation**

At the end of June 2018, an additional 2 ha within Pit A was rehabilitated, which involved installation of four habitat trees and four rockpiles. Topsoil spreading was also undertaken to a minimum depth of 100 mm and gypsum was applied at a rate of 10 t/ha.

Rehabilitation activities within construction areas were also undertaken, which included bulk and detail re-shaping of landforms, topsoiling, ripping / tining, harrowing, seeding and fertilising.

The rehabilitation status for the previous, current and following reporting periods are outlined in Table 24, consistent with the approved MOP. Figure 2 shows the extent of active disturbance area and rehabilitated area at the end of the reporting period, as well as the forecasted additional disturbance area proposed in 2019.

The final land use goals for the MPO outlined within the MOP are as following:

- successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes; and
- post-mining land use compatible with surrounding land uses.

The conceptual final landform across the MPO is an undulating, free draining landform with an optimum post-mining land capability that supports grassland and woodland. The MSC, the community and other stakeholders have indicated their preference for a landform that further integrates with the surrounding landscape.

Accordingly, MACH Energy is considering several options to improve the design of its final landforms so that they align more closely with the surrounding natural landforms. For example, work is being undertaken with regard to the design of the eastern edge of the Out of Pit Emplacement, as it will be more visible to the township of Muswellbrook than other parts of the landform.

Once the revised conceptual final landform is developed, it will be included in future revisions of the MOP.

During the reporting period, several former residential properties were demolished. All hazardous materials were removed and disposed offsite. No buildings were renovated in 2018.

## **7.1 EROSION AND SEDIMENT MANAGEMENT**

General erosion and sediment management measures undertaken in the reporting period included:

- installation and management of sediment fencing and sediment dams;
- construction of the following erosion and sediment control infrastructure:
  - diversion drains and bunds;
  - water dams; and
  - two sediment basins on the western side of the large fill at the rail loop;
- completion of the rail loop dam to capture dirty water runoff from the process at the train load out and overland conveyor;
- completion of all rail loop clean water diversion drains, which are confirmed to be reporting to their designed location; and
- regular inspections of the completed dams and erosion and sediment control structures.

## **7.2 LAND MANAGEMENT**

Landscape management included removal, erection and general maintenance of fence lines in the MPO.

A visual bund was constructed along sections of the MPO adjacent Wybong Road to minimise the visual amenity of the MPO. During the reporting period, extensive tree planting was undertaken along the bund to assist in shielding the site. Nonetheless, growth rates of the planted trees have been lower than the standard rate due to ongoing drought conditions in the area. General maintenance of the visual bund was also carried out throughout the reporting period.

Weed and pest control measures undertaken during the reporting period are outlined in Section 5.5.2. Topsoil management is discussed in Section 5.9.

## **7.3 BUSHFIRE MANAGEMENT**

The main objectives of bushfire management at the MPO are to minimise the risk of bushfires and to rapidly control any outbreaks that might occur. Control measures are in place to:

- minimise potential spreading of bushfires in and around the MPO;
- protect people, property and assets;
- protect areas of heritage value; and
- protect threatened fauna and/or flora.

The control measures implemented to prevent and manage bushfires focus on minimising the amount of fuel available at the MPO and its surrounding land. These measures include:

- slashing of vegetation along roads and internal tracks which are used as fire trails and assist in dividing the site into control zones;
- the use of livestock to reduce pasture-based fuel loads on land suitable for grazing; and
- maintaining a network of water supply points to assist the NSW Rural Fire Service with logistical support.

During the reporting period, a range of activities were undertaken in respect to fire preparation in accordance with the Bushfire Management Plan, including:

- maintenance of property, boundary and roadside firebreaks; and
- slashing of paddocks in the MPO boundary to control bushfire risk.

There were no major outbreaks of fire at the MPO during the reporting period.

#### **7.4 REHABILITATION MONITORING**

Various ecological works were undertaken at the MPO during the reporting period, including as part of the GDP process, and as part of flora surveys and assessments for the two recent modifications lodged with DPE (i.e. MOD 3 and MOD 4). Additional flora and fauna baseline surveys commenced in 2018 in support of a proposed State Significant Development (SSD) application. These works included mapping vegetation communities, searches for threatened flora species, communities and populations, and detailed floristic data collection at numerous survey plots.

