MUSWELLBROOK COAL COMPANY

# 2017 ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

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Name of Leaseholder:	**Muswellbrook Coal Company Limited**
Name of Mine:	**Muswellbrook Coal**
Titles/Mining Leases:	**Consolidated Coal Lease 713** **Mining Lease 1304** **Mining Lease 1562**
MOP Commencement Date: MOP Completion Date:	**31 March 2017** **31 December 2023**
AEMR Commencement Date: AEMR End Date:	**1 January 2017** **31 December 2017**
Reporting Officer:	**Julie Thomas**
Title:	**Environmental Superintendent**
Signature:	_____
Date:	_____

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1.0   INTRODUCTION

Muswellbrook Coal Company (MCC) is a wholly owned subsidiary of the Idemitsu Kosan Company Ltd. Group. MCC has a long association with coal mining at Muswellbrook, with underground coal mining commencing in 1907 and open cut operations in 1944. The mine is located on Muscle Creek Road, approximately 3 kilometres to the north-east of Muswellbrook.

On 1 September 2003, Development Consent for DA 205/2002 was granted by Muswellbrook Shire Council (MSC) to extend the former MCC No.1 Open Cut. The No.1 Open Cut Extension commenced operations in March 2005 and has a capacity to produce up to 2,000,000 tonnes coal per annum. This approval has subsequently been modified on several occasions with the latest modification granted in 2017 to allow mining in an area known as the "Continuation Project" and to extend the life of the mining operations to 2022. Rehabilitation activities will continue past this date.

1.1   STRUCTURE OF THIS REPORT

The structure of this report is based on the document "Guidelines and Format for Preparation of Annual Environmental Management Report", Department of Mineral Resources, Document No. EDG03 MREMP Guide V3 dated January 2006 and incorporates the reporting requirements stipulated in the MCC Development Consent, specifically Condition 42. This report also incorporates the reporting requirements in MCC's water licences and mining leases.

This Annual Environmental Management Report (AEMR) provides a summary of activities, environmental management and performance at MCC from 1 January 2017 to 31 December 2017 (herein referred to as the 'reporting period').

In accordance with the Development Consent, copies of this AEMR will be made available to:
• Muswellbrook Shire Council (MSC);
• Division of Resources and Geoscience (DRG);
• Environment Protection Authority (EPA);
• Office of Environment and Heritage (OEH);
• NSW Department of Primary Industries – Water (DPI-Water); and
• MCC Community Consultative Committee (CCC).

A copy of the report is also available on MCC's website:
https://www.idemitsu.com.au/operations/muswellbrook-coal/approvals-plans-reports/

1.2   CONSENTS, LEASES AND LICENCES

MCC operates under many development consents issued by MSC. The primary consent is DA 205/2002, which was approved by MSC in 2003. This DA has been modified on several occasions with the latest modification being approved in 2016.

Mining activities at MCC are carried out wholly within Consolidated Coal Lease 713, Mining Lease 1562 and Mining Lease 1304.

In addition to the above approvals MCC operates under the following licences:
• Environmental Protection Licence (EPL) 656 issued under the Protection of the Environment Operations Act 1997.
• Water Licences 20WA216928, 20BL169037, 20BL169038, 20WA216982 and 20WA211598 issued under Part 5 of the Water Act 1912.

Relevant consents, authorisations and licences are summarised in **Table 1**.

Table 1: Consents, Authorisations and Licences

Approval	Description	Consent Authority	Date Granted	Expiry/ Renewal Date
DA 86/98 (MSC)	Approval for Sandy Creek Underground Mine	Muswellbrook Shire Council	12 Apr 1999	12 Apr 2020
DA 205/2002 (MSC)	Approval for Extension of MCC Open Cut 1	Muswellbrook Shire Council	1 Sep 2003	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) – Amendment to Condition 1.1	Power line relocation and additions to Workshop	Muswellbrook Shire Council	19 Dec 2005	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) Amendment to 1.1 and 11.3	Relocate office buildings, workshop and bath-house	Muswellbrook Shire Council	13 July 2009	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) Amendment to 11.1	Extension of mining into Area C	Muswellbrook Shire Council	23 Dec 2010	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) Amendment to 1.1(a), 31, 33, 39, 45 and 58.	Revision to Mining Infrastructure Building Requirements and Rehabilitation Plan Revision to permit the continuation of mining operations for an additional 5 years.	Muswellbrook Shire Council	29 Oct 2013	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) Amendment to 1.1, 1.2 & 6.3.2 and additional conditions 59 & 60.	Modification to Permit the Continuation of Mining Operations at Muswellbrook Coal Mine for an Additional Five (5) Years- Multiple Allotments- Coal Road Muswellbrook.	Muswellbrook Shire Council	12 Dec 2013	Mining to 31 Dec 2022 No end date to approval
DA 205/2002 (MSC) General revision of consent conditions	Modification to allow mining operations to mine additional areas and to extend the mine life to 2022.	Muswellbrook Shire Council	26 Oct 2016	Mining to 31 Dec 2022 No end date to approval
Consolidated Coal Lease 713	Mining Lease	Division of Resources and Energy	5 May 1990	24 Nov 2024

Approval	Description	Consent Authority	Date Granted	Expiry/ Renewal Date
Mining Lease 1304	Mining Lease	Division of Resources and Energy	12 Jan 1993	24 Nov 2024
Mining Lease 1562	Mining Lease	Division of Resources and Energy	16 Feb 2005	16 Feb 2026
Mining Lease 1513	Mining Lease	Division of Resources and Energy	20 Mar 2002	20 Mar 2023
Environmental Protection Licence 656	Environmental Licence	Environmental Protection Authority	6 Dec 2000	Not applicable
Water Approval 20WA216928	Water Licence	DPI-Water	1 July 2017	30 Jun 2019
Water Licence 20BL169037	Water Licence	DPI-Water	5 Apr 2014	4 Apr 2019
Water Licence 20BL169038	Water Licence	DPI-Water	5 Apr 2014	4 Apr 2019
Water Approval 20WA216982	Water Licence	DPI-Water	1 July 2017	30 Jun 2019
Water Licence 20WA211598	Water Licence	DPI-Water	1 Aug 2009	31 Jul 2022

1.2.1 CHANGES TO APPROVALS

During the reporting period MCC's Environmental Protection Licence (EPL) was modified with the changes commencing in August 2017. The changes to the EPL included:

- Changes to the air quality monitoring network;
  - o Removal of dust deposition gauges and total suspended particulate monitoring;
  - o Changes to PM monitoring locations;
  - o Addition of gas monitoring (hydrogen sulphide and sulphur dioxide);
- Updates to the meteorological monitoring requirements;
- Addition of noise monitoring locations;
- Updates to the noise criteria;
- Changes to the noise monitoring requirements;
- Updates to the general noise conditions;
- Updates to the general dust management conditions;
- Addition of standard condition relating to the preparation of a Pollution Incident Response Management Plan;
- Addition of standard condition relating to bunding of tanks;
- Addition of requirement to complete a spontaneous combustion emissions study;
- Addition of requirement to complete an independent audit of spontaneous combustion management; and
- Addition of requirement to provide data for the Hunter Valley Dust Risk Forecasting Trial.

There were no other changes to approvals during the reporting period.

1.3   MINE CONTACTS

The names and contacts of site personnel responsible for mining, rehabilitation and environmental management, planning and support functions are shown in **Table 2**.

Table 2: Mine Contacts

Name	Position	Contact Number
Grant Clouten	Senior Operations Manager	(02) 6542 2300
Leon Claassens	Technical Services Superintendent	(02) 6542 2300
Rod Gallagher	Production Superintendent	(02) 6542 2300
Julie Thomas	Environmental Superintendent (appointed Environmental Officer)	(02) 6542 2300

1.4   EMPLOYEE LEVELS

The number of employees and full-time equivalent contractors at MCC for this reporting period is shown in **Table 3**, along with a comparison to the numbers from the last two reporting periods.

Table 3: Employee Levels

Year	Employees	Full-Time Equivalent Contractors
2017	69	85
2016	73	102
2015	75	88

1.5   ACTIONS REQUIRED FROM PREVIOUS AEMR REVIEW

An environmental inspection was conducted by DRG on 19 May 2017 with a follow up inspection on 20 September 2017 to review the 2016 AEMR and to review site performance. Correspondence regarding actions from this inspection was received on 25 September 2017. The actions from this inspection along with how they have been addressed by MCC are shown in **Table 4**.

Table 4: Actions from DRG AEMR Inspections

No	Issue/Observation	Due Date	MCC Comment
1.	The Department is concerned about the performance of rehabilitation undertaken to date at Muswellbrook Coal Mine (MCM). As previously required by the Department, MCM must engage a rehabilitation specialist to review rehabilitation practice at MCM. A written report, prepared as part of this review, is to be provided to the Department by close of business on 15 December 2017. The report is to address rehabilitation limitations present at MCM and provide recommendations such that, were these recommendations to be adopted, site closure rehabilitation completion criteria present in the approved Mining Operations Plan (MOP) would be fully achieved;	15 December 2017	This report was completed and submitted to DRG on 15 December 2017. More details on the findings of the report can be seen in **Section 5.2.3**.

No	Issue/Observation	Due Date	MCC Comment
2.	It was observed that the Brickworks Dam wall is eroding and rilling, this is required to be remediated by MCM and reported on in the next AEMR;	No date	The Brickworks Dam is scheduled to be cleaned out during the next reporting period and these repair works will be completed at the same time.
3.	The Department requests that where rehabilitation reporting details in the AEMR vary from the MOP, a description of the variation is provided and justification to support such variation;	No date	This request is noted.
4.	The Department encourages the introduction of cattle grazing into MCM's adequately mature rehabilitated pasture areas. Such grazing, properly managed, would assist in developing pasture diversity, encourage pasture growth and work towards a demonstration of mine closure land use;	No date	This comment is noted. MCC are reviewing the options to introduce cattle onto the rehabilitation area.
5.	Outer batter slopes on the north-west perimeter of Void No.3 are extremely steep and includes an unprotected downslope feature. MOP figures shows contour drainage in this area which is not present. A review of this situation with a resultant plan to address these apparent deficiencies is to be reported upon in correspondence to be provided to the Department by close of business on 15 December 2017.	15 December 2017	The actual drainage in this area was reviewed against the commitments in the MOP and it was found that the drainage is consistent with the requirements of the MOP. Some minor earthworks were conducted to redirect water into the depression area. A report was provided to DRG on 15 December 2017.

An environmental inspection was conducted by MSC on 31 May 2017 to review the 2016 AEMR and to review site performance. Correspondence regarding actions from this inspection was received from MSC on 24 July 2017. The actions from this inspection along with how they have been addressed by MCC are shown in **Table 5**.

Table 5: Actions from MSC AEMR Inspections

No	Issue/Observation	MCC Comment
	Findings From Review of Report	
1.	Section 3.3.3 of the report describes the activities in the next reporting period for air quality assessment. It correctly describes that the Air Quality Management Plan is to be reviewed as required by the revised Consent. This section failed to describe there would be a significant change in the type and location of air quality monitors and that gas monitors were to be installed in the next reporting period. The AEMR reports primary purpose should be to update the regulators and community on activities within the mine for the last 12 months and predictions for the next 12 months, and air quality assessment is important to both.	Information regarding the changes to the air quality monitoring program that occurred during this reporting period have been included in **Section 3.3**. At the time of writing last year's AEMR these details weren't available and the changes hadn't been approved by MSC, which is why there wasn't a lot of detail included in the AEMR. MSC's comments about including details on next year's activities are noted and these will be included if they are available.

No	Issue/Observation	MCC Comment
2.	Section 3.18 covers Hydrocarbon Contamination. We were advised that Muswellbrook Coal use the EPA's 10,000ppm limit for hydrocarbon management. This limit is meant to be applied to waste emplacements. Muswellbrook Coal mine is not a waste emplacement. The current environmental assessment does not cover the use of the mine for a waste emplacement, and the existence of a waste emplacement will limit further land uses. Most mines in the Hunter Valley use the 1,000ppm limit although the best guide can be found in the NEPM B1 schedule below. Contaminated material up to 10,000ppm hydrocarbon should not be disposed of in the pit regardless of where it is to be placed in relation to the surface or the groundwater table.	MCC has developed a Bioremediation Management Plan in consultation with DRG and the levels are based on the EPA Waste Classification Guidelines. The guidelines mention that if the levels are less than 10,000ppm the material is not contaminated and therefore doesn't need to be treated as a waste. MCC has continued to operate in accordance with the Bioremediation Management Plan during this reporting period.
3.	Table 47 summarised flora and fauna monitoring results. All the rehabilitation sites rated a low value for their condition. As some of the areas assessed have been rehabilitated for over 15 years, this is of great concern. This raises the possibility of significant delays after mine closure to have the areas released from the mining lease. Muswellbrook Coal need to work with DRG to determine what changes need to be made to have rehabilitation reach an acceptable standard in a reasonable time. This should necessitate either work to improve the standard of the rehabilitation or review the standard expected for the work with DRG.	During the reporting period the closure criteria were revised and approved by DRG in the MOP. This included changes to the criteria for older rehabilitation areas and the monitoring conducted during this reporting period demonstrated a higher level of compliance with the closure criteria. More details can be found in **Section 5.5.3** and **5.7.5**.
4.	Table 25 continues to indicate that dust readings (PM10) are rising over time and approaching the EA predicted levels. This matter was raised last year and the values have continued to rise. The cause should be investigated to see if it is mine related. Should it be mine related, action should be taken before the readings exceed EA predicted levels.	This table was showing the results from a single monitor that recorded PM10 every six days, therefore was not a continuous monitor. This unit was decommissioned during the reporting period. A review of the data from this reporting period showed that the average results have decreased from previous reporting periods.

No	Issue/Observation	MCC Comment
	Findings From Site Inspection	
1.	The drainage of the coal stockpile areas was inspected following the concerns raised at last years' inspection. The result of last year's inspection was a Review of Water Management Structures that committed to address the issue in September and October 2016. Following this years' inspection it would appear that this work has not been completed. It remains that a significant area of the drainage from 2 coal pads can leave the mine site with only the coarse sediment removed by a small sediment dam. It is accepted practice that stormwater drainage that has been in contact with coal is classified as mine water and does not leave the mine site. To address this historical drainage design problem works are needed promptly and are as follows: • The windrow near Stockpile 3 to be opened and the water report to the drain leading to the Final Settling Dams – this will then be maintained as required. • The drains along the Stockpile Access Road to be cleaned out and hay bales placed to assist with filtering the water – these will be maintained as required. • The dam across from the weighbridge to be cleaned out – this will be maintained as required. • The redirection of the majority of the water on the ROM towards the pit to be completed – this will be maintained as required. • Works to redirect the water from Stockpile 4 to the Final Settling Dams – this will be completed by the end of August 2017. • Following the redirection works at Stockpile 4 material to be placed in the washout area – this will be completed by the end of August 2017. • Following a rain event that causes the water to overflow from the dam opposite the weighbridge, the water is to be sampled and tested against relevant criteria to ensure the water is of suitable quality to leave the site.	This work has now been completed and is discussed further in **Section 3.5.1**. The requirement to collect samples from the dam opposite the weighbridge during rainfall events has been added to the Water Management Plan, which is still awaiting approval from MSC at the end of the reporting period.
2.	A number of weed infested areas were observed on the site. We were advised at the recent DRG inspection that weed management was picked up as an issue that required attention. Weed burden needs to be managed to prevent seed set and assist with future weed control issues. As the Muswellbrook Coal Mine prepares for closure, weed control is particularly important to reduce weed cover post closure. Council supports the DRG's requirements to assess and manage weeds.	MCC has undertaken an extensive weed control program during this reporting period. This program is discussed further in **Section 3.10**.

No	Issue/Observation	MCC Comment
3.	We inspected the "bowl" area of the mine where the former No. 1 open cut mining occurred. Since the AEMR inspection in 2016, the final use of this land has been clarified. It is no longer to be used a future waste emplacement area by Council. Until another use is found for this area, the land should be prepared for closure as an area periodically grazed by stock. We understand that there are no areas in the mine scheduled for rehabilitation this year due to the current stage of mining and pit design. It is requested that the resources usually set aside for rehabilitation should be focused on areas requiring maintenance, like the "bowl" area, so it can be improved to a standard that can be relinquished from the mining lease.	As discussed in **Section 5.2.3** MCC undertook rehabilitation maintenance activities during the reporting period, and this included some minor works on the Western Depression area. At the end of the reporting period, MSC still held an option to purchase this land from MCC and while this option stays in place, MCC do not propose to undertake any significant maintenance activities in this area. If MSC decide not to purchase this land, MCC will review the maintenance activities required in this area.

1.6   COMPLIANCE STATUS

1.6.1   REPORTABLE INCIDENTS

During the reporting period, there were no reportable incidents at MCC.

1.6.2   COMPLIANCE REVIEW

In accordance with the requirements of Condition 42 (a) of the development consent, a detailed compliance review of the performance of the project against conditions of this consent and statutory approvals was undertaken at the end of the reporting period. This review was against the conditions in place on 31 December 2017. MCC were compliant with all the conditions of consent and statutory approvals during the reporting period.

2.0 ACTIVITIES DURING THE REPORTING PERIOD

2.1 EXPLORATION
No exploration was conducted during the reporting period.

2.2 LAND PREPARATION
Land preparation is the process of preparing the land for open cut mining. Activities include vegetation clearing, topsoil stripping and topsoil stockpiling.

Prior to any vegetation clearance, a pre-clearance survey is undertaken to identify any potential habitat features located within proposed disturbance areas. The pre-clearance surveys also identify any weed infestations that may need treatment prior to clearing activities commencing. A Pre-Clearance Permit is approved by the Environmental Superintendent prior to any clearing commencing on site.

Trees containing features with the potential to provide habitat resources for birds, bats and/or arboreal mammals will be retained wherever practicable. Where practical and feasible, habitat features such as large hollows identified during the preclearance surveys will be salvaged and relocated to existing areas of rehabilitation or stockpiled for use in future rehabilitation areas.

During the reporting period there was a disturbance of 11.1ha of previously rehabilitated land to allow mining to continue. There was no salvageable topsoil in this area as the area that was cleared this reporting period is dominated by the Golden Wreath Wattle (*Acacia Saligna*). This species was historically used in the rehabilitation process at MCC but is now considered a threat to diversity on the rehabilitation areas and is no longer included in the seed mix. To reduce the risk of spreading the *Acacia Saligna* seed onto new rehabilitation areas the topsoil in this area is buried on site.

2.2.1 TOPSOIL MANAGEMENT
Previously stripped topsoil is stockpiled in locations around the site for use and will be used in future rehabilitation activities. The stockpile locations are away from current mining operations and are inspected on a regular basis.

2.3 CONSTRUCTION
During the reporting period no construction activities occurred.

2.4 MINING
All mining activities this reporting period have occurred in Open Cut 1 with operations able to occur 24 hours a day, seven days a week. The status of mining activities at the end of the reporting period is shown in **Figure 1**.

The Open Cut 1 mining schedule will continue within the Northern section of the approved area during the year, mining down through the seam sequences as they present from the Fleming through to the Loder seam.

Mining has started in Strip 21. This area will be lowered to the same elevation as the area that was previously mined above the pillar extraction area to eliminate sources of spontaneous combustion.

During the second quarter overburden stripping will extend into Strip 22 in Open Cut 1. At the end of mine life all UG workings will be mined out removing any fuel sources for spontaneous combustion. The mining waste will be dumped in Open Cut 1 and Open Cut 2.

Open Cut 1 will continue to expose underground workings of the No. 2 Underground and St Heliers Collieries. Site based procedures have been developed to allow safe extraction of the remaining underground pillar coal. These procedures are reviewed to reflect the operating experience gained during mining progress. Open cut wall designs were undertaken following recommendations of a geotechnical study completed for MCC by Lambert Geotech P/L.

Mining operations at MCC are undertaken in accordance with the MOP and relevant approvals, leases and licences.

Mining is achieved through open cut methods using excavators, front-end loaders and rear dump trucks. The current fleet used for mining at MCC is provided in **Table 6**.

Table 6: Mining Fleet Utilised at MCC

Equipment	Model	No	Work Area
Excavator	Hitachi EX3600 Hydraulic Excavator	2	Overburden, interburden and coal removal
	Hitachi EX2600 Hydraulic Excavator	1	Overburden, interburden and coal removal
Dump Truck	Hitachi 3500 (170 Ton)	9	Overburden, interburden and coal removal
	CAT 777C (85 Ton)	3	Overburden, coal and rejects
Front End Loader	CAT 990H	1	Coal stockpile management
Blast Hole Drill	SMW Drilltech 45	1	Drilling for blasting in overburden, interburden and coal
Grader	CAT 16H Grader	2	Surface preparation, road maintenance
Water Cart	Water Cart (CAT 777) 70,000 litre	2	Dust suppression, road maintenance
Dozer	CAT D10T	5	Dumps, roads, coal and overburden area preparation

2.5 MINERAL PROCESSING

MCC produces thermal coal for both export and domestic markets. High ash coal is mined, crushed and washed through the Coal Preparation Plant (CPP) while low ash coal is crushed and by-passes the CPP directly to the product stockpile.

Coal from Open Cut 1 requires washing by the CPP as a result of dilution associated with mining of the underground roadways. The CPP uses a jig as the main method of separation and has a capacity of approximately 240 tonnes per hour. The CPP is used on an 'as required' basis.

The CPP uses a belt press filter to treat the fines or tailings component of the coal feed. Both coarse and fine reject material will be trucked back to the open cuts for disposal. This material is quite dry and able to be handled in the same manner as overburden material. Disposal of carbonaceous material is undertaken in accordance with the Spontaneous Combustion Management Plan (SCMP).
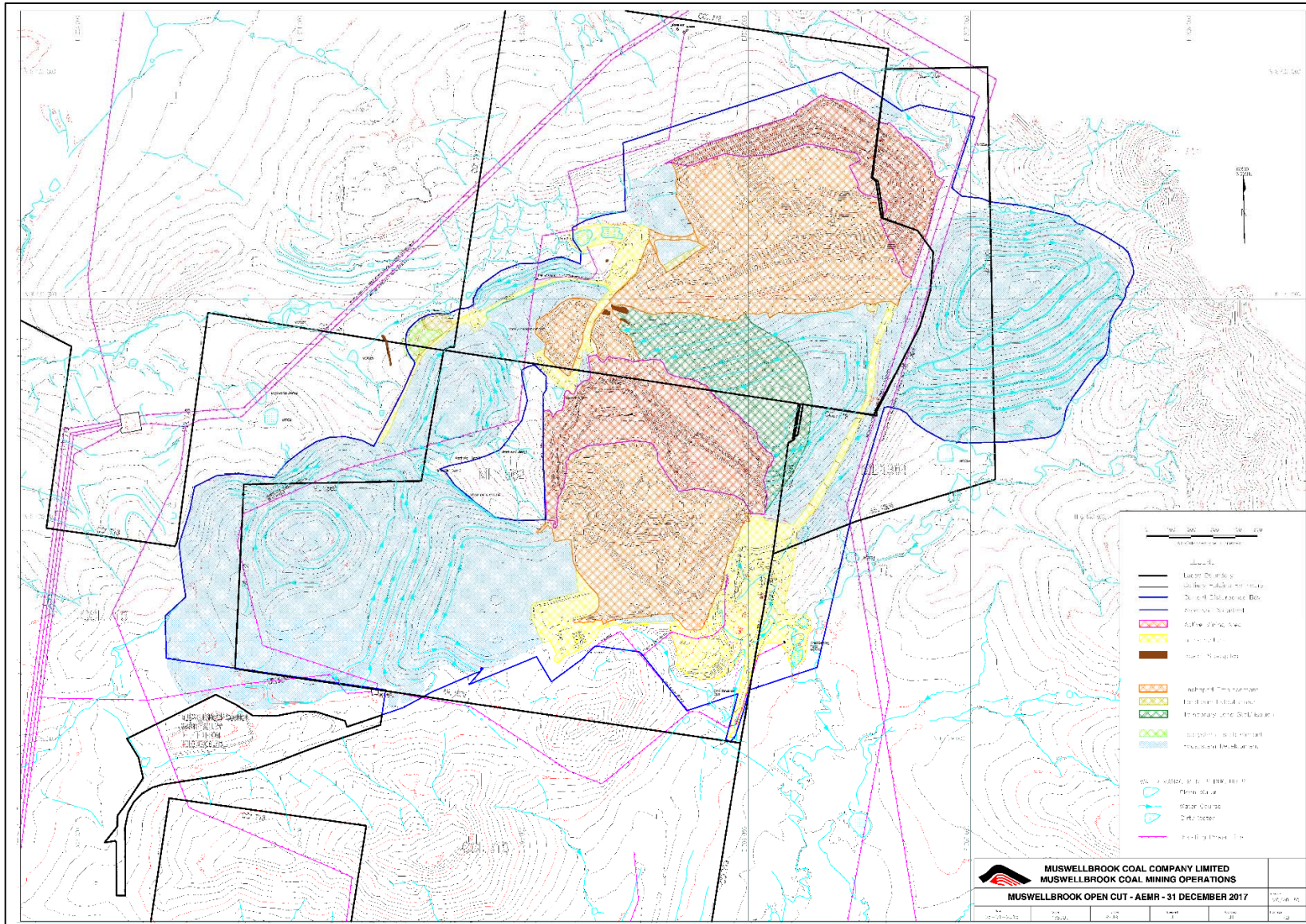
Figure 1: Mining Activities This Reporting Period

2.6 WASTE MANAGEMENT

During the reporting period MCC continued to maintain a Total Integrated Waste Management Service to manage all waste streams generated on site. This includes general waste, cardboard and paper recycling, timber, waste oil, and steel. MCC continue to separate and recycle waste materials when possible, to assist in reducing the amount of waste going to the local landfill.

Table 7 shows the amount of waste that was removed from site during the reporting period. There has been an increase in the total waste removed from site during this reporting period and this is due to a clean-up of redundant equipment and material on site.

Table 7: Waste Stream Generation

Month	Total Waste Removed (tonnes)	Total Waste to Landfill (tonnes)	Percentage Reused/ Recycled
January 2017	80.12	2.26	97.18
February 2017	360.96	10.33	97.14
March 2017	126.88	6.39	94.97
April 2017	75.33	1.63	97.84
May 2017	125.81	2.31	98.16
June 2017	137.27	3.48	97.46
July 2017	108.06	1.41	98.69
August 2017	138.39	10.95	92.09
September 2017	130.81	1.62	98.76
October 2017	119.53	2.42	97.97
November 2017	131.22	7.95	93.94
December 2017	95.24	6.03	93.67
Total	**1,629.62**	**56.78**	**96.49**

2.7 PRODUCT COAL AND TRANSPORT

Product coal is hauled from the product bin by truck to the stockpiles. Five product stockpiles have a total capacity of 250,000 tonnes. Product coal is trucked off site via Muscle Creek Road and the New England Highway to the Ravensworth Coal Terminal (RCT) for train loading. This coal is then transported to the port of Newcastle.

2.8 PRODUCTION SUMMARY

The amount of production and associated waste generated by MCC is detailed in **Table 8**. There was a detailed survey conducted on the topsoil stockpiles this reporting period, which has adjusted the stockpiled numbers from the previous reporting period.

Table 8: Production and Waste Summary

	PRODUCTION		
	At End of This Reporting Period	**At End of Last Reporting Period**	**Estimate, End of Next Reporting Period**
Topsoil Stripped (m³)	0	0	0
Topsoil used/spread (m³)	0	10,940	0
Topsoil stockpiled (m³)	3,450	3,662	0
Waste Rock (BCM)	8,186,728	7,557,556	7,809,913
Open Cut ROM Coal (t)	1,784,386	1,652,181	1,702,659
Underground ROM Coal (t)	0	0	0
Total Coal (t)	1,784,386	1,652,181	1,702,659
Processing Waste (t)	252,085	254,164	202,606
Open Cut Product Coal (t)	1,528,134	1,424,073	1,500,053
Underground Product Coal (t)	0	0	0
Total Product Coal (t)	1,528,134	1,424,073	1,500,053

2.9   HAZARDOUS MATERIALS MANAGEMENT

2.9.1   FUEL STORAGE

Diesel fuel is stored in three Class C1 above ground, self-bunded tanks, with a capacity of 105,000L each. The tanks are located 50m from any major buildings. They are currently listed under MCC's License for Keeping Dangerous Goods No. 35/021999, issued by SafeWork NSW.

2.9.2   CHEMALERT SYSTEM

MCC use a web based ChemAlert system to manage chemical use at the mining operation and system users can access the database from the MCC intranet site. The ChemAlert system is a chemical hazard management tool that contains information on the storage, transportation, use and disposal of chemicals. A Dangerous Goods manifest and safe operating procedure for chemical selection and use can be readily accessed from the MCC intranet server. Audits are undertaken with a focus on safe chemical use and storage by the Health and Safety Committee representatives.

2.9.3   EXPLOSIVES

MCC has a licence to supply and store explosives and explosive precursors in accordance with all relevant legislation under Licence Number XSPL100002. This storage consists of 2 external magazines and an above ground tank for raw materials with 30,000L capacity. Bulk explosive product can also be stored on the mobile processing unit with a capacity of 8,000L but it is not common practice to do so as this is only used on an as needs basis. All dangerous goods on the premises are listed under MCC's Notification of Hazardous Chemicals, Licence Number NDG021999. Blasting contractors are employed to carry out total loading service on site.

2.10 WATER MANAGEMENT

The primary objective of the Site Water Management Plan (SWMP) is to enable the effective management of on-site water to minimise the impact of mining operations on surface and ground water resources, both on and adjacent to the mine site. No changes were made to the water management system during the reporting period.

The objectives of the SWMP are to:
* Meet the water supply needs of the project;

- Separate clean water runoff produced by undisturbed catchments from dirty (sediment-laden) and contaminated runoff from disturbed catchments;
- Use appropriate sedimentation controls for dirty water;
- Where possible, recycle and reusing dirty and contaminated mine water for dust suppression and wash down activities;
- Allow clean water to flow through the catchment and using clean water for firefighting supplies (firefighting system uses raw mine water) and sensitive equipment where required and allowed by harvestable rights;
- Where possible, and where mine safety permits, use disused open cuts and underground mines as mine water storages;
- Have nil discharge of saline mine water by containing all saline mine water on site and minimising the risk of accidental off-site discharge; and
- Monitor surface and groundwater to determine significant impacts to water quality or beneficial use and undertaking remedial action where required.

2.10.1 WATER STORAGE
Volumes of stored water available at MCC are provided in **Table 9**.

Table 9: Stored Water

VOLUMES (m³)	START REPORTING PERIOD	END REPORTING PERIOD	STORAGE CAPACITY
DIRTY WATER			
Blues Crusher Dam	1,065	339	8,500
Brickworks Dam 1	0	0	30,000
Brickworks Dam 2	2,579	1,600	20,000
Final Settling Pond	7,141	4,513	10,100
Dam 3	3,993	0	8,000
SALINE OR MINE WATER			
Dam1	18,900	19,000	30,000
Dam 2	20,000	20,000	20,000
No.2 O/C Void	943,300	616,678	1,200,000

2.10.2 GROUNDWATER EXTRACTION
MCC holds four licences to extract ground water. The volumes of groundwater extracted in this reporting period are shown **Table 10**. No new bores were constructed during the reporting period.

Table 10: Groundwater Extraction

Licence No.	Reporting Period Extraction Volume (ML)	Extraction Entitlement (ML per Annum Limit)
20WA216928 (borehole RDH529)	8.9	1,000
20BL169037 (No.1 O/C Void)	0.0	2,000 (combined)
20BL169038 (No.2 O/C Void)	636.8	
20WA216982 (borehole RDH607)	418.8	3,000

2.10.3 WATER BALANCE
The calculated water balance for the reporting period is provided in **Table 11**. The water balance indicates a water surplus for the year. Extra water has been stored in on-site water storages.

Table 11: Site Water Balance

INPUTS	ML/year	ML/day
Ground Water Seepage	0.0	0.00
Surface Water Runoff and Dam Capture	98.9	0.03
Entrainment in Coal	133.8	0.37
Potable Water	3.7	0.01
Underground Workings – Dewatering Bores	1,064.5	2.92
TOTAL	**1,300.9**	**3.33**
OUTPUTS	**ML/year**	**ML/day**
Entrainment in Coal	128.5	0.35
Discharge Off Site	0.0	0.00
Dust Suppression – water infusion and sprays	420.5	1.15
Dust Suppression – water carts	368.5	1.01
Evaporation from Dams	126.2	0.34
Pumped to Council Void	0.00	0.00
Septic Pump Out	1.1	0.00
TOTAL	**1,044.8**	**2.85**
2017 Balance	**256.1**	**0.48**

2.11 OTHER INFRASTRUCTURE MANAGEMENT

No other management of infrastructure occurred during this reporting period.

3.0   ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

3.1   ENVIRONMENTAL MANAGEMENT

To measure compliance with the management plans, the development consent and various licences, MCC undertakes a comprehensive monitoring program in the vicinity of the MCC mining areas. More details on the individual monitoring programs are provided in the following sections.

3.2   METEOROLOGICAL

During the reporting period, MCC continued to maintain a Meteorological Monitoring Station (MMS) on rehabilitated land to the immediate west of Open Cut 1. This station is part of the Real Time Environmental Monitoring System (RTEMS). During the reporting period, the MSS was upgraded to comply with the updated requirements of the Development Consent and the Environmental Protection Licence.

The principal MMS provides 10m elevation wind speed and direction, 2m and 10m elevation air temperature, rainfall, humidity, barometric pressure, sigma theta and stability class. In addition, a calculation is performed to calculate temperature inversions.

Meteorological data provided in this report was sourced from the MMS. Wind data, rainfall and temperature results are summarised below. Data recovery for the monitoring period was 99.5%.

3.2.1   WIND SPEED AND DIRECTION

Quarterly wind roses are provided in **Figure 2**. These results are generally consistent with the predominant wind patterns in the Hunter Valley.

January – March Windrose

Apr-Jun 2017

Calms (%): 39.1
Maximum Wind Speed (m/s): 12.5
Prevailing Wind Direction (degree): 135

Wind Velocity (m/s)
- 20+
- 15 - 20
- 10 - 15
- 5 - 10
- 3 - 5
- 1 - 3
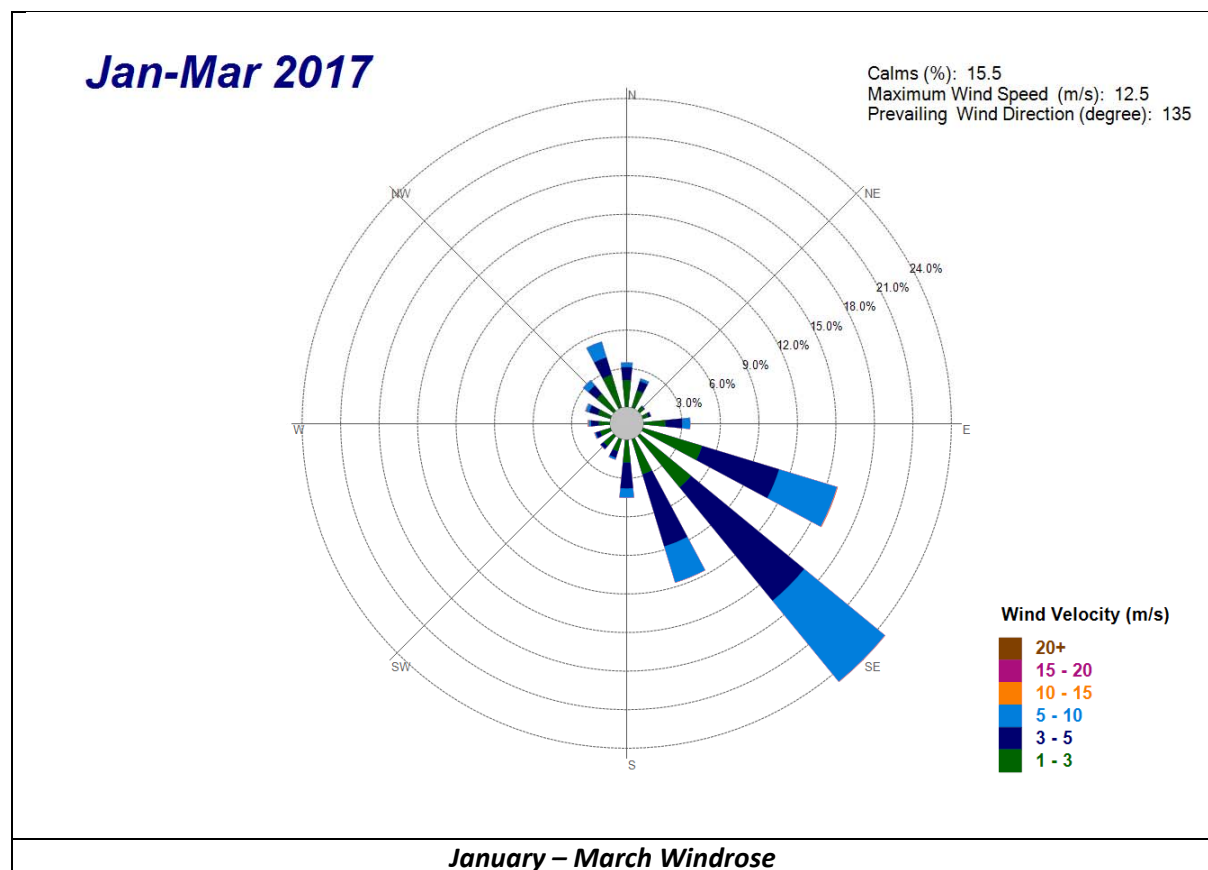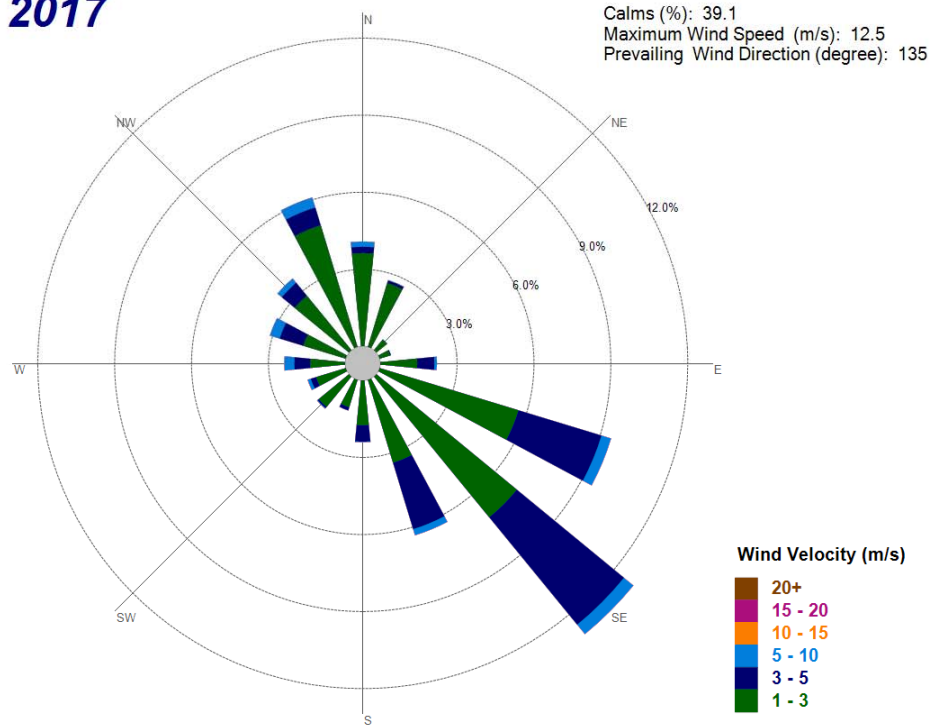
April – June Windrose

Jul-Sep 2017

Calms (%): 11.4
Maximum Wind Speed (m/s): 12.08333
Prevailing Wind Direction (degree): 337.5

Wind Velocity (m/s)
- 20+
- 15 - 20
- 10 - 15
- 5 - 10
- 3 - 5
- 1 - 3
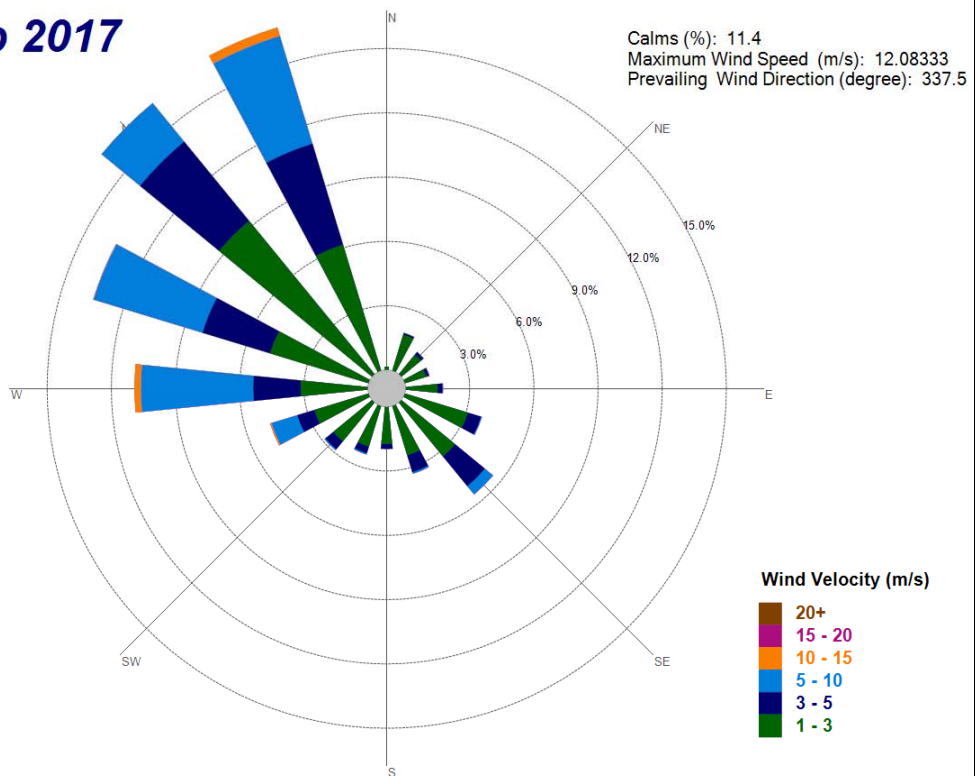
July – September Windrose