With the final landform design currently undergoing review and improvement (the subject of MOD 3 and planned submission of an SSD application). MACH Energy is not yet in a position to select detailed analogue sites. Notwithstanding, in undertaking the ecological works referenced above, MACH Energy is building an extensive knowledge of the characteristics of the MPO site and surrounding area. As the design of the more accurate final landform is refined, MACH Energy will have a more accurate understanding of the type of analogue sites required to be monitored (i.e. in terms of flora species mix, vegetation types, landforms etc.).

The MPO adopts a systems-based approach to rehabilitation monitoring (e.g. use of Landscape Function Analysis [Tongway and Ludwig, 2011]) to determine progress towards a self-sustaining ecosystem. Once representative analogue sites have been selected, the conditions of the rehabilitated areas will be compared to the analogue sites.

Further information regarding rehabilitation monitoring at the MPO is provided in the approved MOP/RMP.



## 8 COMMUNITY

MACH Energy's approach to community relations is focused on extending and strengthening the relationships that MACH Energy representatives have already formed with the local community.

MACH Energy released a community newsletter in January 2018 and August 2018 outlining the community activities undertaken during the reporting period. MACH Energy plans to continue to release regular community newsletters in the next reporting period to inform stakeholders/interested parties of activities at the MPO.

During the reporting period, MACH Energy undertook community relations in four key areas: communication, consultation and engagement, community development, and relationships with the local Aboriginal community. These activities are outlined in detail in the following sections.

### 8.1 COMMUNICATION

A number of points of communication have been established with the community. Members of the local community are encouraged to engage MACH Energy in the way that proves most convenient for them.

MACH Energy maintains a website (<https://machenergyaustralia.com.au/>) which is used to provide information to stakeholders and interested parties about the operation and environmental performance of the MPO. Information provided on the website includes key environmental management documentation, monthly environmental monitoring reports, an environmental complaints register (which is updated on a monthly basis) and CCC meeting minutes.

MACH Energy maintains a Community Hotline (1800 886 889) that is dedicated to the receipt of community complaints, enquiries or information. The Community Hotline is publicly advertised in a variety of MACH Energy's public communication tools and is available during operating hours (i.e. 24/7), to receive any complaints or enquiries from anyone seeking information about the MPO. Communication received from the hotline is recorded in a Community and Stakeholder Engagement Database. This database records all necessary information regarding the nature of the communication, and if necessary, any action taken by MACH Energy as a result of the communication.

A total of 113 community complaints were received during the reporting period (see Complaints Summary 2018: <https://machenergyaustralia.com.au/mount-pleasant/documentation/>) compared with seven complaints received during the last reporting period. The community complaints for 2018 reporting period related to:

- air quality (58);
- noise (35);
- blasting (11);
- water (2);
- visual (3); and
- others (4) (related to lighting plant, mine vehicles' use of Wybong and Roxburgh Road, safety and acquisition).

Most of the complaints were received via the Community Hotline, however some complaints were received directly to the ERM, the Environmental Superintendent, the Land and Property Superintendent, the DPE, and the EPA.

While noise related complaints were predominant during the last reporting period (four complaints out of seven), dust related complaints were received the most in 2018. Complaints regarding blasting were also recorded in 2018, while there were none in 2017. It is common for the number of complaints to increase as a mining project transitions from the construction phase to the operational phase. Additionally, dust related complaints may have been exacerbated by the drought conditions observed in 2018.

Thorough investigations were undertaken in response to all complaints. For noise, dust and blasting related complaints, real time monitors were reviewed and alarms were examined. Following the investigation, the ERM made contact with the complainant in a timely manner to describe the MPO activities which may have been causing the issue and the response/s from MACH Energy. Activities were modified or ceased where necessary.

## **8.2 CONSULTATION AND ENGAGEMENT**

A CCC is administered by MACH Energy, with a membership comprised of an independent chair, as well as appropriate representation from MACH Energy and the general community. The CCC is operated in general accordance with the *Community Consultative Committee Guidelines* (DPE, 2016).

In 2018, the CCC met four times during March, June, September and December, three of which included a site tour. These meetings provided regular updates about the MPO, as well as an avenue to discuss aspects of the MPO which concerned community stakeholders. General discussions from these meetings related to:

- general overview of MPO progress;
- progress of construction;
- current status of approvals, management plans, modifications and supporting environmental documents;
- environmental monitoring and management;
- progress of land management activities at the MPO; and
- updates on community initiatives.