October – December Windrose
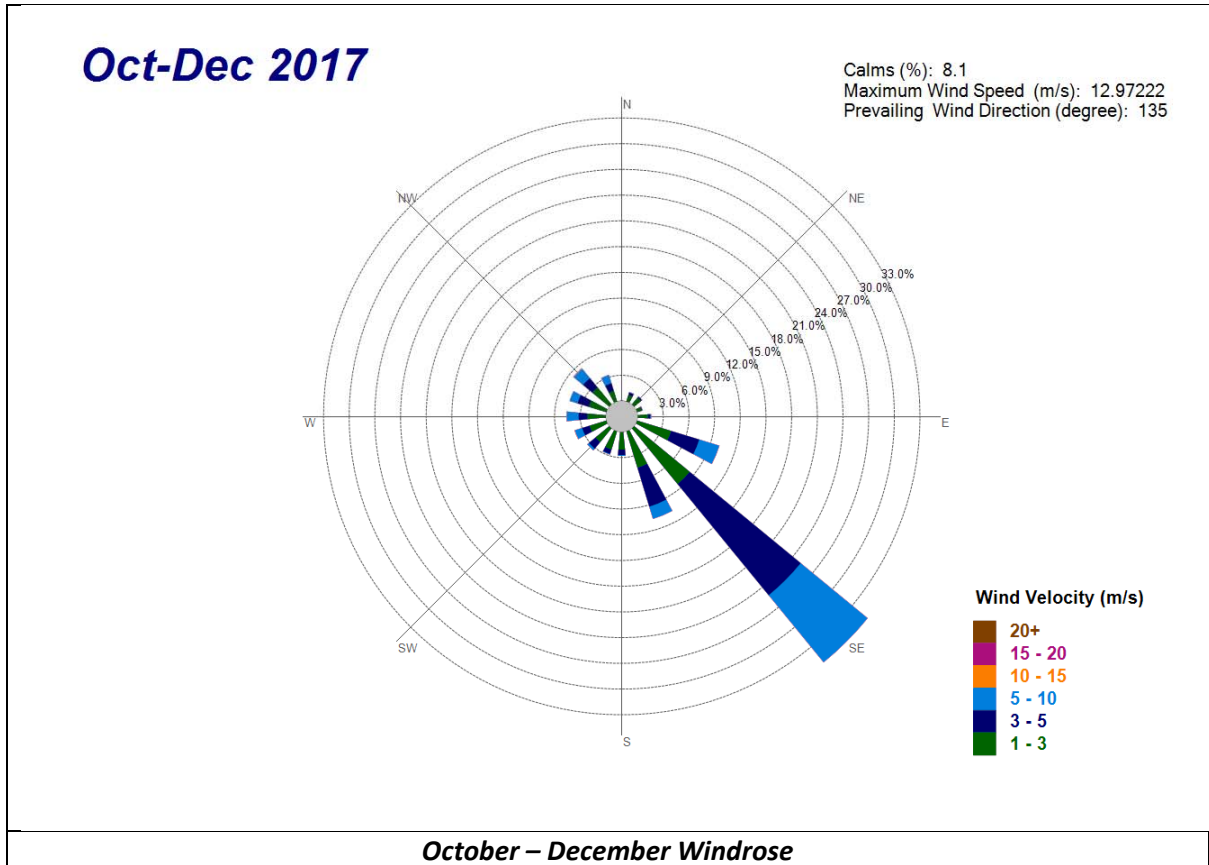
Figure 2: Quarterly Windroses

3.2.2   RAINFALL

Total rainfall recorded during the reporting period was 347.0mm, which is significantly below the long-term average of 620.8mm, recorded at the nearest Australian Bureau of Meteorology (BOM) site at Lower Hill Street in Muswellbrook. This is the driest year on record at MCC since records commenced in 2005. A summary of rainfall during the reporting period, compared to the historical rainfall at MCC and the closest BOM station in Muswellbrook, is provided in **Table 12** and **Figure 3**.

Table 12: Rainfall Data

Month	Muswellbrook Coal Actual (mm)	Muswellbrook Coal Average (mm)	Muswellbrook BOM Average (mm)
January	22.6	69.1	69.6
February	7.6	74.2	66.9
March	96.8	45.6	52.8
April	29.4	37.7	43.5
May	26.4	27.8	41.5
June	42.4	65.9	51.3
July	2.6	34.3	44.2
August	13.6	35.2	38.6
September	14.6	31.6	40.7
October	46.0	39.0	48.6
November	21.8	80.9	56.1
December	23.2	60.1	67.0
Total	**347.0**	**601.4**	**620.8**
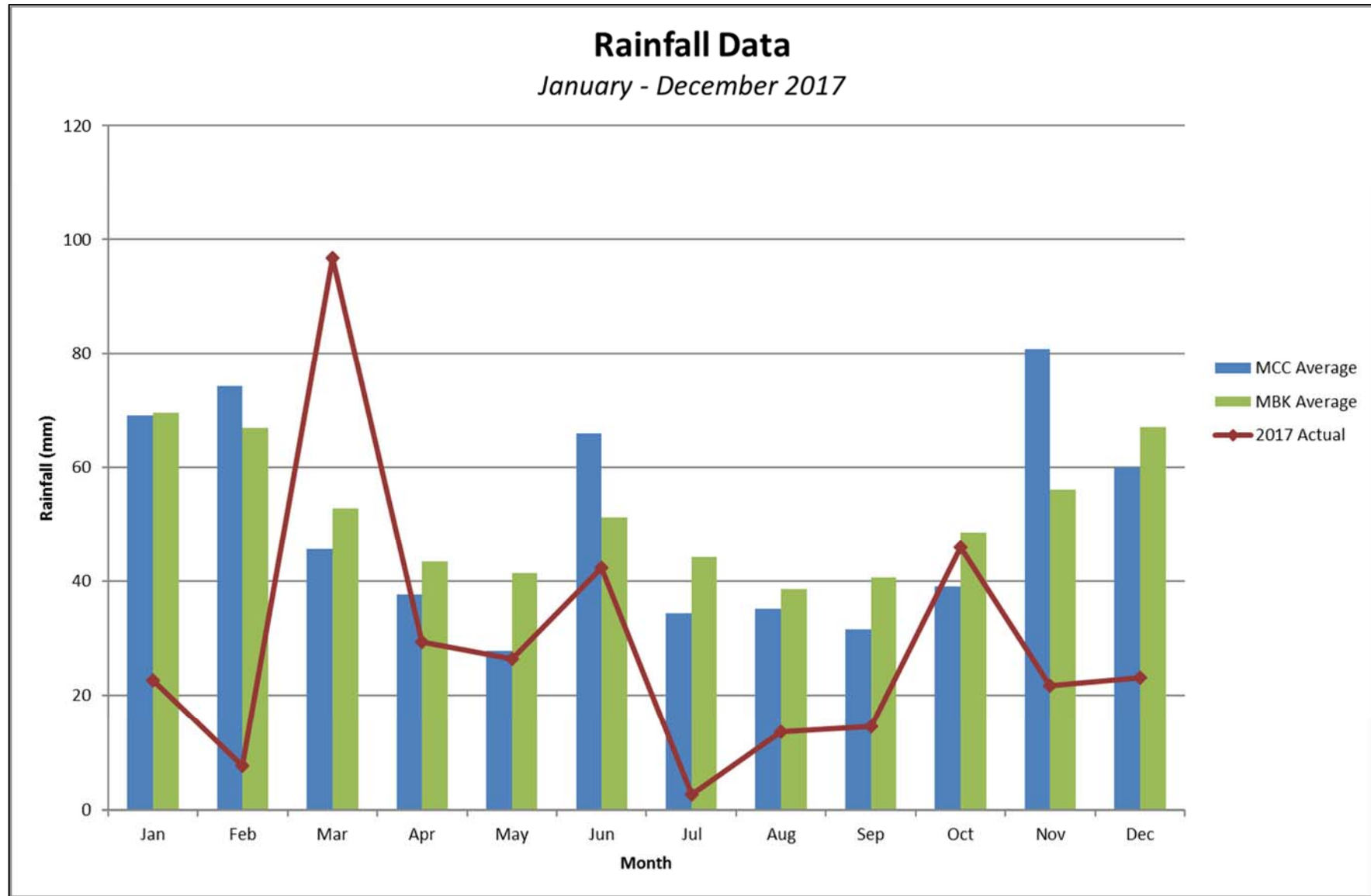
Figure 3: Rainfall Graph

3.2.3 TEMPERATURE

Maximum temperature recorded during the reporting period was 46.1°C and the minimum recorded was -1.0°C. This is consistent with the long term minimum and maximum recorded by the Australian Bureau of Meteorology site at Scone, -5.1°C and 44.2°C. A summary of minimum, maximum and average monthly temperatures during the reporting period is provided in **Table 13** and **Figure 4**.

Table 13: Temperature Data

Month	Minimum Temperature (°C)	Average Temperature (°C)	Maximum Temperature (°C)
January	16.2	26.2	41.3
February	11.1	26.1	46.1
March	11.8	21.7	33.9
April	5.3	16.5	27.0
May	0.3	13.6	25.1
June	0.7	11.5	18.9
July	-1.0	10.2	23.5
August	0.3	12.0	25.4
September	0.5	16.3	33.7
October	6.5	19.3	35.3
November	7.7	19.3	32.0
December	13.9	25.1	41.1
Summary	**-1.0**	**18.2**	**46.1**

3.2.4 INVERSION MONITORING

Inversion strength is measured between two different meteorological sites around MCC at two different elevations. The recorded temperatures are used to calculate the temperature differential per 100 metres (inversion strength). Temperatures normally decrease with increase in height above the ground. A temperature inversion is a temperature increase with height. Meteorological conditions, such as temperature inversion, may significantly increase noise levels by focusing sound-wave propagation paths at a single point. Inversions over 3°C per 100m are considered to be strong and occur primarily during the evening to early morning in the cooler months.

Over the reporting period, inversions were monitored and the daily maximum recorded. The days in each month recording an inversion level of 3°C/100m or greater (strong inversion) are displayed in **Figure 5**. A strong inversion was recorded on 61 days during the reporting period with May 2017 having the highest number of days with 19 days above 3°C/100m.
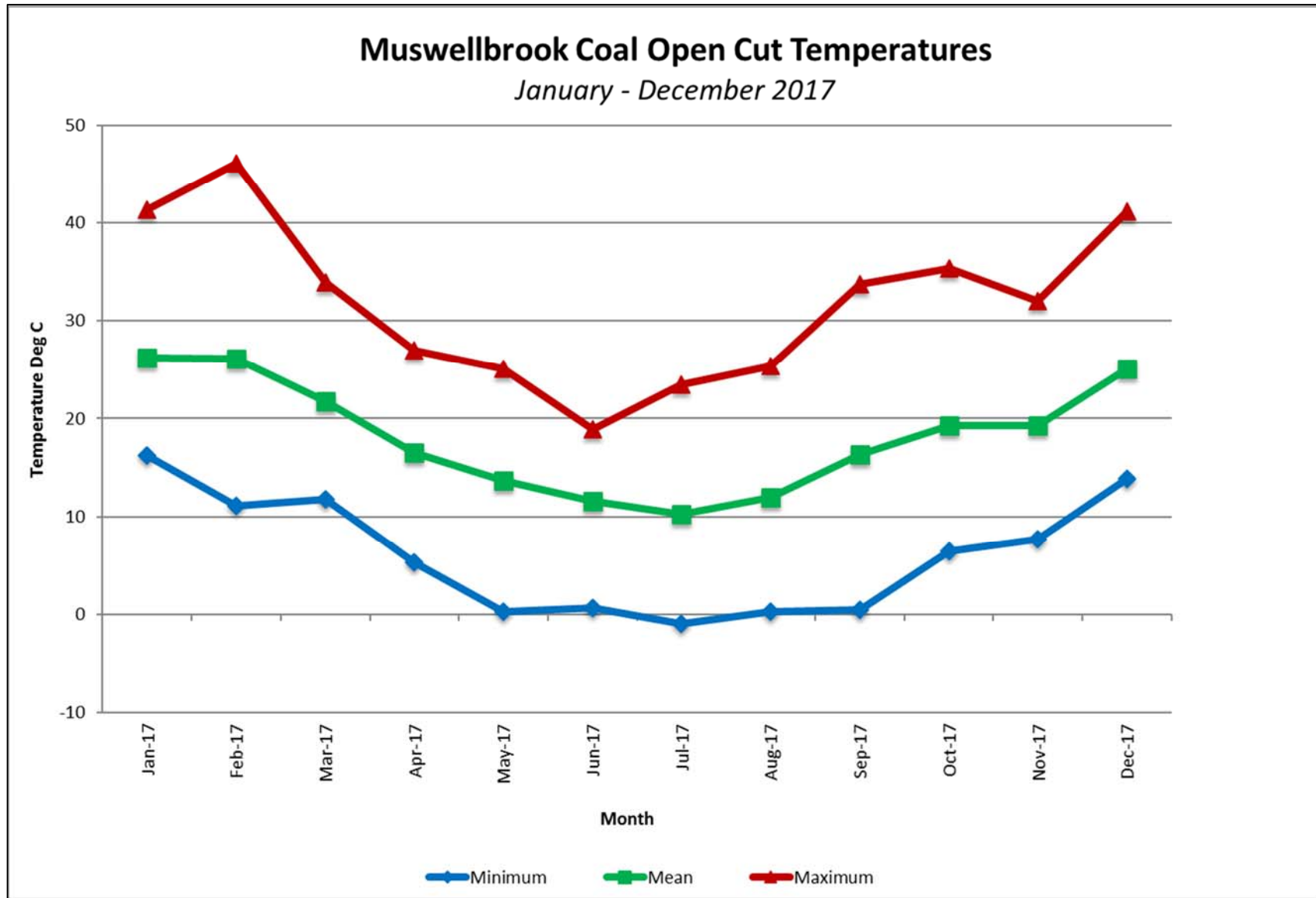
Figure 4: Temperature Graph

Temperature Inversion - Days Over 3.0°C per 100m
January - December 2017
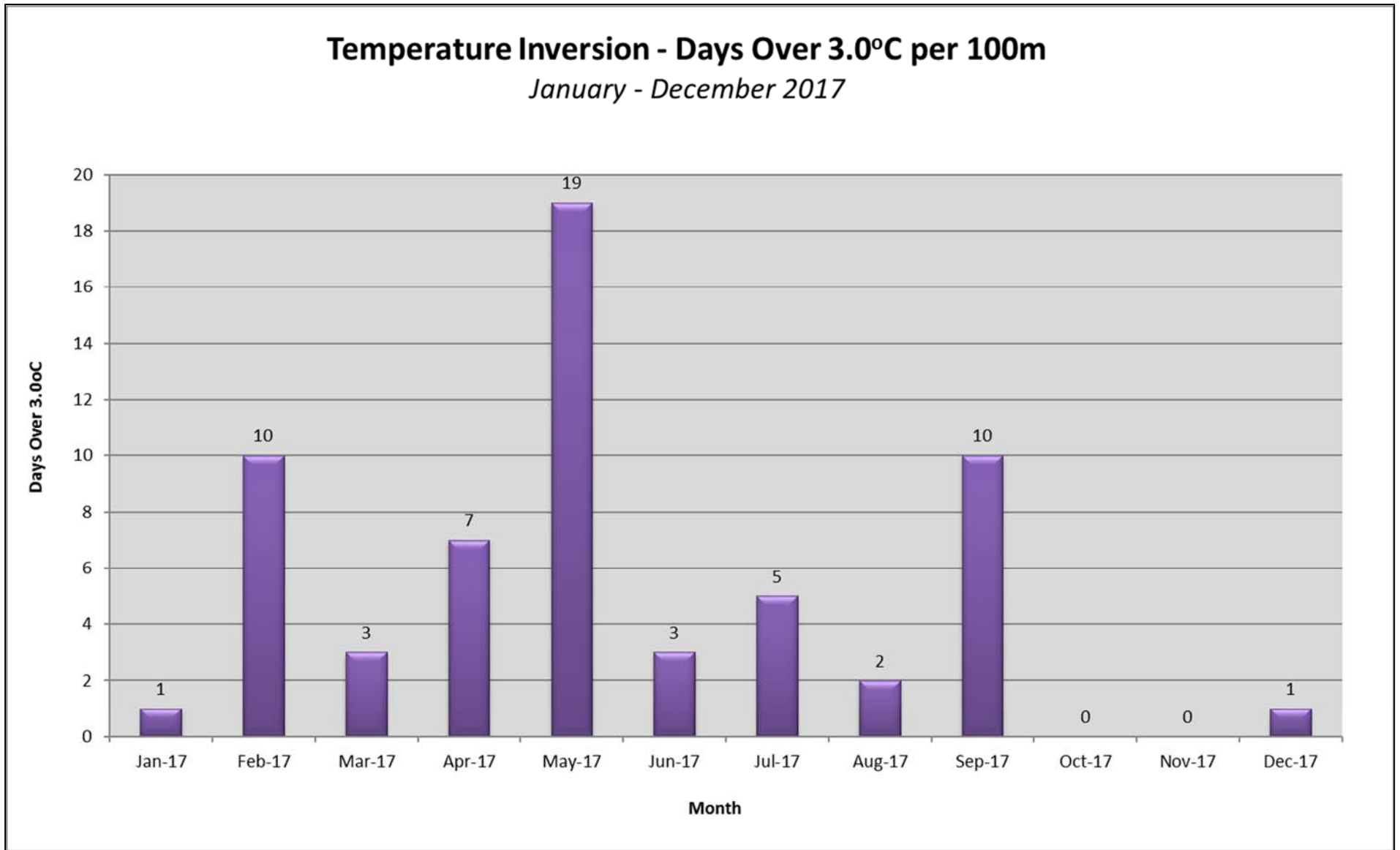
Figure 5: Temperature Inversion Graph

3.3 AIR QUALITY MANAGEMENT

3.3.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC reviewed and updated the Air Quality Management Plan to reflect the updated requirements of the development consent and environmental protection licence. This review of the management plan did not make any changes to the management practices at MCC but there were changes made to the air quality monitoring program. These changes include:

- Removal of dust depositional gauges – these were decommissioned at the end of June 2017.
- Removal of high volume air samplers – these were decommissioned at the end of June 2017.
- Relocation of PM10 monitors – these were moved at the end of June 2017.
- Introduction of gas monitoring for sulphur dioxide (SO_2) and hydrogen sulphide (H_2S) – monitoring at one location commenced at the end of August 2017, the other two sites will be commissioned in February 2018.

The historical air quality monitoring sites are shown in **Figure 6** and the current air quality monitoring sites are shown in **Figure 7**.

The primary objective of air quality management at MCC is to manage and minimise the impact of dust from the operations on the environment and nearby residences. Dust mitigation measures have been divided into control procedures for wind-blown dust and mining generated dust sources.

Dust can be generated from two primary sources, either windblown dust from exposed areas, or dust generated by mining activities. The control procedures for these sources are outlined in **Table 14** and **Table 15**.

Table 14: Control Procedures for Wind Blown Dust

Source	Control Procedures
Areas disturbed by mining	- Disturb only the minimum area necessary for mining. - Reshape, topsoil and rehabilitate completed overburden emplacement areas after the completion of overburden tipping.
Coal Handling and Coal Stockpile Areas	- Maintain coal handling areas in a moist condition using water carts to minimise windblown and traffic generated dust. - Clean-up after any spillage event. - Water carts to operate around the coal stockpile area to suppress dust on roadways and the coal stockpiles.
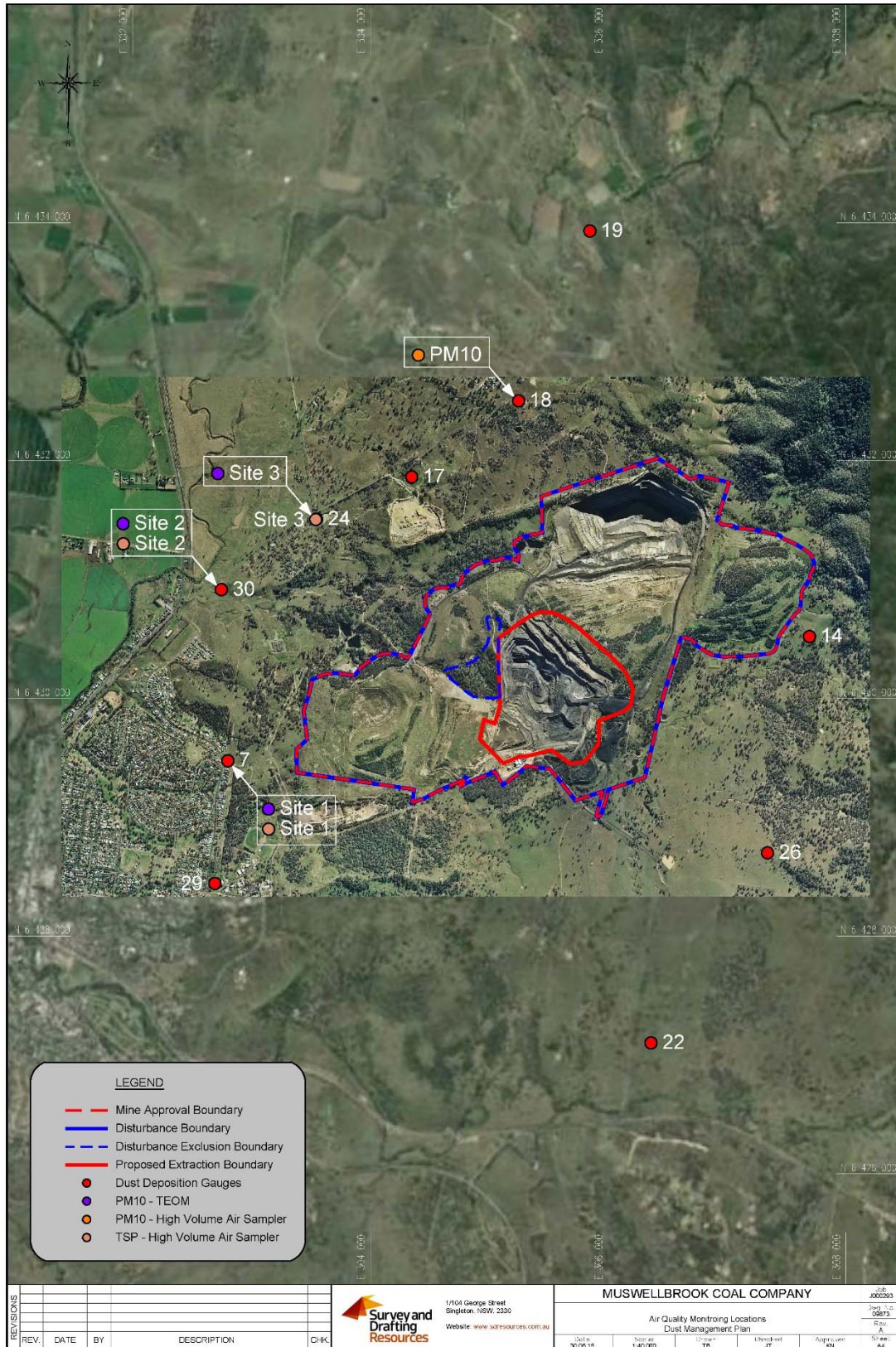
Figure 6: Historical Air Quality Monitoring Locations
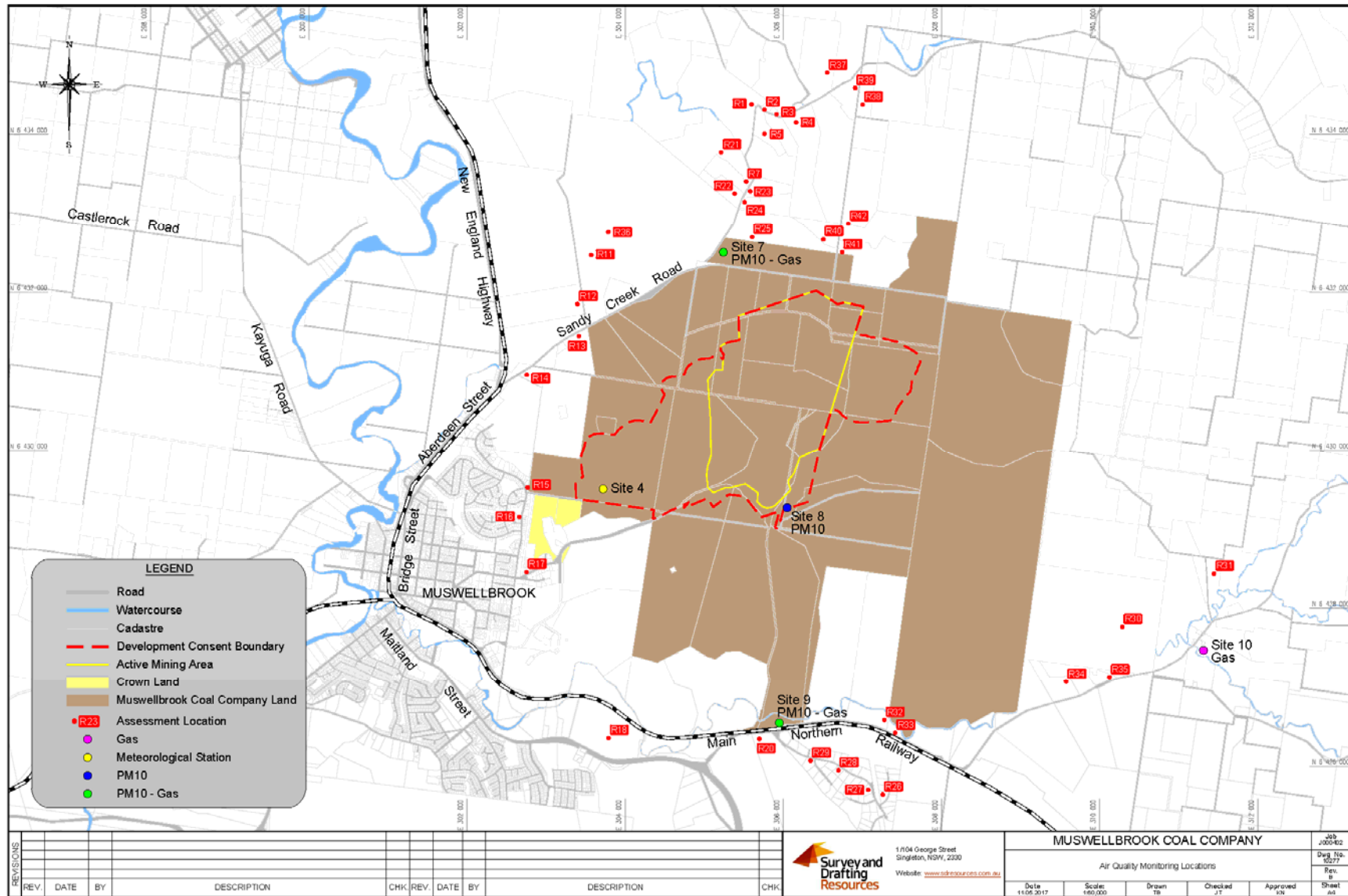
Figure 7: Current Air Quality Monitoring Locations

Table 15: Control Procedures for Mining Generated Dust Sources

Source	Control Procedures
Haul road dust	• All roads and traffic areas will be watered using water carts to minimise the generation of dust. • Long term haul roads will be sheeted with hard wearing material where practicable.
Minor roads	• Development of minor roads will be limited to those roads as required by mining and rehabilitation activities. • Minor roads will be watered if used for extended periods.
Topsoil stockpiling	• All topsoil stockpiles will be located and shaped to minimise the area exposed to prevailing winds. • Long term topsoil stockpiles, not used for over 6 months will be vegetated.
Drilling	• Dust aprons will be lowered during drilling. • Drills will be equipped with dust extraction cyclones or water injection systems. • Water injection or suppression sprays will be used when high levels of dust are being generated.
Blasting	• Stemming will be used at all times. • Blasting will occur in accordance with the Blast-Vibration Management Plan relating to meteorological conditions.
Raw Coal Receival Bin	• Sprays are to be used when tipping raw coal into the receival bin during high wind events.
Coal Handling and Preparation Plant	• Sprays are fitted at transfer points.

Equipment used to control dust generation include: water cart (sprays on haul roads and coal stockpiles), sprays at the Raw Coal Receival Bin, sprays at conveyor transfer points, dust extraction cyclones or water injection systems on drill rigs.

Further control procedures are implemented during periods of high dust emissions and for short term episodic events.

3.3.2 AIR QUALITY MONITORING

The air quality criteria that apply to MCC are shown in **Table 16** – **Table 18**.

Table 16: Long Term Particulate Matter Criteria

Pollutant	Standard / Goal
Particulate Matter <10μg (PM$_{10}$)	30μg/m^3 (annual mean)

Table 17: Short Term Particulate Matter Goal

Pollutant	Standard/Goal
Particulate Matter <10μm (PM$_{10}$)	50μg/m^3 (24-hour average)

Table 18: Atmospheric Gas Content Criteria

Pollutant	Criterion	
Sulphur Dioxide (SO$_2$)	80ppb (24 hour average)	200ppb (1 hour average)
Hydrogen Sulphide (H$_2$S)	100ppb (24 hour average)	500ppb (1 hour average)

The historical and current air quality monitoring sites are displayed in **Figure 6** and **Figure 7**.

Depositional Dust Gauge Results

Monitoring depositional dust has occurred in the area surrounding MCC since 1983 and ceased at the end of June 2017.

All gauges were analysed for insoluble solids and ash residue. The annual average EPA maximum for depositional dust on non-mine owned land is 4.0g/m^2/month.

All dust gauges were sampled on a 30±2 day cycle and sent to a NATA accredited laboratory for analysis. Samples with excessive contamination, including bird droppings, insects and vegetation, were excluded from the annual average. Contamination is determined based on field observation and laboratory analysis.

There was a network of eight dust deposition dust gauges with the locations of the gauges shown in **Figure 6** with a description provided in **Table 19**.

Table 19: Depositional Dust Gauge Locations

Location Identifier	Description of Location
D7	Queen St Muswellbrook – west of operations
D17	Sandy Creek Road – northwest of operations
D18	Sandy Creek Road – north of operations
D19	McCullys Gap – north of operations
D22	Muscle Creek Road – southeast of operations
D24	Sandy Creek Road – northwest of operations
D26	Muscle Creek Road – southeast of operations
D29	Queen St – Muswellbrook

All gauges complied with the maximum annual average dust criteria of 4g/m^2/month. The 12 month-rolling average dust deposition rates for insoluble solids until June 2017 for all monitoring sites was 1.8g/m^2/month. **Table 20** compares the average results for this reporting period, historical monitoring results, background results and predictions made in the 2010 Environmental Assessment (EA). As the depositional dust gauges were to be removed following the modification to the consent in 2016, depositional dust rates weren't modelled in the 2016 Statement of Environmental Effects. The results this reporting period are consistent with historical monitoring results and background levels and are below the predicted results from the EA.

Table 20: Comparison of Depositional Dust Results

Year	Average Monitoring Results (g/m^2/month)	Background Results (g/m^2/month)*	EA Predicted Results (g/m^2/month)*
2017	1.8	1.7	2.3
2016	1.8	1.7	2.3
2015	1.8	1.7	2.3
2014	2.2	1.7	2.3
2013-2014	2.1	1.7	2.3
2012-2013	1.9	1.7	2.3
2011-2012	1.7	1.7	2.3
2010-2011	1.6	1.7	2.3

* - average of all gauges

12-month rolling average and historical average values are displayed in **Figure 8**. The results of the depositional dust monitoring program for the reporting period are presented in **Appendix 1**.

Total Suspended Particulates (TSP) High Volume Air Samplers (HVAS)

Three TSP HVAS units were located to the west and north-west of the operation and were operational from March 2005 until they were decommissioned in June 2017. Samples were collected over a 24-hour period on the EPA nominated six-day run cycle. Filter papers were then collected and sent to a NATA accredited laboratory for analysis. The locations of the HVAS are shown in **Figure 6** with a description provided in **Table 21**.

Table 21: TSP Monitoring Locations

Location Identifier	Description of Location
Site 1	Queen St Muswellbrook – west of operations
Site 2	Sandy Creek Road – northwest of operations
Site 3	Corner Sandy Creek Road and St Heliers Road – northwest of operations

Annual average TSP results for the reporting period were below the annual criteria of 90µg/m^3 at all sites. **Table 22** displays the average TSP value at each monitoring location during the reporting period. **Figure 9 – Figure 11** display the 24-hour TSP results over the monitoring period. A comprehensive table of TSP results is provided in **Appendix 1**.

Table 22: TSP Averages

Site	Annual Average TSP Concentration (µg/m^3)	Annual Average Criteria (µg/m^3)	2017 Data Recovery %
1	32.6	90	100
2	32.9	90	100
3	36.7	90	100
All sites	**34.1**	**90**	**100**

Table 23 compares the average results for 2017, historical monitoring results, background results and predictions made in the 2010 Environmental Assessment. As TSP monitoring was to be removed following the modification to the consent in 2016, TSP wasn't modelled in the 2016 Statement of Environmental Effects. The results in 2017 are below historical monitoring results, background levels and the predicted results in the EA.

Table 23: Comparison of TSP Results

Year	Average Monitoring Results (µg/m^3)*	Background Results (µg/m^3)*	EA Predicted Results (µg/m^3)*
2017	34.1	41.4	46.4
2016	31.4	41.4	46.4
2015	30.8	41.4	46.4
2014	45.5	41.4	46.4
2013-2014	39.4	41.4	46.4
2012-2013	40.3	41.4	46.4
2011-2012	31.9	41.4	46.4
2010-2011	30.9	41.4	46.4

* - average of all sites
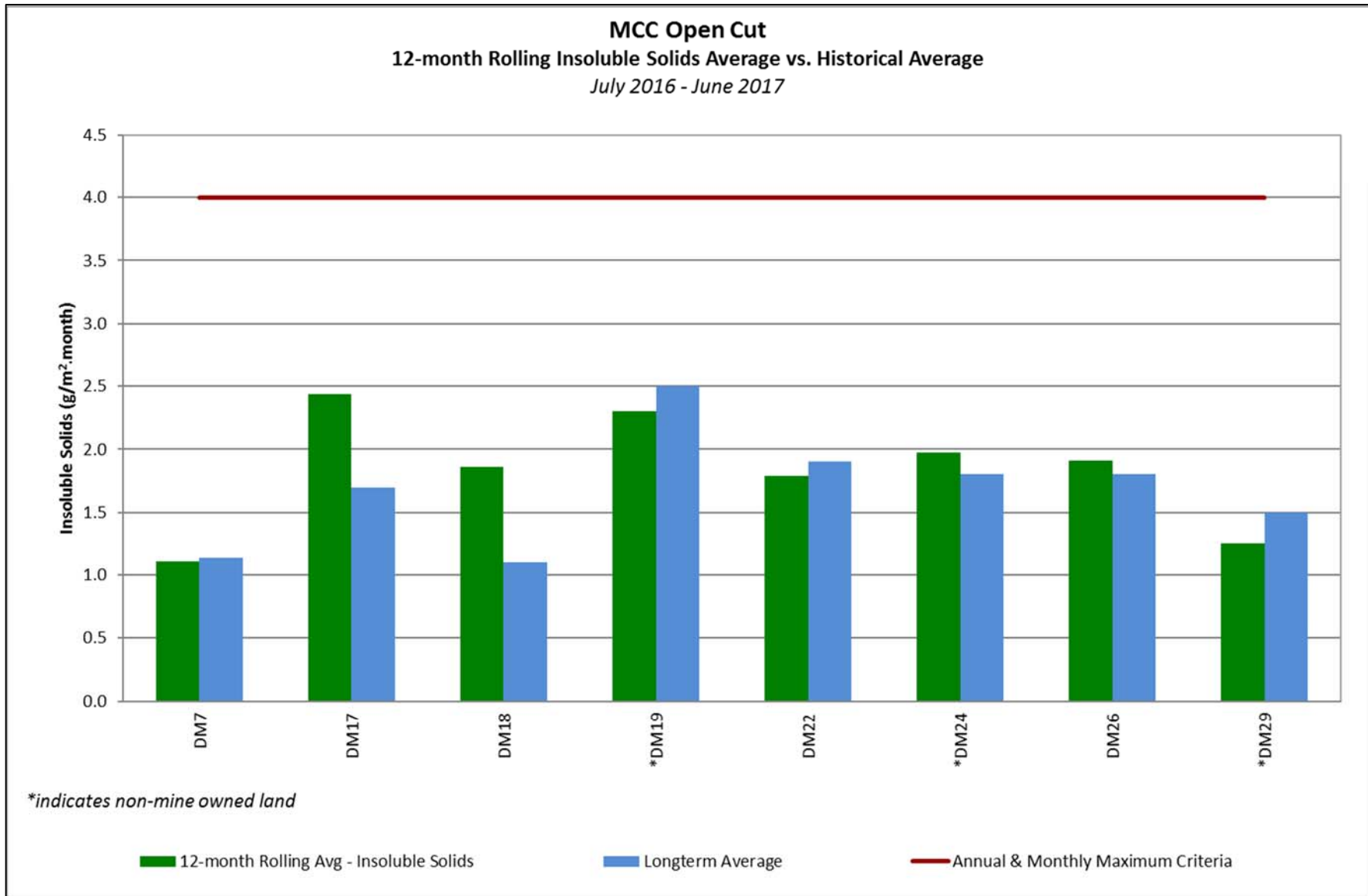
Figure 8: Average Depositional Dust Results
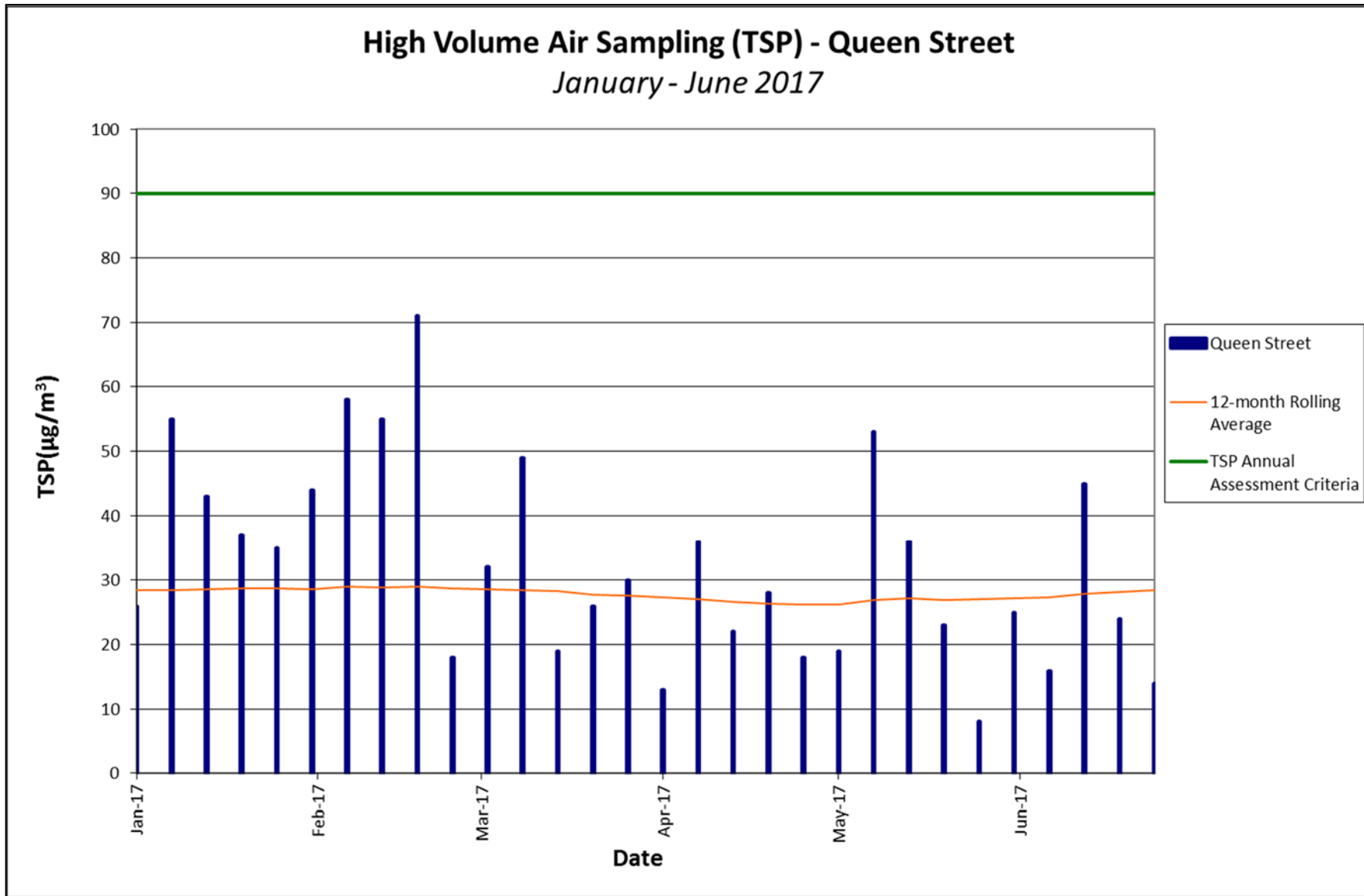
Figure 9: Site 1 TSP Monitoring Results
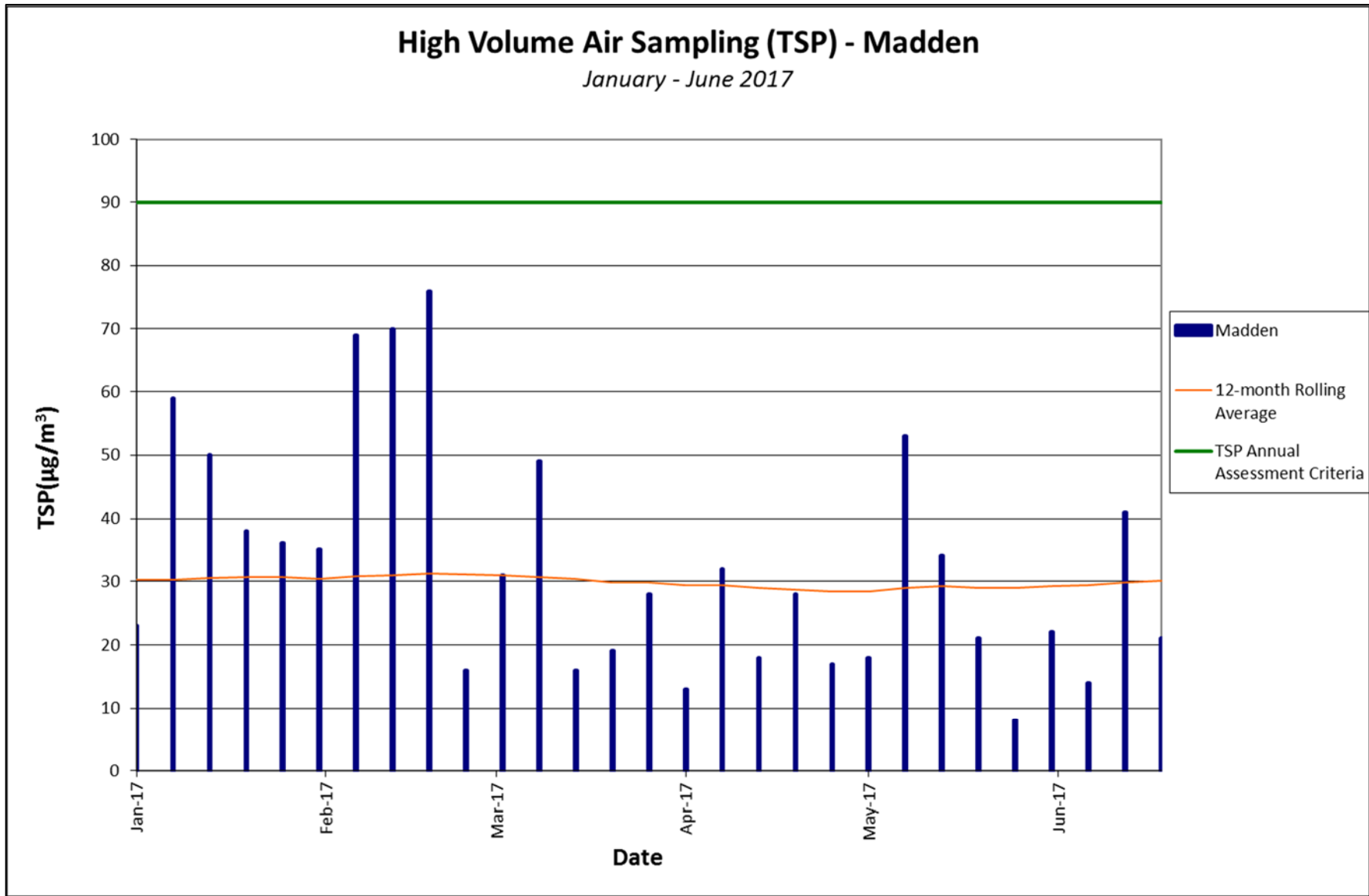
Figure 10: Site 2 TSP Monitoring Results
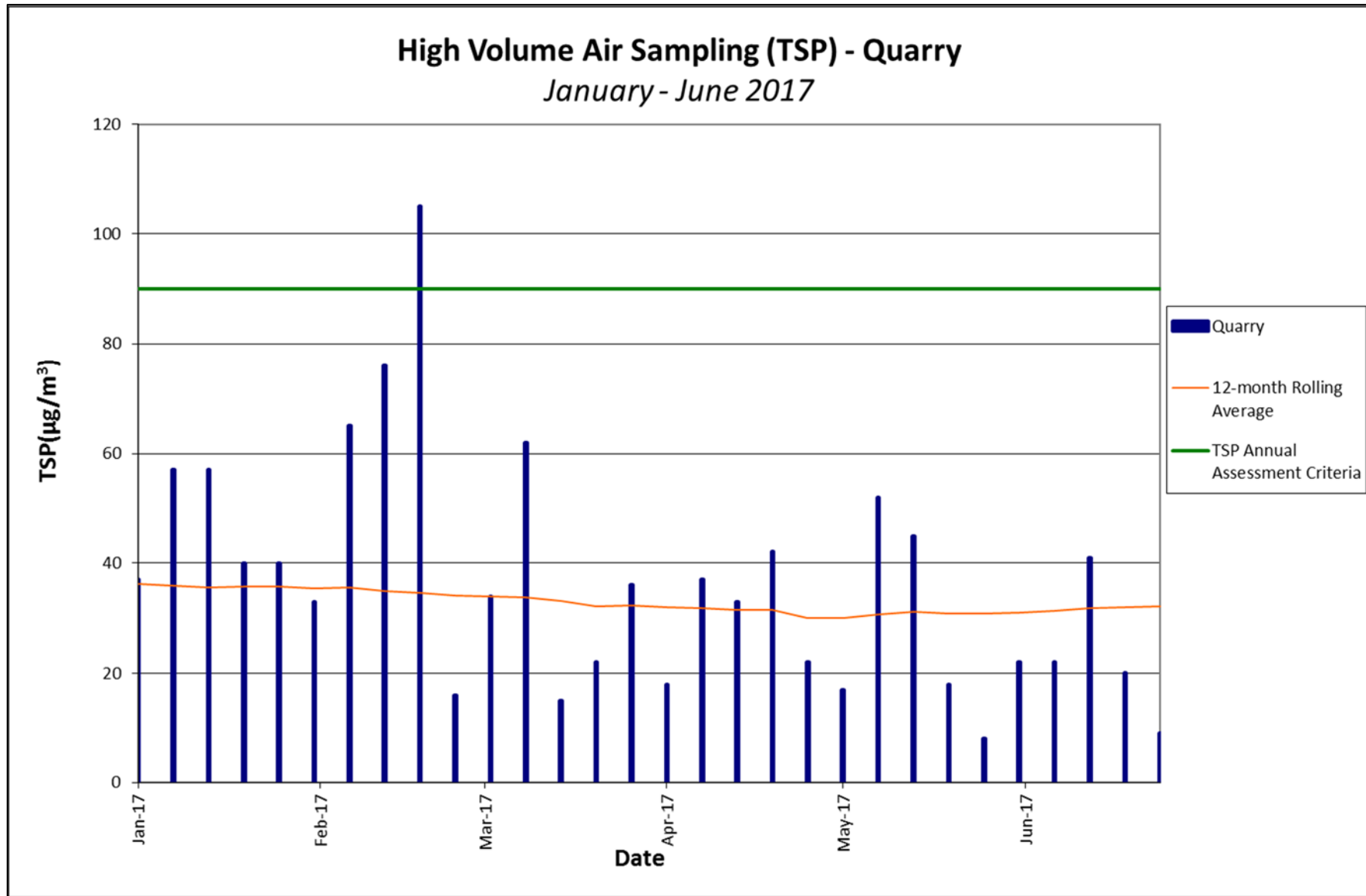
Figure 11: Site 3 TSP Monitoring Results