MACH Energy invites a range of its team members to present updates to the committee as direct contact enhances the two-way communication between both parties.

Full meeting minutes for the 2018 CCC meetings are provided on the MACH Energy website (Section 8.1).

## **8.3 COMMUNITY DEVELOPMENT**

As part of acquisition of the MPO, MACH Energy has maintained the Aboriginal Community Development Fund (ACDF) developed by Coal & Allied. The fund was a community benefit specified in the Native Title Agreement made with the Wonnarua People in 2005. Since its commencement in 2006, the ACDF has contributed more than \$4 million into projects which benefit the Upper Hunter Valley Aboriginal community.

Since the acquisition, MACH Energy representatives have joined the existing ACDF community members to administer funds, manage its current projects and to seek-out new partnerships. Key partnerships which were maintained during the reporting period as part of the ACDF are presented in Table 25.

**Table 25**  
**Aboriginal Community Development Fund Partnerships**

Partner	Description
Many Rivers Microfinance	A not-for-profit microenterprise organisation which assists Indigenous and other Australians to establish and develop small businesses.
Polly Farmer Foundation – Enrichment Centre	Graham (Polly) Farmer Foundation assists aspiring Aboriginal students who have the capacity to complete school, but potentially in the absence of additional support, are unlikely to do so. Project staff work closely with students to provide them with intensive and targeted support throughout their secondary schooling.
Parents and Learning (PAL)	The PAL program builds capacity in Indigenous communities by supporting parents to become engaged in their children's learning, especially in the development of early literacy and numeracy skills. PAL kits are provided to parents who are taught to use the kits as well as techniques to encourage full engagement of their children in their learning.

In conjunction with the ACDF, MACH Energy hosted the Muswellbrook Cultural Spectacular on 15 September 2018. The Cultural Spectacular showcased Aboriginal and Australian culture through food demonstrations, craft, oral presentations and live music. The event was held at the Muswellbrook Showground (MACH Energy, 2018c).

MACH Energy also sponsored NAIDOC Week 2018 through the ACDF, which celebrated Aboriginal and Torres Strait Islander peoples' history, culture and achievements across Australia. The funds were distributed across a range of activities, from primary schools through to the Upper Hunter NAIDOC Week Awards (MACH Energy, 2018d). A free dental service for Aboriginal adults living in Singleton and the Upper Hunter Valley (ACDF Adult Dental Program) was also launched through the ACDF in October 2018 (MACH Energy, 2018d).

MACH Energy also funded the Hunter Coal Festival and participated in the Family and Community Day held in April 2018. The festival aimed to highlight the value of coal industry within the wider Hunter region and celebrated coexistence, community, innovation and education (MACH Energy, 2018c).

#### **8.4 RELATIONSHIPS WITH LOCAL ABORIGINAL COMMUNITY**

MACH Energy works closely with the local Aboriginal community, including undertaking regular consultation with the Registered Aboriginal Parties (RAPs). MACH Energy maintains a contact register, containing up to date contact details for the 85 RAPs, and is committed to maintaining on-going consultation with these RAPs throughout the life of the MPO.

During 2018, archaeological salvages were carried out under AHIP #C0002092 in accordance with the ACHMP and stored on site (Plate 3). RAPs had a strong presence in these salvage activities.



**Plate 3: 2018 Archaeological Salvage – Storing Artefacts**

## 9 INDEPENDENT ENVIRONMENTAL AUDIT

An Independent Environmental Audit (IEA) was undertaken in late 2017 in accordance with Condition 9, Schedule 5 of Development Consent DA 92/97.

The IEA considered compliance until 25 November 2017. MACH Energy commissioned Environmental Resources Management Australia Pty Ltd to complete the IEA, which was undertaken on-site from 5 – 6 December 2017.

The audit included a review of:

- conditions contained within Development Consent DA 92/97, including the Statement of Commitments;
- EPL 20850;
- ML 1645, ML 1708, ML 1709, ML 1713 and ML 1750; and
- implementation of the management plans prepared under Development Consent DA 92/97 (Table 4).

A qualitative risk assessment was completed on the findings, consistent with AS/New Zealand Standard (NZS) 4360:2004 *Risk management*, the HB 436:2004 *Risk Management Guidelines Companion to AS/NZS 4360:2004* and the *Independent Audit Guidelines* (DPE, 2015b). The number of non-compliances with the statutory conditions and implementation of the management plans is summarised in Table 26.

**Table 26**  
**Summary of Audit Findings**

Non-compliance	Administrative Non-compliance	Observations	Total Conditions
6	2	7	169

The IEA Report was submitted to the DPE (including an action response table addressing the audit findings) on 18 May 2018. A summary of IEA recommendations and MACH Energy's responses is provided in Table 27.

**Table 27**  
**Summary of Independent Environmental Audit Recommendations and MACH Energy Responses**

Item No.	Recommendation	MACH Energy Response
<b>Development Consent DA 92/97</b>		
<b>3.20</b>	<b>Air Quality Criteria</b> Alteration of the EPL to utilise A-PF2 instead of the EPA Muswellbrook monitor would address the potential site shutdown issue.	An EPL variation was submitted in November 2018 to utilise A-PF2 if the Muswellbrook NW monitor was unavailable to address potential site shutdowns.
<b>3.26</b>	<b>Water Discharges</b> All future incidents are to be reported to regulatory agencies within required timeframes.	MACH Energy will ensure that all future incidents are reported to regulatory agencies within required timeframes.
<b>3.28</b>	<b>Water Management Plan</b> Regularly updated Progressive Erosion and Sediment Control Plans are recommended for Rail Loop area as observation of controls in the area, and discussion with Environmental Superintendent are indicative of improvements that could be made in the area. Clean and dirty catchment confluence points should be a high priority for development of management strategy. An audit of sediment basins by a soil conservationist is believed to have been undertaken; recommendations for improvement should be implemented as soon as practicable. Basin markers (and marking of sediment storage zone) to be installed as soon as is practicable. Upon implementation, photographs of these points can assist in demonstrating compliance with discharge criteria.	As construction/improvement of the Rail Loop progressed, MACH Energy prepared progressive erosion and sediment control plans to achieve <i>Managing Urban Stormwater - Soils and Construction Landcom</i> (2004) standards. Clean and dirty water confluence points continued to be a high priority for the control plans and construction. Sediment basin audits were undertaken progressively on-site at least quarterly and triggered by the commencement of new areas of construction and rainfall events, with the recommendations from these audits implemented progressively. Basin levels were also monitored regularly. Basin markers and marking of the sediment storage zones are yet to be installed.
<b>3.32</b>	<b>Biodiversity Management Plan</b> Update Rehabilitation Strategy, Landscape Management Plan, Biodiversity and Rehabilitation Management Plan in line with stated requirements.	MACH Energy updated and submitted the following management plans to the DPE: The LMP submitted on 19 September 2018 and approved on 16 October 2018. The Biodiversity Management Plan submitted on 28 September 2018 and approved on 19 October 2018. The MOP (incorporating the Rehabilitation Management Plan) submitted on 30 August 2018 and approved on 10 October 2018. The Rehabilitation Strategy submitted on 25 January 2019 and is currently being reviewed.
<b>3.47</b>	<b>Landscape Management Plan</b> Landscape Management Plan to be update [sic] 2018.	MACH Energy updated and submitted the LMP, which was approved on 16 October 2018.
<b>3.48</b>	<b>Bushfire Management Plan</b> Ensure Bushfire Management Plan details sites ability to respond to fires on site.	MACH Energy prepared the Bushfire Management Plan in February 2018, which includes provisions to respond to fires on-site.