Particulate Matter <10µg (PM$_{10}$)

Three real-time PM$_{10}$ monitoring units have been operational since March 2005. Two of these units were relocated at the end of June 2017 and the third unit was relocated at the end of August 2017. All three units continuously relay weather data to a password protected website that is accessible by MCC personnel. The historical monitoring locations are shown in **Figure 6** and the current monitoring locations are shown in **Figure 7**.

The PM$_{10}$ units are continuous electronic monitoring systems that are subject to equipment faults, communication losses, power outages and maintenance downtime. High data recovery is considered essential and data recovery levels obtained during the reporting period were 98% across the three units. Some data was also lost while the units were being relocated.

The criteria in the development consent apply to PM10 levels at residential locations and as monitoring location Site 8 is used as a management tool, it is not subject to the criteria in the development consent. There were four days during the reporting period where the 24 hour PM$_{10}$ results were above the 24-hour criteria of 50µg/m^3 at the compliance based monitoring locations. These days were in February 2017 and the high levels were a result of smoke from bushfires burning in the local area. These results were communicated to MSC and EPA shortly after the results were confirmed.

The annual average PM$_{10}$ did not exceed the 30µg/m^3 annual criteria during the reporting period. **Table 24** displays the average PM$_{10}$ value at each site during the reporting period with the results graphically presented in **Figure 12 – Figure 17**. A table of comprehensive PM$_{10}$ results is provided in **Appendix 1**.

Table 24: Real-Time PM$_{10}$ Averages

Site Number	Annual Average PM$_{10}$ Concentration (µg/m^3)	Annual Average Criteria (µg/m^3)	Data Recovery %
1	17.1	30	99
2	17.2	30	99
3	15.7	30	88
7	15.6	30	100
8	55.5	NA	99
9	16.7	30	99
All sites	**16.7 (excl Site 8)**	**30**	**98**

Table 25 compares the average results from Sites 1-3 for this reporting period, historical monitoring results, background results and predictions made in the 2010 Environmental Assessment (EA) (for 2016 and earlier) and the 2016 Statement of Environmental Effects (SEE) (for 2017 data). When the SEE was prepared a different data set was used to calculate the background results and the predicted results were also recalculated. The results this reporting period are generally consistent with historical monitoring results, and below the background levels and the predicted results in the EA and SEE.

Table 25: Comparison of Real-Time PM$_{10}$ Results (Sites 1-3)

Year	Average Monitoring Results (µg/m³)*	Background Results (µg/m³)*	EA Predicted Results (µg/m³)*
2017	16.7	16.9	20.0
2016	14.1	17.6	20.6
2015	14.5	17.6	20.6
2014	16.9	17.6	20.6
2013-2014	17.4	17.6	20.6
2012-2013	18.3	17.6	20.6
2011-2012	14.0	17.6	20.6
2010-2011	14.1	17.6	20.6

* - average of all sites

Table 26 compares the results from Sites 7 and 9 for this reporting period, background results and predictions made in the 2016 Statement of Environmental Effects (SEE). The results this reporting period are generally consistent with the background levels and the predicted results in the EA and SEE. 2017 was modelled as the worst-case scenario in the SEE, and the actual results were lower than the predicted results. As reported in **Section 3.2.2,** there was very low rainfall this reporting period and very dry conditions were experienced, and the air quality results demonstrate that MCC has been managing dust emissions effectively during the dry conditions**.**

Table 26: Comparison of Real-Time PM$_{10}$ Results (Sites 7 and 9)

Year	Monitoring Results (µg/m³)		Background Results (µg/m³)		SEE Predicted Results (µg/m³)	
	Site 7	Site 9	Site 7	Site 9	Site 7	Site 9
2017	15.6	16.7	16.9	16.9	23.0	17.0

In addition to the real-time PM$_{10}$ units a PM$_{10}$ HVAS unit has been established with the location of this site shown in **Figure 6**. This unit operates on a 6-day cycle and is not real-time like the other PM$_{10}$ units. This unit was decommissioned in July 2017. There were three days during the reporting period where the 24 hour PM$_{10}$ result was above the 24-hour criteria of 50µg/m³. These occurred on 11 February 2017, 17 February 2017 and 23 February 2017. These high results were a result of smoke from bushfires burning in the local area. The annual average PM$_{10}$ did not exceed the 30µg/m³ annual criteria during the reporting period. The rolling annual average PM$_{10}$ HVAS recorded over the reporting period was 18.2µg/m³ with the results being displayed in **Figure 18** and **Table 27**.

Table 27: PM$_{10}$ HVAS Average

| Site Number	Annual Average PM$_{10}$ Concentration (µg/m³)	Annual Average Criteria (µg/m³)	Data Recovery %
Nisbet	18.2	30	100

Table 28 compares the average results for this reporting period, historical monitoring results, background results and predictions made in the 2010 Environmental Assessment (EA) (for 2016 and earlier) and the 2016 Statement of Environmental Effects (SEE) (for 2017 data). When the SEE was prepared a different data set was used to calculate the background results and the predicted results were also recalculated. The results this reporting period are generally consistent with historical monitoring results, are slightly elevated when compared with background levels but are below the levels predicted in the EA.

Table 28: Comparison of PM$_{10}$ Results

Year	Average Monitoring Results (µg/m³)*	Background Results (µg/m³)*	EA Predicted Results (µg/m³)*
2017	18.2	16.9	20.0
2016	19.4	17.6	20.6
2015	19.1	17.6	20.6
2014	19.1	17.6	20.6
2013-2014	16.7	17.6	20.6
2012-2013	16.2	17.6	20.6
2011-2012	11.2	17.6	20.6
2010-2011	10.6	17.6	20.6

* - average of all sites

Gas Monitoring (Hydrogen Sulphide and Sulphur Dioxide)

During July 2017, MCC installed a gas monitor in the Muscle Creek area with the location shown in **Figure 7**. Monitoring is performed by a GrayWolf TG-501 Toxic Gas Probe fitted with H$_2$S and SO$_2$ sensors. The unit is enclosed in a weatherproof case with the sensor at a height of approximately 1.8m above the ground. While the sensor is designed as a passive sampler, a small fan has been installed to generate airflow past the sensor to provide adequate air movement for a representative atmosphere for gas analysis.

The GrayWolf monitor measures gasses in parts per million (ppm) with the following limits of detection (LOD):
- H$_2$S:0.01 ppm
- SO$_2$:0.1 ppm

Readings are then converted to parts per billion (ppb) for reporting purposes with the LOD's being 10ppb for H$_2$S and 100 ppb for SO$_2$. For the calculation of 1hr and 24hr averages, where the instrument returns a zero reading, half the instrument LOD value is used. These are 5 ppb for H$_2$S and 50 ppb for SO$_2$.

The criteria for H$_2$S and SO$_2$ are shown in **Table 18**. A summary of the monitoring results is shown in **Table 29** and this shows that there were no results above these criteria during the reporting period. The full data set can be seen in **Appendix 1**.

Table 29: Summary of Gas Data Results

Month	Highest SO$_2$ 1 hour result	Highest SO$_2$ 24 hour result	Highest H$_2$S 1 hour result	Highest H$_2$S 24 hour result
July/August	50*	50*	75.8	22.6
September	50*	50*	98.5	28.6
October	50*	50*	15.0	5.8
November	50*	50*	11.3	5.4
December	50*	50*	33.8	6.8