**Table 27 (Continued)**  
**Summary of Independent Environmental audit Recommendations and MACH Energy Responses**

Item No.	Recommendation	MACH Energy Response
<b>Development Consent DA 92/97</b>		
<b>5.3</b>	<p><b>Annual Review</b></p> <p>Mount Pleasant Project Annual Environmental Review 2015 dated 24/02/2016 was reviewed. The reviewed document generally conformed to the relevant requirements; however, it did not describe the development that is proposed to be carried out over the next calendar year.</p> <p>It is recommended that every annual review provides an overview of the development proposed to be carried out over the next calendar year.</p>	<p>This recommendation was made in relation to the 2015 Annual Review, prior to acquisition of the project by MACH Energy. The IEA found the 2016 Annual Review to be compliant. Future Annual Reviews will also comply with the <i>Annual Review Guideline</i> (NSW Government, 2015). This includes outlining a summary of forecast operations for the next reporting period.</p> <p>Both the 2017 and 2018 Annual Reviews summarise forecasted activities for the next reporting period in Section 3.3.</p>
<b>5.4</b>	<p><b>Revision of Strategies, Plans and Programs</b></p> <p>Communicate review of plans following incidents and audits.</p>	<p>The IEA found that MACH Energy was compliant with this condition. MACH Energy will continue to communicate review of plans following incidents and audits.</p>
<b>SOC</b>	<p><b>Air Quality</b></p> <p>Alteration of the EPL to utilise A-PF2 instead of the EPA Muswellbrook monitor would address the potential site shutdown issue.</p>	<p>An EPL variation was submitted in November 2018 to utilise A-PF2 if the Muswellbrook NW monitor was unavailable to address potential site shutdowns.</p>
<b>Environment Protection Licence 20850</b>		
<b>O3.8</b>	<p><b>O3 Dust</b></p> <p>Alteration of the EPL to utilise A-PF2 instead of the EPA Muswellbrook monitor would address the potential site shutdown issue.</p>	<p>An EPL variation was submitted in November 2018 to utilise A-PF2 if the Muswellbrook NW monitor was unavailable to address potential site shutdowns.</p>
<b>Water Access Licences</b>		
<b>MW2338-00001</b>	<p><b>Water Access Licences</b></p> <p>Log book/tracking sheet was provided as evidence following the audit. This is to be kept for five years from the date of the last take, to comply with this position.</p>	<p>The IEA found MACH Energy was compliant with this condition. MACH Energy will continue to track water taken from the WALs it holds.</p>
<b>MW2337-00001</b>	<p><b>Water Access Licences</b></p> <p>The tracking sheet tracks the cumulative total so that volumes taken will not exceed the cumulative total allowed by all licences/orders. To strictly meet the conditions of the approval the tracking sheet is to be updated to state address requirements that are currently missing (i.e. approval number under which water is taken, volume against individual licences).</p>	<p>MACH Energy updated the tracking sheet/log book to address the IEA recommendation. Water extraction was tracked from each individual WAL, as well as cumulatively. This took effect from the new water year in 2018.</p>

In accordance with Condition 9, Schedule 5 of Development Consent DA 92/97, MACH Energy is required to commission, commence and pay the full cost of the next IEA by 25 November 2020.

## **10 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD**

### **10.1 ENVIRONMENTAL INCIDENTS**

No reportable incidents occurred in 2018.

### **10.2 NON-COMPLIANCES**

A summary of non-compliances during the reporting period, and if applicable, the actions taken in response to the non-compliances, is outlined in Table 28.

**Table 28**  
**Compliance Summary**

Approval Document Reference	Condition	Observation	Action/Comment								
EPL 20850 Condition M2.2	<p><i>Air Monitoring Requirements</i></p> <p><b>POINT 1,2</b></p> <table> <tr> <th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr> <tr> <td>PM10</td><td>Milligrams per cubic metre</td><td>Continuous</td><td>Special Method 1</td></tr> </table> <p><i>Note: Special Method 1 requires the Licensee to undertake the monitoring of PM10 concentrations in strict accordance with the manufacturer's operating manual supplied with the continuous monitoring equipment, or any updated versions as published by the manufacturer.</i></p>	Pollutant	Units of measure	Frequency	Sampling Method	PM10	Milligrams per cubic metre	Continuous	Special Method 1	PM <sub>10</sub> was not monitored continuously at Point 1 during the reporting period, with capture rate being 99% or 362 days out of 365. Equipment malfunction and power outage were the primary cause of data loss. No pollution or environmental harm occurred as a result of the non-compliance.	MACH Energy have engaged a specialist environmental monitoring consultant to analyse and verify PM <sub>10</sub> data on a monthly basis.
Pollutant	Units of measure	Frequency	Sampling Method								
PM10	Milligrams per cubic metre	Continuous	Special Method 1								
EPL 20850 Condition L1.1	<i>Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.</i>	Filling of Environmental Dam 3 caused seepage of clean water to neighbouring Bengalla Coal Mine. In May 2018, MPO were advised that seepage had been noted at Bengalla Coal Mine. MACH Energy and Bengalla Coal Mine are jointly undertaking engineering and hydrogeological reviews to determine the source of the seepage. No pollution or environmental harm occurred as a result of the non-compliance.	MACH Energy has engaged engineering and hydrogeological assessments to determine the cause of the seepage. MACH Energy engaged with the EPA throughout the investigations.								

## **11 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD**

Key activities to be completed during the next reporting period include:

- approval of the AQGGMP and NMP to revise the location of monitoring locations (Section 5.4.2);
- commencement of TDS surface water monitoring (Section 6.1);
- review of the pH and EC trigger levels of groundwater monitoring sites and associated update of the WMP (Section 6.2.3);
- update of the MOP to reflect a new MOP term beyond 30 June 2018 and to include the improved mine layout and final landform design, following approval of MOD 3;
- approval of the Rehabilitation Strategy;
- update of the Rehabilitation Management Plan components of the MOP consistent with the approved Rehabilitation Strategy;
- undertake independent erosion and sediment control structure audit in early 2019;
- continue rehabilitation of additional final landform areas as mining progresses into its second year;
- progressive implementation on erosion and sediment control systems as mining progresses;
- continued operational improvements to minimise potential air quality impacts;
- commencement of the rail loop and train load out relocation, as per MOD 4;
- commencement of coal washing and generation/emplacement of fine reject material; and
- increasing coal export volumes/rates and associated train movements.

## 12 REFERENCES

- Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.
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**APPENDIX A**  
**BLASTING SUMMARY 2018**

Date of Shot	Blast Monitoring Site					
	B-VOC		B-VO2		B-VOA	
	GV	OP	GV	OP	GV	OP
1/08/18	0.370	103.6	0.560	111.6	0.330	94.6
2/08/18	0.410	93.6	0.940	99.4	0.920	96.5
4/08/18	0.270	103.6	0.690	100.8	0.540	94.8
9/08/18	0.380	85.1	1.830	110.2	1.590	93.1
10/08/18	0.140	92.0	0.710	102.2	0.240	101.8
15/08/18	0.380	95.6	1.070	105.7	0.830	101.6
16/08/18	0.230	106.6	0.450	103.0	0.320	86.2
17/08/18	0.250	96.9	1.250	97.6	0.530	95.0
21/08/18	0.360	106.2	0.760	101.2	0.540	101.2
22/08/18	0.180	104.0	0.600	100.5	0.370	94.7
24/08/18	0.390	91.3	1.470	100.9	0.910	95.2
28/08/18	0.150	94.7	1.450	100.9	0.400	92.0
4/09/18	0.280	90.8	0.410	113.0	0.840	96.8
6/09/18	0.490	90.2	1.680	110.0	0.840	94.4
6/09/18	0.490	105.0	0.930	108.9	2.510	101.5
13/09/18	0.260	91.6	0.820	105.6	0.570	95.7
14/09/18	0.180	104.2	2.180	102.5	0.510	93.5
20/09/18	0.270	93.0	0.480	112.0	Trigger Error	Trigger Error
21/09/18	0.270	93.0	0.480	112.0	1.010	101.1
25/09/18	0.280	90.8	0.410	113.0	0.840	96.8
27/09/18	0.490	90.2	1.680	110.0	0.840	94.4
4/10/18	0.310	101.8	0.550	114.0	1.870	109.5
10/10/18	1.680	102.0	1.890	102.1	2.150	96.7
12/10/18	1.420	100.6	1.560	111.1	1.540	108.0
22/10/18	0.270	98.3	0.830	99.6	0.800	97.6
23/10/18	0.050	89.9	0.140	101.6	0.160	94.7
26/10/18	0.790	86.8	2.670	104.3	0.990	93.2
31/10/18	0.330	87.1	0.360	100.4	0.690	92.6
5/11/18	0.470	91.0	0.650	107.9	0.970	94.8
8/11/18	0.230	87.5	1.240	102.8	0.540	90.5
14/11/18	0.150	86.3	0.240	96.7	0.500	89.9
14/11/18	0.470	88.9	1.090	102.7	1.020	98.7
16/11/18	0.160	102.6	1.120	103.3	0.540	103.2
21/11/18	0.880	102.5	1.330	107.7	1.940	104.6
29/11/18	0.160	82.5	1.260	100.7	0.450	89.1
20/12/18	0.220	89.0	0.880	107.0	0.690	98.8
21/12/18	0.310	92.3	0.320	96.0	0.430	105.1
27/12/18	0.060	92.5	0.50	94.7	0.180	85.5
28/12/18	0.040	89.7	0.190	93.4	0.140	95.8