3.3.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, a Spontaneous Emissions Combustion Study will commence as per the requirements of the EPL. This will include the installation of additional Hydrogen Sulphide (H$_2$S) and Sulphur Dioxide (SO$_2$) monitors. Data from the gas monitors will be made available on MCC's website with the final report due to be finalised in 2019. MCC will continue to manage and monitor air quality impacts in accordance with the AQMP.
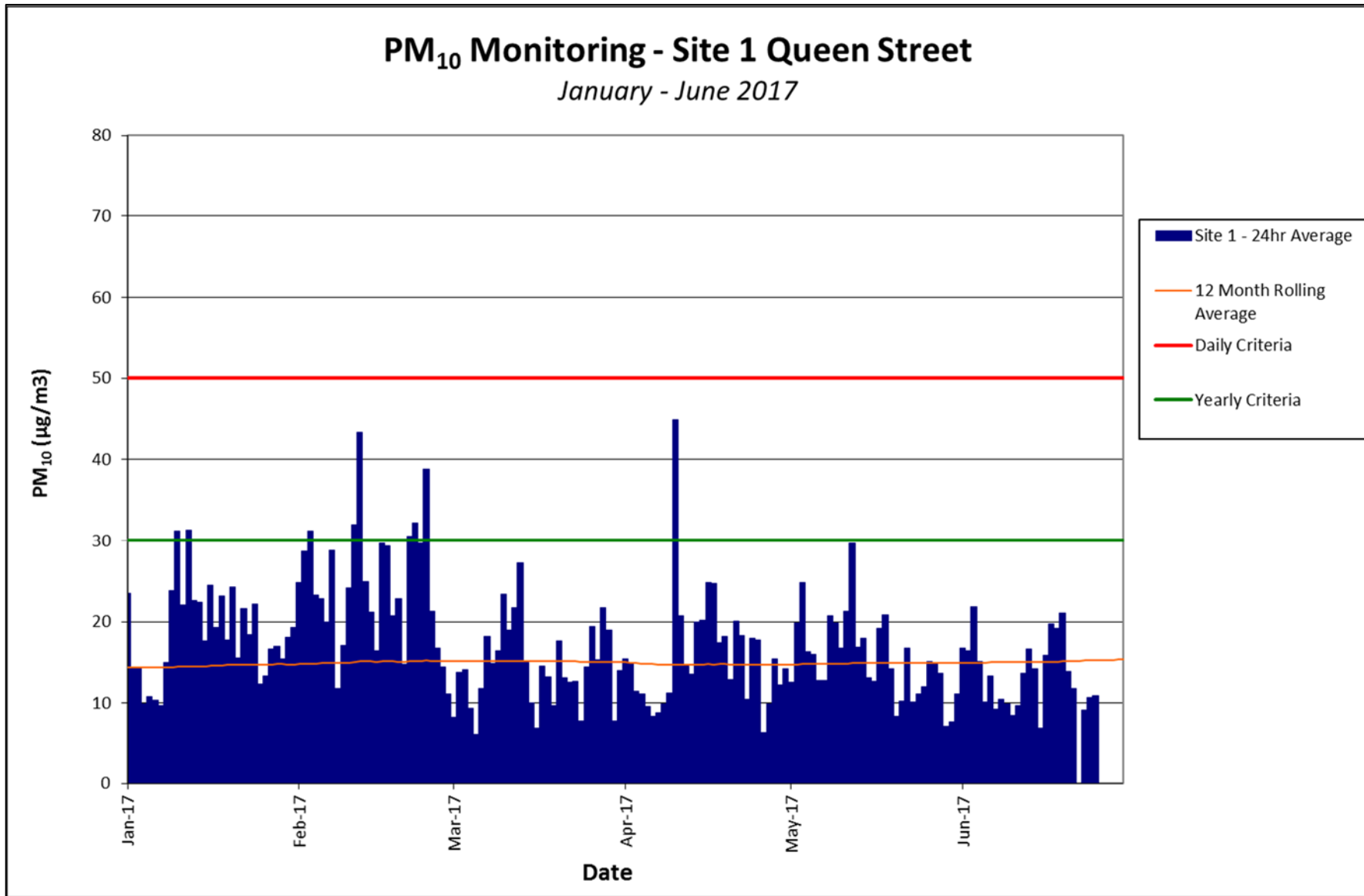
Figure 12: Site 1 PM$_{10}$ Results
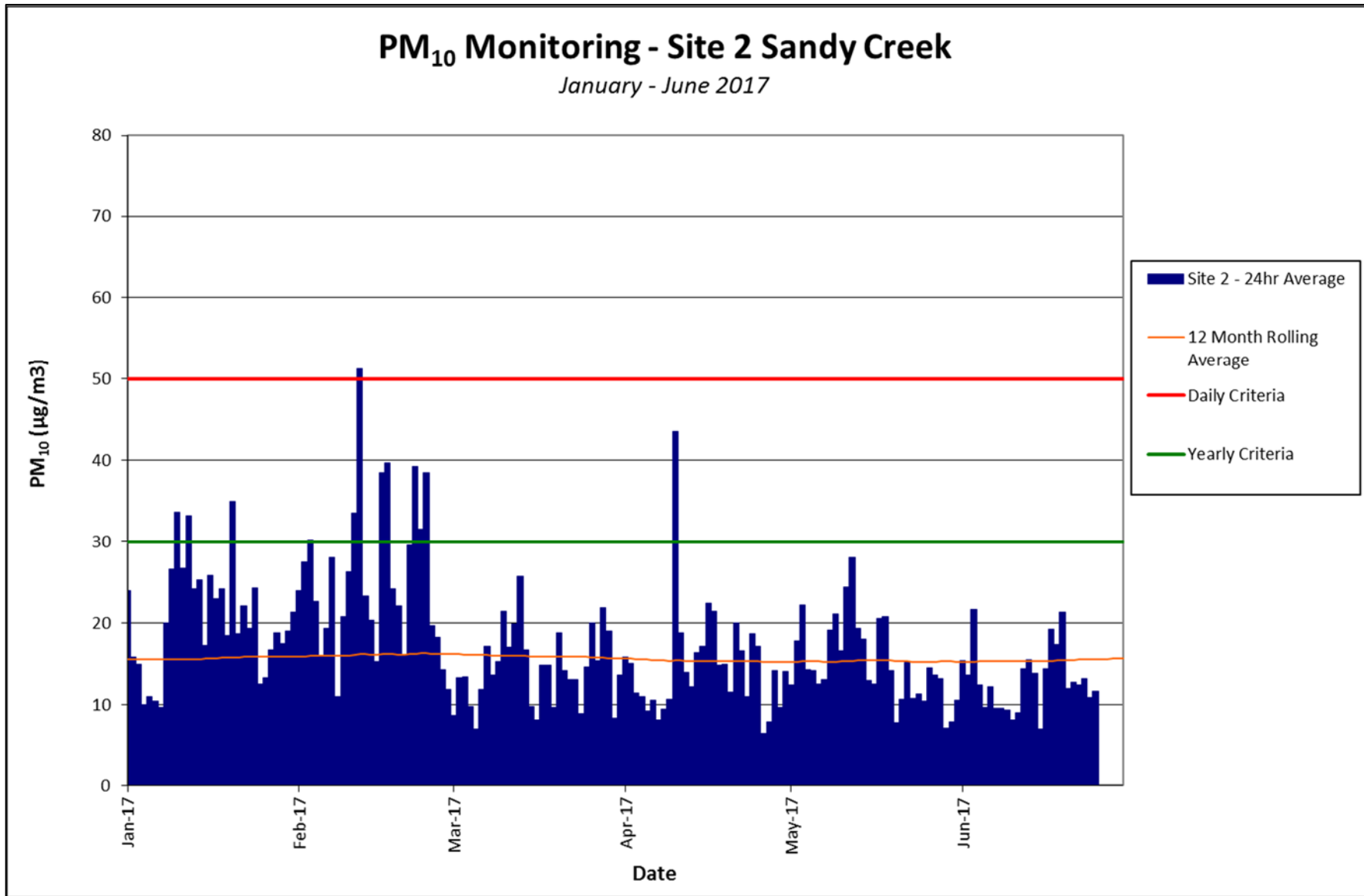
Figure 13: Site 2 PM$_{10}$ Results
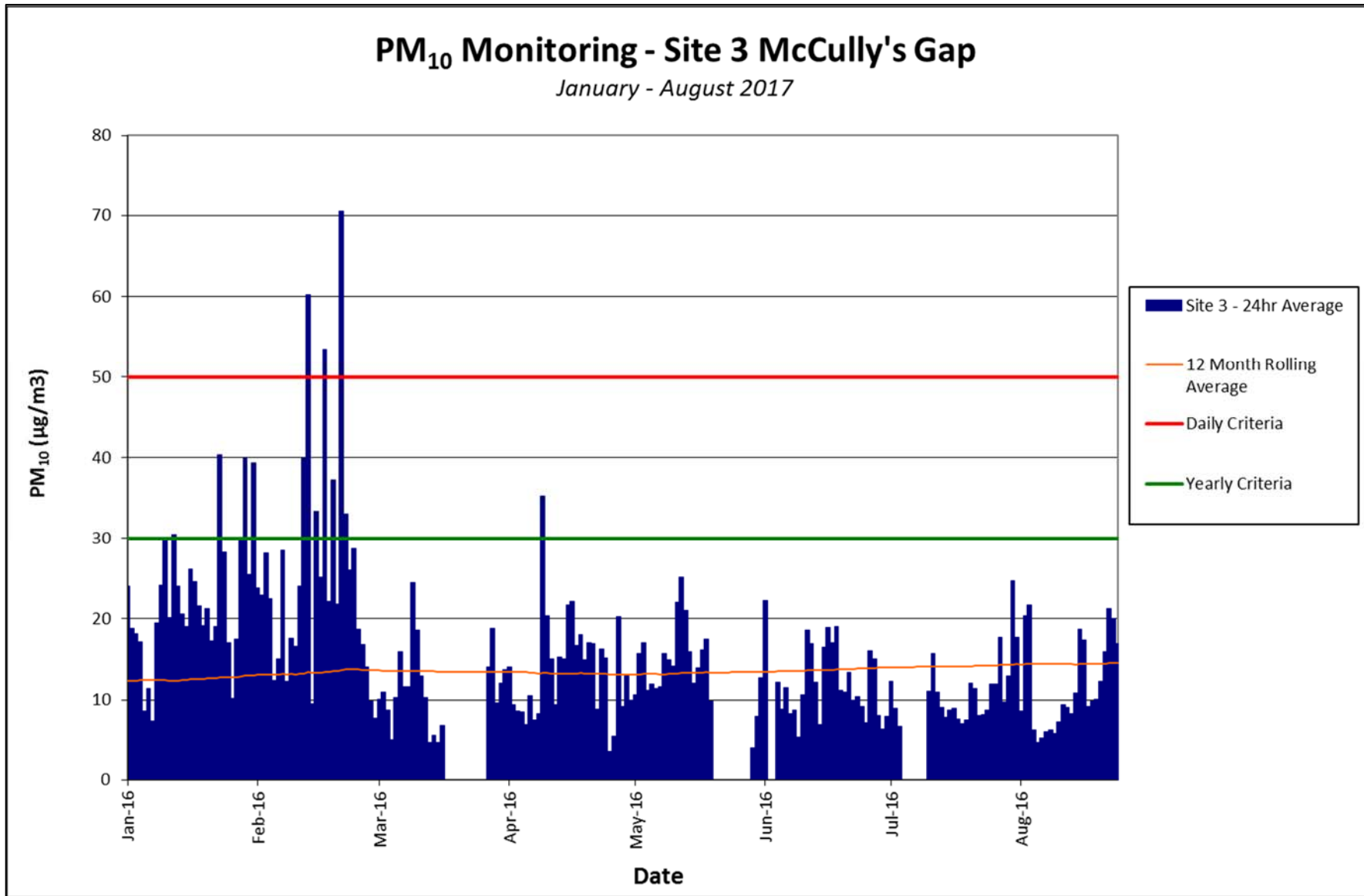
Figure 14: Site 3 PM$_{10}$ Results
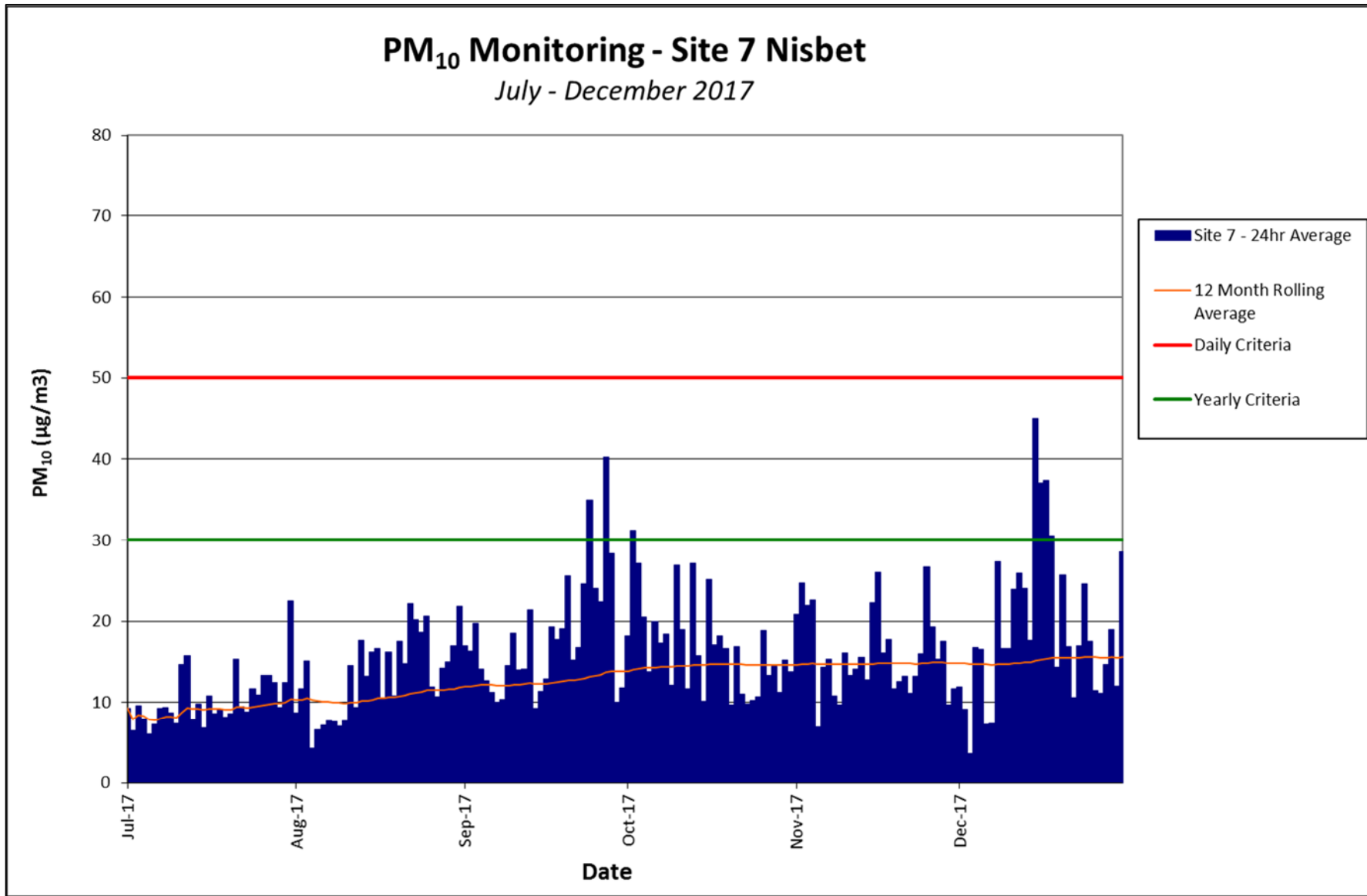
Figure 15: Site 7 PM₁₀ Results
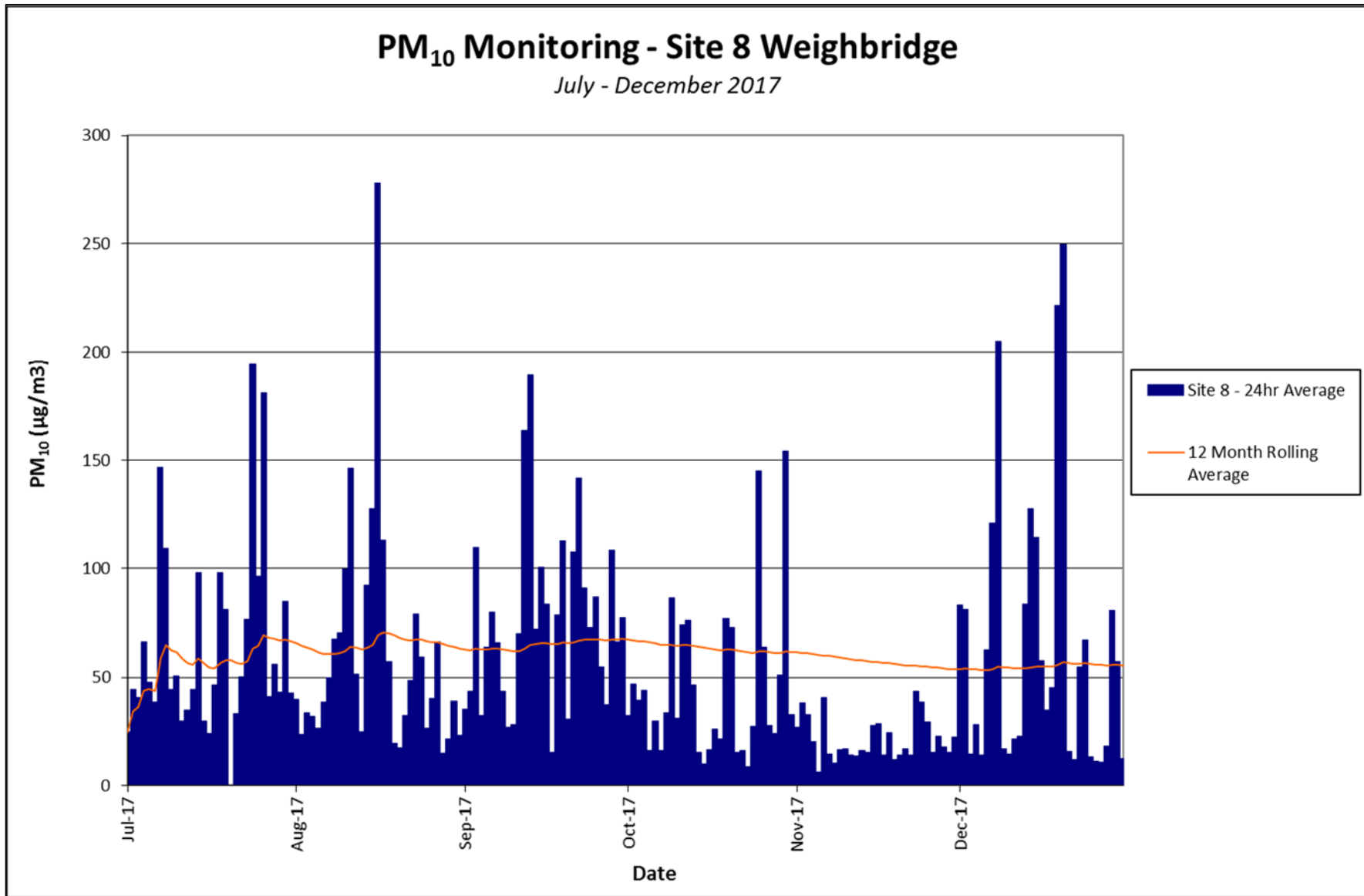
Figure 16: Site 8 PM$_{10}$ Results
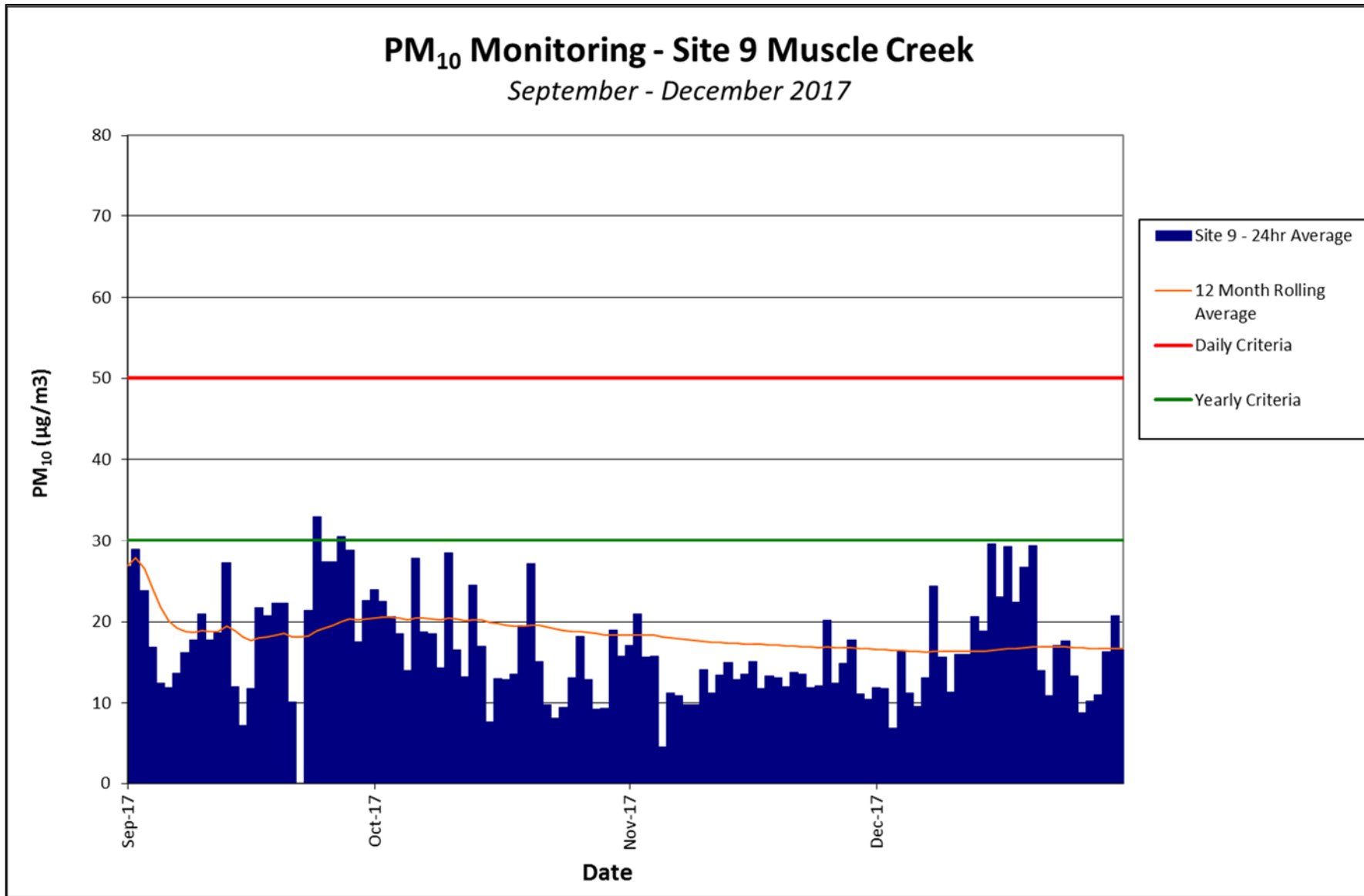
Figure 17: Site 9 PM$_{10}$ Results
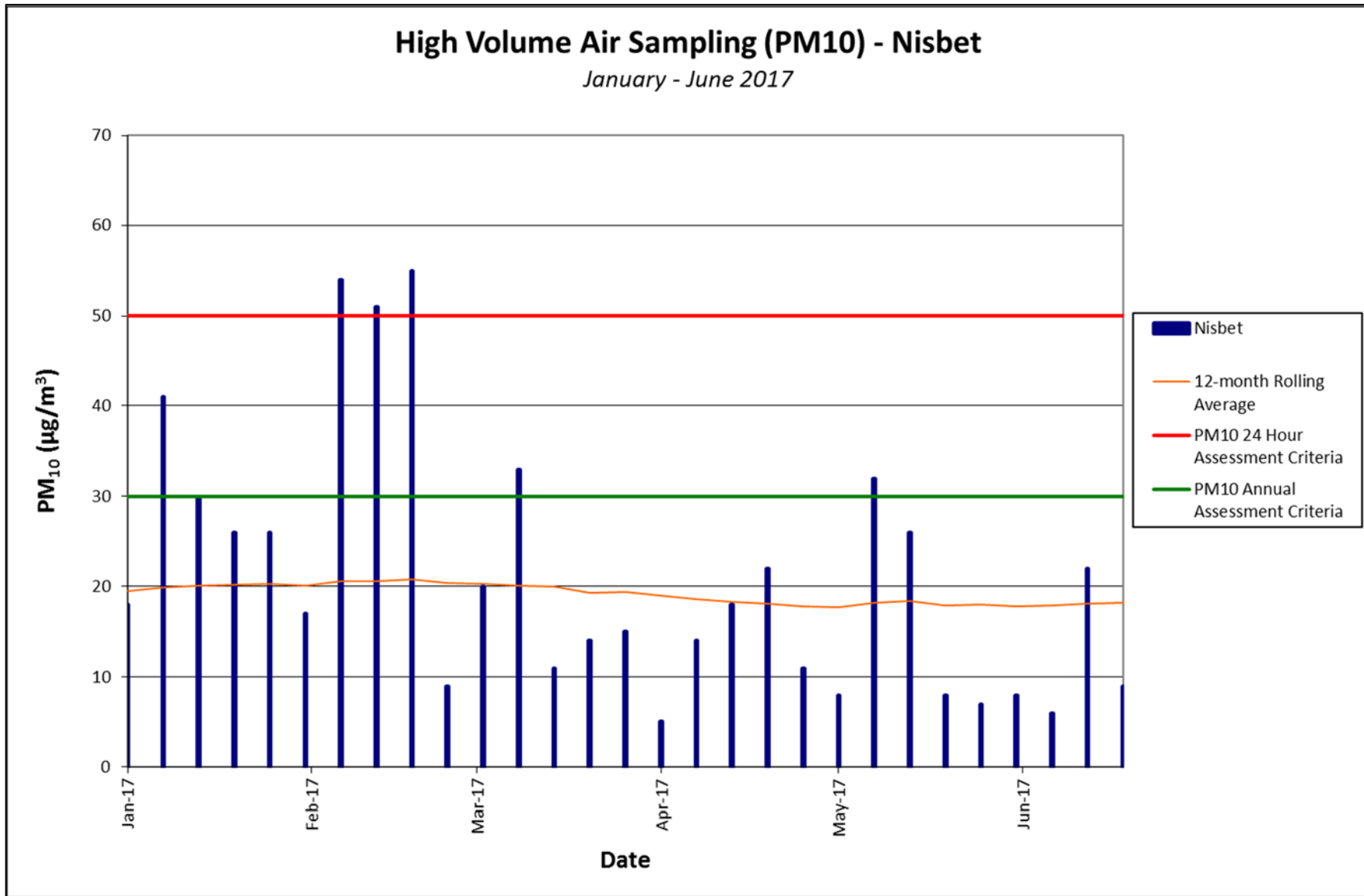
Figure 18: PM$_{10}$ HVAS Results

3.4   GREENHOUSE GAS

No methane drainage or ventilation issues were associated with the Open Cut operations during this reporting period. A number of boreholes intersect the underground workings that are used for gas and water monitoring. These boreholes are capped and opened only for monitoring purposes.