Date of Shot	Blast Monitoring Site					
	B-VOC		B-VO2		B-VOA	
	GV	OP	GV	OP	GV	OP
1/03/18	0.050	101.0	0.260	96.3	0.130	100.8
2/03/18	0.160	109.9	0.630	105.7	0.640	111.4
9/03/18	0.140	99.3	1.020	105.8	0.300	96.9
12/03/18	0.150	90.2	0.570	98.4	0.820	95.1
14/03/18	0.150	95.7	0.980	101.9	0.240	93.6
16/03/18	0.150	102.9	1.040	113.1	0.470	106.2
19/03/18	0.080	86.6	0.480	96.8	0.440	101.9
5/04/18	0.210	100.3	1.500	104.8	0.560	95.5
6/04/18	0.050	90.7	0.150	107.7	0.260	97.0
6/04/18	0.200	90.4	0.840	100.6	0.300	98.4
14/04/18	0.270	101.8	0.470	109.0	0.380	94.7
17/04/18	0.110	97.4	0.550	101.9	0.400	100.6
20/04/18	0.140	88.6	0.320	100.1	0.320	94.5
24/04/18	0.340	100.0	1.260	108.3	1.180	109.9
27/04/18	0.300	101.3	0.730	97.9	0.260	102.5
1/05/18	0.040	92.0	0.190	96.0	0.120	89.7
2/05/18	0.590	89.7	1.440	107.7	0.920	94.3
5/05/18	0.120	78.7	1.180	105.8	0.240	92.6
5/05/18	0.080	84.9	0.470	97.6	0.130	90.5
8/05/18	0.220	88.2	0.790	102.9	0.570	89.0
14/05/18	0.170	99.9	0.680	101.8	0.270	103.3
16/05/18	0.180	96.0	0.510	98.8	0.600	97.5
22/05/18	0.270	96.9	1.000	106.7	0.660	103.2
28/05/18	0.270	89.9	1.170	105.1	0.600	92.0
2/06/18	0.120	78.7	1.180	105.8	0.240	92.6
8/06/18	0.170	103.6	1.640	103.8	0.380	95.6
14/06/18	0.480	88.7	0.940	101.0	0.440	90.6
16/06/18	0.270	79.8	1.080	101.9	0.360	85.5
18/06/18	0.180	99.1	0.760	106.9	0.370	101.0
22/06/18	0.050	97.8	0.290	103.5	0.150	97.8
25/06/18	0.040	86.0	0.200	92.4	0.090	84.6
28/06/18	0.520	87.8	1.930	99.9	0.930	93.6
4/07/18	0.420	93.8	0.940	102.2	0.920	97.9
6/07/18	0.270	109.9	0.860	105.7	0.630	104.7
11/07/18	0.270	90.4	1.480	108.3	0.490	96.7
13/07/18	0.240	103.2	0.770	102.9	0.580	101.7
20/07/18	0.700	105.7	1.400	114.5	2.020	113.6
25/07/18	0.500	104.3	0.900	99.5	0.770	97.7
27/07/18	0.260	89.4	1.250	102	0.700	93.1

Date of Shot	Blast Monitoring Site					
	B-VOC		B-VO2		B-VOA	
	GV	OP	GV	OP	GV	OP
1/04/18	0.100	93.4	0.420	98.5	0.240	92.3
1/05/18	0.120	87.5	0.410	99.0	0.230	93.3
17/01/18	0.150	90.6	0.570	101.9	0.720	94.9
24/01/18	0.080	95.9	0.040	83.9	0.250	96.5
25/01/18	0.170	91.8	0.860	102.5	0.410	90.7
30/01/18	0.080	85.6	0.590	105.1	0.300	93.9
02/02/18	0.090	104.7	0.340	98.8	0.320	100.6
07/02/18	0.080	97.3	0.770	105.5	0.210	97.2
07/02/18	0.080	97.3	0.770	105.5	0.210	97.2
09/02/18	0.060	80.1	0.590	105.5	0.100	85.9
15/02/18	0.080	100.3	0.420	95.0	0.140	94.2
16/02/18	0.050	95.3	0.580	100.6	0.120	92.7
23/02/18	0.070	93.6	0.310	113.2	0.090	96.8

Note      GV = Ground Vibration measured in mm/s, OP = Overpressure measured in dB(Lin Peak).