MCC supply data to Idemitsu for their corporate reporting requirements for the National Greenhouse and Energy Reporting (NGER's) process.

3.5   EROSION AND SEDIMENT CONTROL

3.5.1   ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC updated the Water Management Plan (WMP) in consultation with DPI-Water and submitted the plan to MSC for approval. At the end of the reporting period MCC was still waiting for approval of the WMP from MSC. The approved WMP will include erosion and sediment control management, which will remove the requirement for the Erosion and Sediment Control Plan.

The main objective of the erosion and sediment control at MCC is to prevent the erosion of soil from the site and its transport downstream, resulting in sedimentation of watercourses. This is achieved through the implementation of the following strategies:
- Separating clean water runoff produced by undisturbed catchments from dirty and contaminated runoff from disturbed catchments;
- Reducing water runoff velocity;
- Controlling flow volume and path;
- Constructing sediment control dams at the base of rehabilitated emplacement areas and rehabilitated disturbed areas to improve quality of discharged water; and
- Implementing control structures that promote stable landforms.

Two main natural catchments exist in the area of mining, associated with Muscle and Sandy Creeks. The area contains undisturbed land surfaces that drain towards Sandy Creek. However, some of the runoff is captured by dams. Water from undisturbed catchments is diverted around mining operations by diversion banks, and channelled into adjacent watercourses.

Drainage from the coal crushing plant and stockpile area is collected in a dam and re-used for dust suppression. All disturbed or newly rehabilitated areas contain diversion banks (major and minor graded banks) to control the flow of water from catchment areas and to contain dirty runoff on the mine site.

All disturbed or newly rehabilitated areas will contain diversion banks to control the flow of water from catchment areas and to contain dirty runoff on the mine site. There shall be two types of banks constructed:
- Major graded banks – They will be constructed to fall by up to 1.0%. Banks that have the potential for erosion or scouring will be rock-lined or stabilised to reduce water runoff velocity and direct water flow in a more controlled manner. Major graded banks will be maintained for an extended period and are intended to be permanent features after mining and rehabilitation ceases.
- Minor graded banks – These are temporary pasture furrows which are used to assist in site management during the first stage of rehabilitation. Pasture furrows are not required in the long term because a successful rehabilitation strategy will result in a well vegetated slope which will not require them. The spacing of minor banks will be based on the actual requirements of the rehabilitation program and soil conservation principles. Adequate storage will be provided for minor flows and two to three years of accumulated sediment.

During the reporting period MCC completed water management upgrades around the CHPP to contain any potentially contaminated water on site. This work including redirecting water back towards the mining operations to reduce the catchment of the final settling dams, desilting of dams to maintain capacity, and drain cleanout to remove blockages.

3.5.2   EROSION AND SEDIMENT CONTROL MONITORING
Erosion and sediment control monitoring is conducted as part of the surface water monitoring program. Surface water monitoring is discussed in **Section 3.6.2**.

3.5.3   ACTIVITIES NEXT REPORTING PERIOD
During the next reporting period, the approved WMP will be implemented and MCC will continue to manage and monitor erosion and sediment impacts in accordance with the WMP.

3.6   SURFACE WATER MANAGEMENT

3.6.1   ACTIVITIES THIS REPORTING PERIOD
During the reporting period MCC updated the Water Management Plan (WMP) in consultation with DPI-Water and submitted the plan to MSC for approval. At the end of the reporting period MCC was still waiting for approval of the WMP from MSC.

There were no significant changes made to the surface water management or monitoring system during the reporting period.

The surface water monitoring program is shown in **Table 30**. The locations of these sites are shown in **Figure 19**.
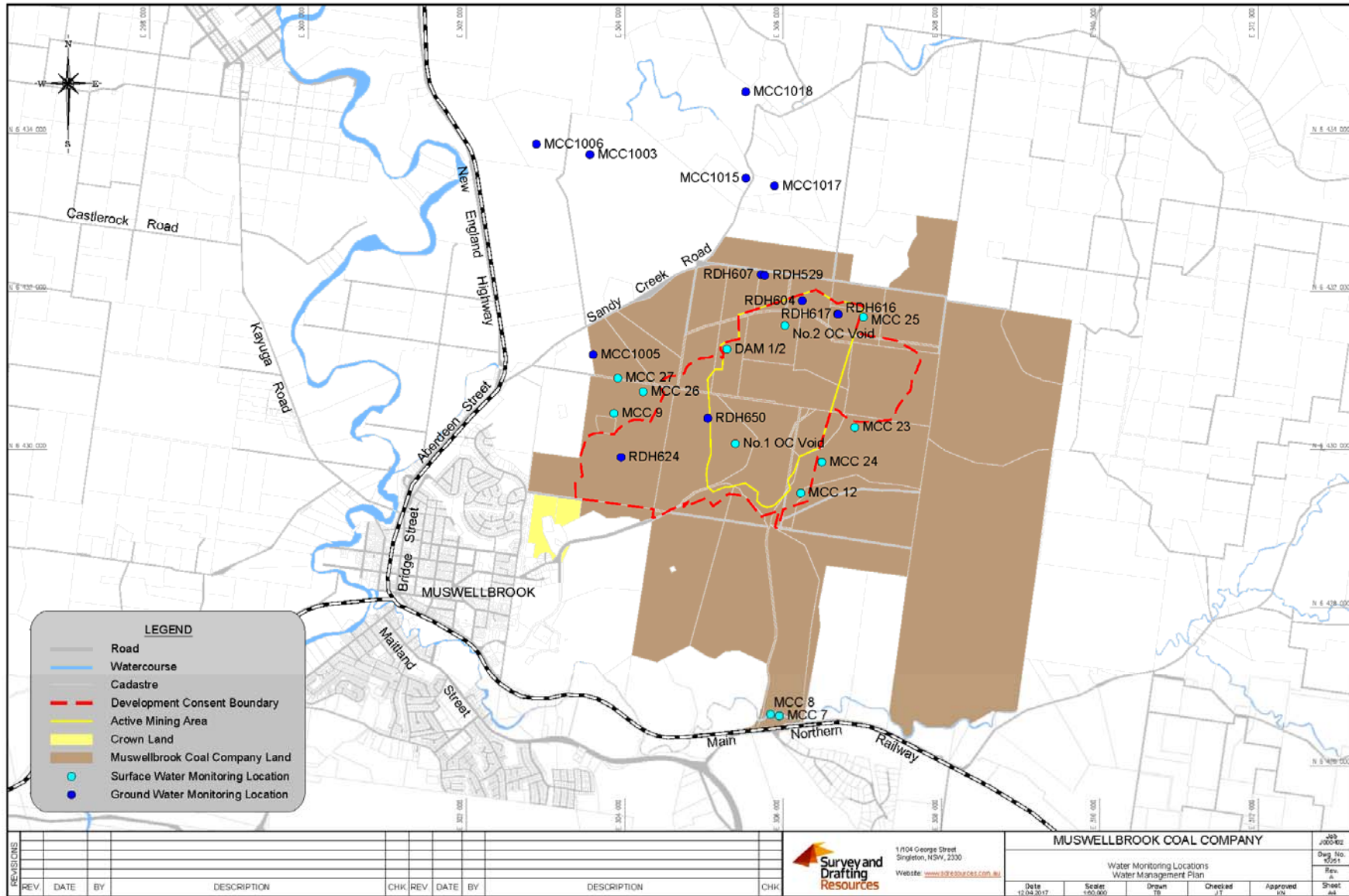
Figure 19: Water Monitoring Locations

Table 30: Surface Water Monitoring Program

Site	Monitoring Frequency	Analysis
No 1 Void	Monthly	pH, EC, TSS
	Annually	Comprehensive
No 2 Void	Monthly	pH, EC, TSS
	Annually	Comprehensive
Dam 1/2	Monthly	pH, EC, TSS
	Annually	Comprehensive
MCC7 – Muscle Creek Upstream	Monthly	pH, EC, TSS
	Annually	Comprehensive
MCC8 – Muscle Creek Downstream	Monthly	pH, EC, TSS
	Annually	Comprehensive
MCC9 – Brickworks Dam	Quarterly	pH, EC, TSS
	Annually	Comprehensive
MCC12 – Final Settling Dam	Monthly	pH, EC, TSS
	Annually	Comprehensive
MCC23 – E. Emplacement Dam South	Quarterly	pH, EC, TSS
	Annually	Comprehensive
MCC24 – East Haul Road Dam	Quarterly	pH, EC, TSS
	Annually	Comprehensive
MCC25 – E. Emplacement Dam North	Quarterly	pH, EC, TSS
	Annually	Comprehensive
MCC26 – Blues Crusher Dam	Quarterly	pH, EC, TSS
	Annually	Comprehensive
MCC27 – Dam 3	Quarterly	pH, EC, TSS
	Annually	Comprehensive
Comprehensive analysis monitors for the following: pH, electrical conductivity (EC), total suspended solids (TSS), hardness, calcium, magnesium, sodium, potassium, sulphate, chloride, fluoride, carbonate, bicarbonate, nitrate, oil and grease, ammonia, dissolved iron, total iron, manganese, arsenic, barium, boron, cadmium, chromium, copper, nickel, lead, zinc, mercury, selenium, total petroleum hydrocarbons, polycyclic aromatic hydrocarbons		
Annual analysis is undertaken in March each year Quarterly analysis is undertaken in June, September and December each year		

3.6.2 SURFACE WATER MONITORING

The surface water pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS) results are shown graphically in **Figure 20 – Figure 25**. The data and the annual comprehensive surface water monitoring results are provided in **Appendix 2**.

_pH_

The pH levels at surface water monitoring sites were generally within the recommended ecosystem pH levels of 6.5 – 9.5 throughout the reporting period. As shown in **Table 31** the results from this reporting period are consistent with the results from previous reporting periods. There are no background results or predictions to compare these results to.

Table 31: Comparison of pH Results to Historical Results

Location	pH Annual Average							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
Dam 1/2	7.6	7.6	7.8	7.8	7.7	7.7	7.9	8.0
MCC12 Final Settling Pond	8.1	8.1	8.1	8.3	8.3	8.3	8.4	8.4
No.2 Open Cut Void	7.6	7.6	7.9	8.0	8.1	7.9	8.0	8.0
No.1 Open Cut Void	7.7	7.7	7.8	7.7	no results	no results	no results	no results
MCC07	not sampled	not sampled	7.8	7.8	7.8	7.9	8.0	8.0
MCC08	not sampled	not sampled	7.9	7.8	7.9	7.9	7.9	8.0
MCC09	8.0	8.1	8.3	8.6	8.7	8.7	8.4	8.1
MCC23	8.9	8.2	8.8	8.6	9.3	9.2	8.8	8.1
MCC24	8.6	8.4	8.3	8.2	8.0	7.7	7.8	no results
MCC25	8.0	7.9	no results	7.5	no results	7.6	7.8	8.0
MCC26	8.4	8.3	8.4	8.7	8.9	8.3	8.4	8.8
MCC27	8.5	8.3	8.3	8.2	8.4	8.0	8.2	8.2

Electrical Conductivity (EC)

Typically, EC levels for mine water are greater than 4,000µS/cm, with lower levels found in surrounding watercourses. As mine water is not discharged off site there is no impact on the environment from EC levels in mine water dams. The EC levels in surrounding watercourses are influenced by rainfall with higher levels during dry periods and lower levels during wet periods. The low rainfall during the reporting period is reflective in the elevated EC results in the dams, where the water levels have remained low and the salts have concentrated in the water.

As shown in **Table 32** the results from this reporting period are consistent with the results from previous reporting periods. There are no background results or predictions to compare these results to.

Table 32: Comparison of EC Results to Historical Results

Location	Electrical Conductivity Annual Average (µS/cm)							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
Dam 1/2	5,818	5,818	5,886	5,975	6,133	6,337	6,511	6,757
MCC12 Final Settling Pond	6,760	6,760	8,836	8,359	8,530	7,523	7,514	7,537
No.2 Open Cut Void	5,285	5,285	5,941	6,267	6,465	6,526	6,683	6,908
No.1 Open Cut Void	4,365	4,365	5,030	5,533	no results	no results	no result	no result
MCC07	not sampled	not sampled	2,064	2,843	4,780	2,887	2,594	4,723
MCC08	not sampled	not sampled	2,800	3,672	5,207	3,185	3,338	5,036
MCC09	8,186	4,833	4,718	4,043	3,900	4,985	12,400	5,220
MCC23	8,192	2,760	3,110	1,953	2,080	1,950	1,970	4,765

Location	Electrical Conductivity Annual Average (μS/cm)							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
MCC24	6,710	3,475	5,278	3,933	3,840	3,940	2,740	no result
MCC25	3,703	1,837	no results	1,740	no results	1,533	3,413	5,470
MCC26	5,524	5,643	6,300	4,868	6,615	4,133	4,660	7,898
MCC27	8,950	7,763	10,175	9,588	9,405	8,273	8,623	12,735

Total Suspended Solids (TSS)

TSS results in site dams can be influenced by water movements and runoff stirring up sediment. As this water is not discharged off site there is no impact on the environment from TSS levels in mine water dams. The TSS levels in surrounding watercourses are influenced by rainfall with higher levels during wet periods where there is runoff or during dry when water levels are low. Lower levels are found during "normal" conditions.

As shown in **Table 33** the results from this reporting period are consistent with the results from previous reporting periods. There are no background results or predictions to compare these results to.

Table 33: Comparison of TSS Results to Historical Results

Location	Total Suspended Solids Annual Average (mg/L)							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
Dam 1/2	16	16	13	14	7	11	9	13
MCC12 Final Settling Pond	19	19	18	22	16	18	31	19
No.2 Open Cut Void	21	21	18	20	12	12	9	12
No.1 Open Cut Void	86	86	16	13	no results	no results	no results	no result
MCC07	not sampled	not sampled	14	16	11	8	8	18
MCC08	not sampled	not sampled	12	13	10	8	7	9
MCC09	14	21	10	11	4	33	608	8
MCC23	34	7	15	20	18	7	22	25
MCC24	14	9	21	13	14	7	11	no result
MCC25	8	7	no results	13	no results	5	9	17
MCC26	41	13	16	15	42	5	7	30
MCC27	26	31	13	14	31	9	15	41

3.6.3   ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, the approved WMP will be implemented and MCC will continue to manage and monitor surface water quality impacts in accordance with the WMP.
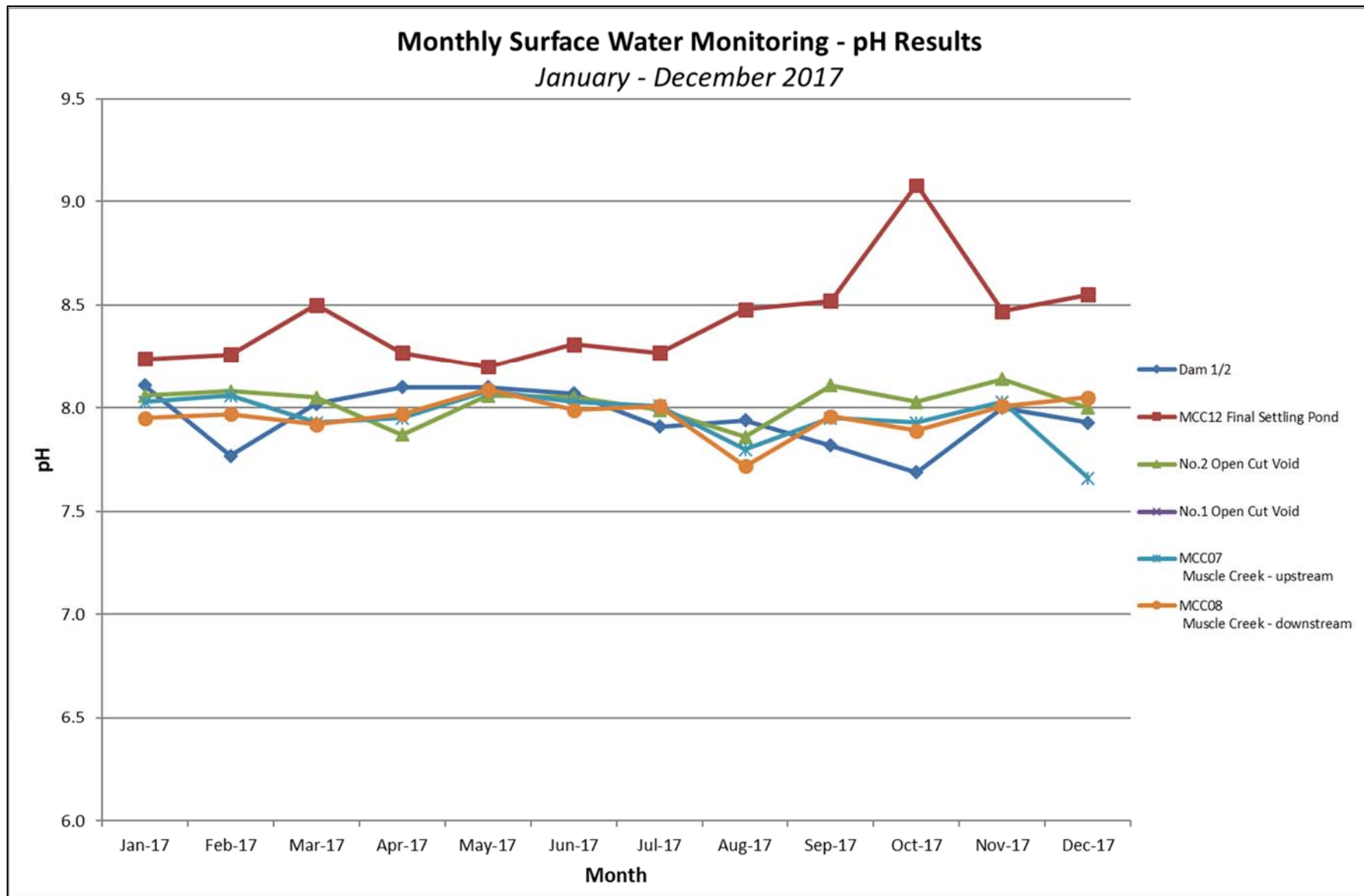
**Figure 20: Monthly Surface Water Monitoring Results – pH**
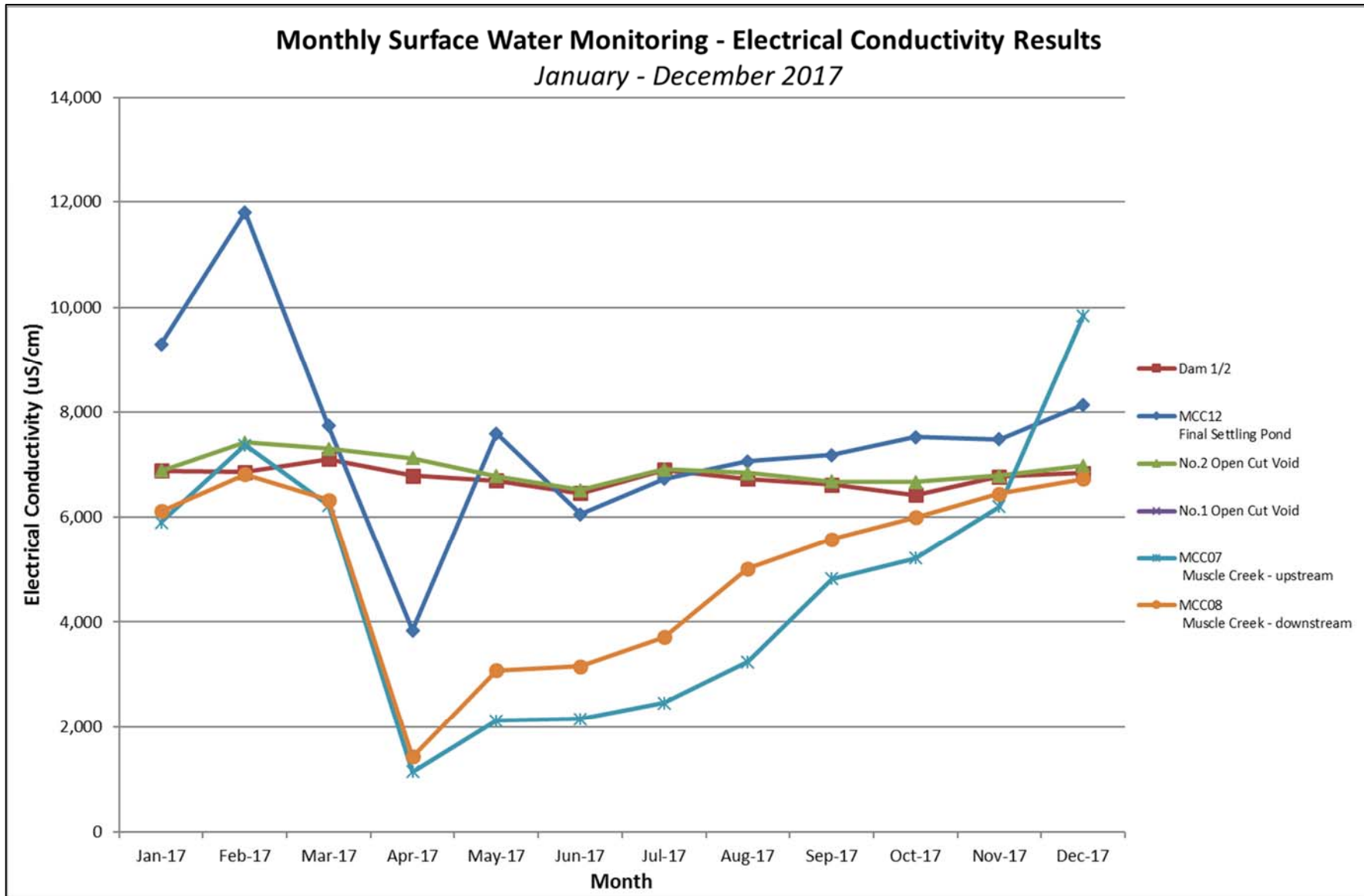
Figure 21: Monthly Surface Water Results – Electrical Conductivity
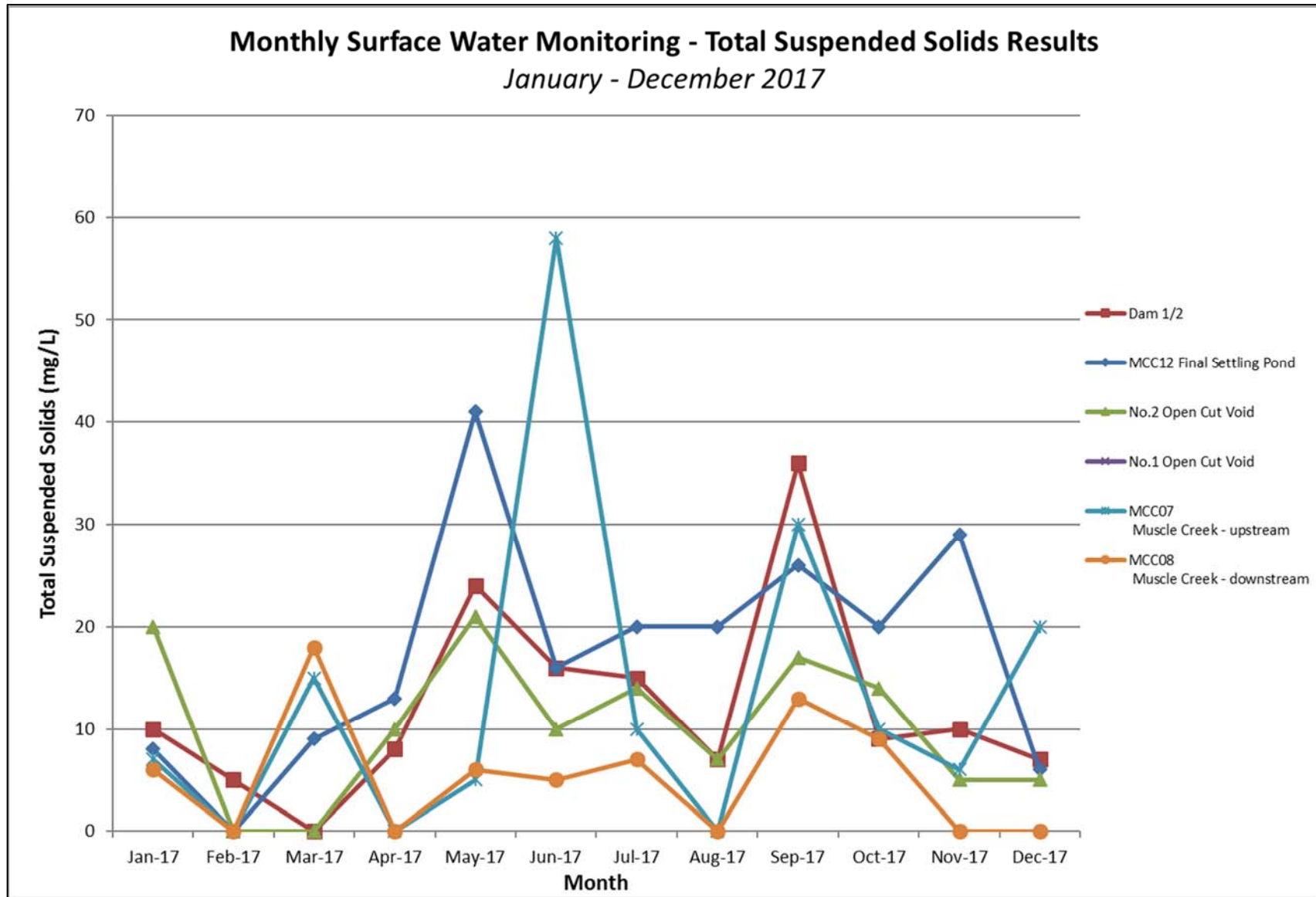
Figure 22: Monthly Surface Water Results – Total Suspended Solids
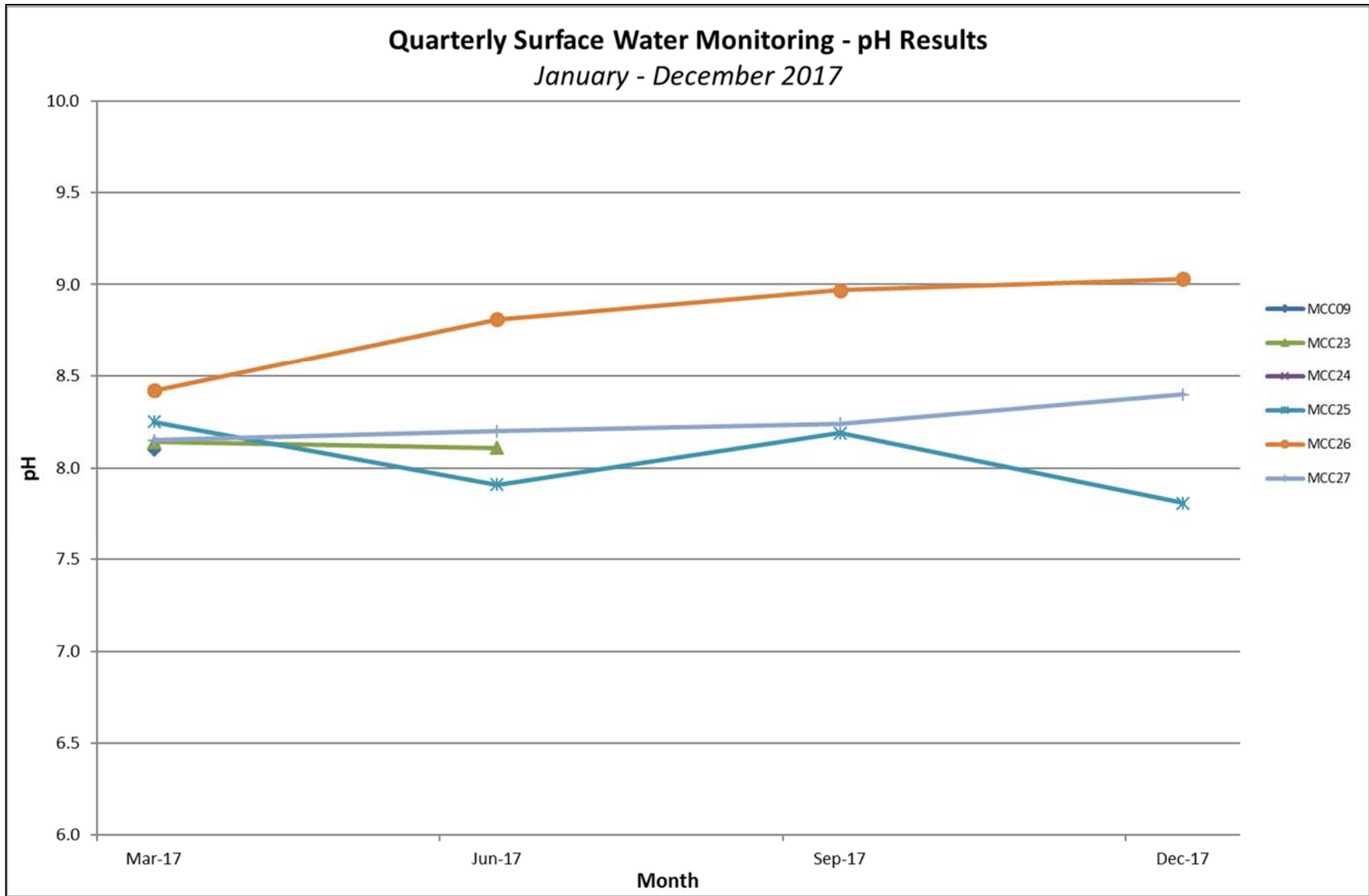
Figure 23: Quarterly Surface Water Results – pH
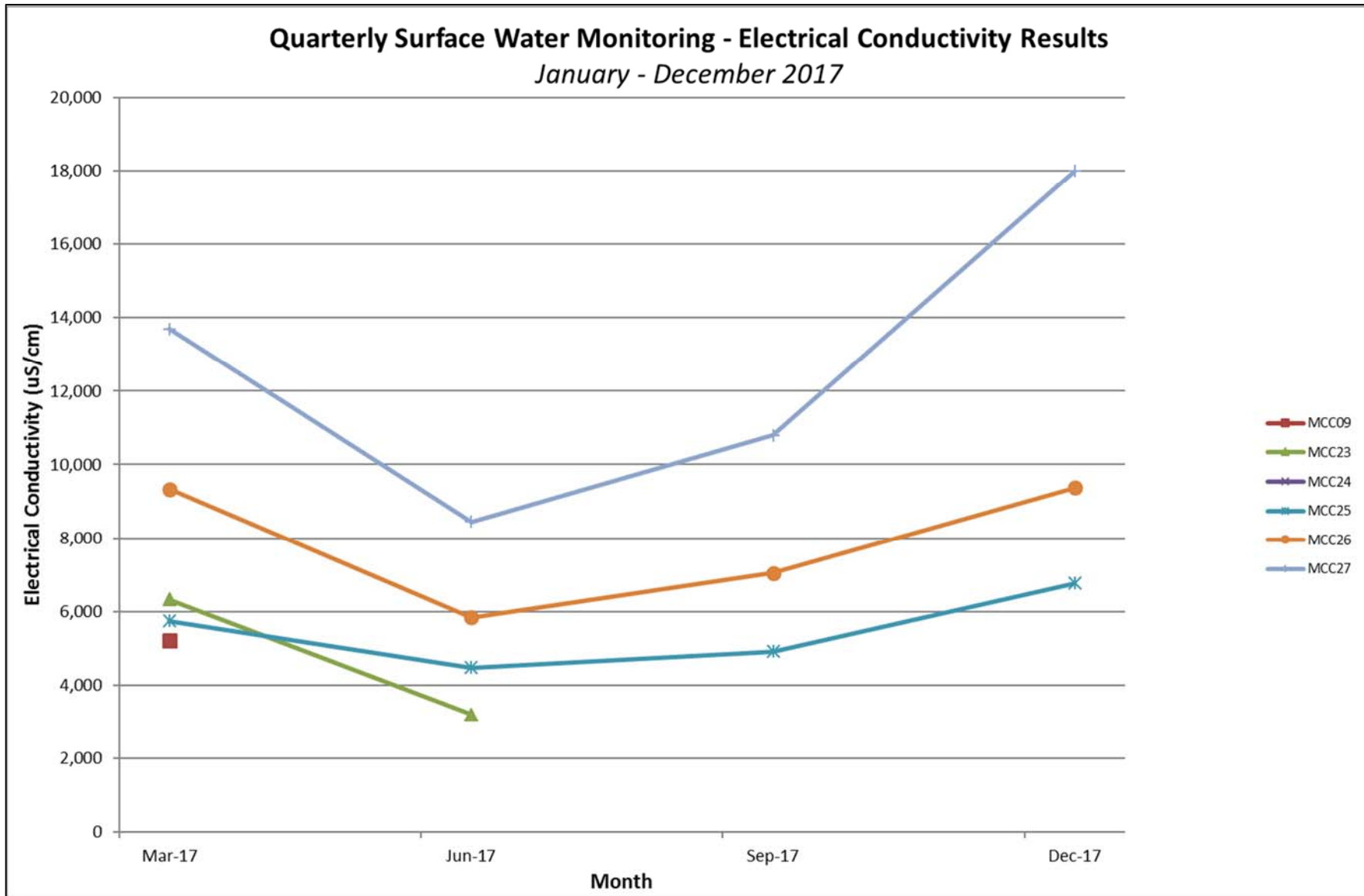
Figure 24: Quarterly Surface Water Monitoring Results – Electrical Conductivity
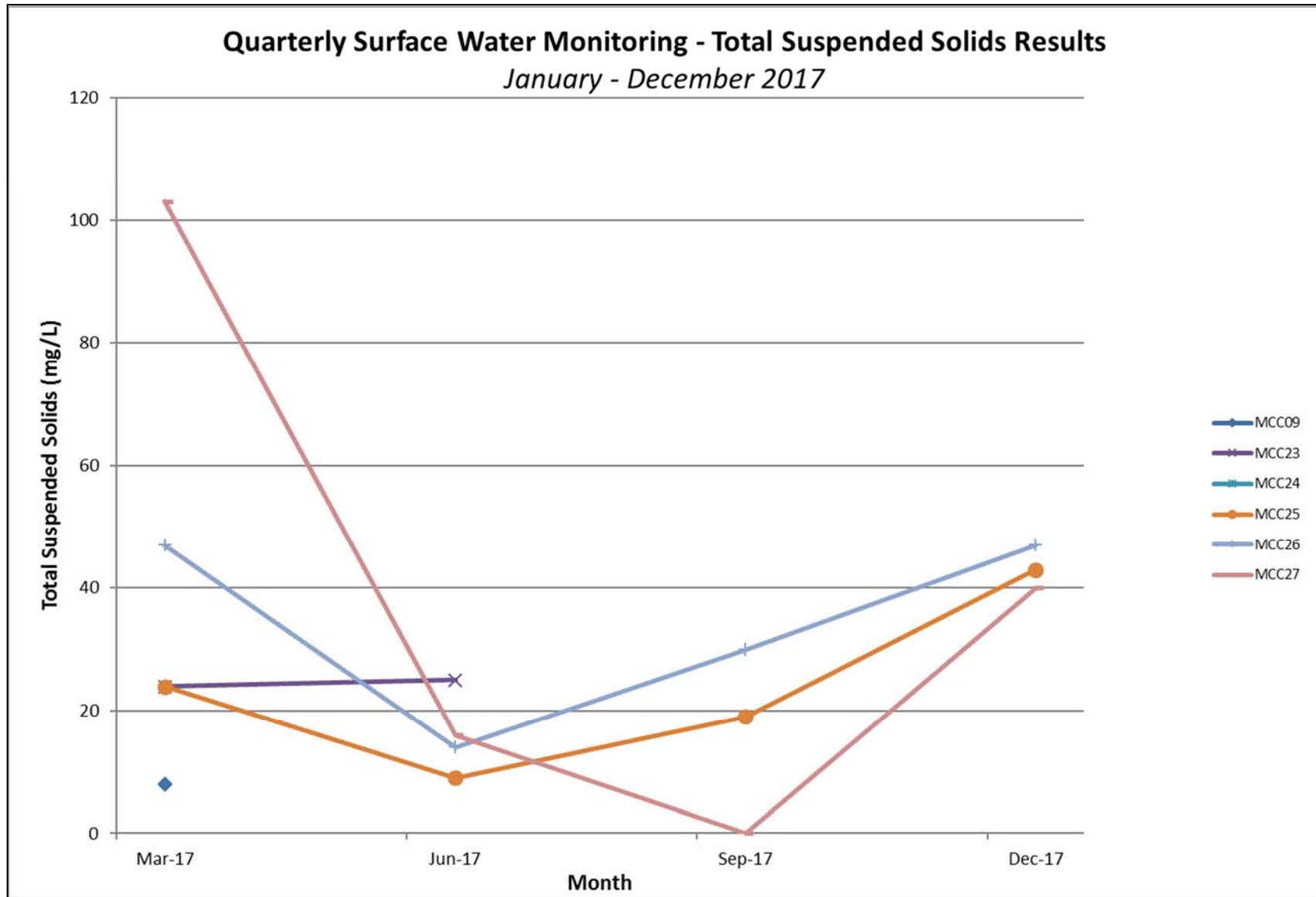
Figure 25: Quarterly Surface Water Monitoring Results – Total Suspended Solids

3.7 GROUNDWATER MANAGEMENT

3.7.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC updated the Water Management Plan (WMP) in consultation with DPI-Water and submitted the plan to MSC for approval. At the end of the reporting period MCC was still waiting for approval of the WMP from MSC.

There were no significant changes made to the groundwater management or monitoring system during the reporting period.

The groundwater monitoring program is shown in **Table 34**. The locations of these sites are shown in **Figure 19**.

Table 34: Groundwater Monitoring Program

Site	Monitoring Frequency	Analysis
RDH607/RDH529	Monthly	Depth, pH, EC
	Annually	Comprehensive
RDH616	Monthly	Depth
RDH617	Monthly	Depth
RDH624	Monthly	Depth
RDH650	Monthly	Depth
MCC1003	Monthly	Depth, pH, EC
	Annually	Comprehensive
MCC1005	Monthly	Depth, pH, EC
	Annually	Comprehensive
MCC1006	Monthly	Depth, pH, EC
	Annually	Comprehensive
MCC1015	Monthly	Depth, pH, EC
	Annually	Comprehensive
MCC1017	Monthly	Depth
MCC1018	Monthly	Depth
Comprehensive analysis monitors for the following: solids (TSS), hardness, calcium, magnesium, sodium, potassium, sulphate, chloride, fluoride, carbonate, bicarbonate, nitrate, oil and grease, ammonia, dissolved iron, total iron, manganese, arsenic, barium, boron, cadmium, chromium, copper, nickel, lead, zinc, mercury, selenium, total petroleum hydrocarbons, polycyclic aromatic hydrocarbons		
Annual analysis is undertaken in March each year		

3.7.2 GROUNDWATER MONITORING

Ground Water Monitoring Results – Mining Operations

The water level, pH and Electrical Conductivity of the underground working are shown in **Figure 26** and **Figure 27**. The water levels in groundwater monitoring wells located on site are shown in **Figure 28**. These results show there has been minimal fluctuation in water levels or quality during the reporting period. There was a slight fluctuation in the pH levels in the underground workings, which is attributable to natural changes. The data and the annual comprehensive groundwater monitoring results are provided in **Appendix 2**.

As shown in **Table 35** the pH and Electrical Conductivity results from this reporting period are slightly higher than previous results and the water levels are generally consistent with previous results. There are no background results or predictions to compare these results to.

Table 35: Comparison of Underground Working Results

Year	Average pH	Average EC (μS/cm)	Relative Level (RL) (AHD metres)
2017	7.7	6,545	114
2016	7.5	6,482	114
2015	7.3	6,196	114
2014	7.3	5,525	116
2013-2014	7.1	5,078	115-117
2012-2013	7.6	5,711	123-146

Ground Water Monitoring Results – Sandy Creek Area

The alluvial and hard rock aquifers in the Sandy Creek area are a significant lateral distance from the open cut footprint and no impacts have been determined. Ground water depths and quality results are presented in **Figure 29 – Figure 31**. The data and the annual comprehensive groundwater monitoring results are provided in **Appendix 2**.

As shown in **Table 36 – Table 38** the results from this reporting period are consistent with the results from previous reporting periods. There are no background results or predictions to compare these results to.

Table 36: Comparison of Depth to Historical Results

Location	Depth Annual Average (mbgl)							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
MCC1003	3.2	2.5	3.8	4.5	5.8	3.6	3.9	4.6
MCC1005	7.2	6.7	7.3	7.8	8.3	7.9	7.5	8.0
MCC1006	5.6	4.4	5.7	6.5	no result	no result	5.6	6.4
MCC1015	3.6	3.6	3.8	3.6	3.7	3.7	3.8	no result
MCC1017	17.3	17.0	17.0	17.1	16.8	17.1	17.1	17.2
MCC1018	17.5	17.0	16.6	16.7	16.8	17.3	17.6	17.8

Table 37: Comparison of pH Results to Historical Results

Location	pH Annual Average							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
MCC1003	7.4	7.3	7.2	7.3	7.2	7.2	7.1	7.1
MCC1005	7.4	7.4	7.1	7.2	7.2	7.1	7.2	7.1
MCC1006	7.3	7.3	7.1	7.2	no result	no result	7.2	7.2
MCC1015	7.3	7.1	7.1	7.1	7.1	7.2	7.2	7.1

Table 38: Comparison of EC Results to Historical Results

| Location	Electrical Conductivity Annual Average (μS/cm)							
	2010-2011	2011-2012	2012-2013	2013-2014	2014	2015	2016	2017
MCC1003	1,434	1,410	1,359	1,480	1,701	1,345	1,471	1,347
MCC1005	2,635	1,579	1,947	2,544	2,697	2,768	2,170	2,235
MCC1006	1,095	933	1,087	1,117	no result	no result	982	931
MCC1015	2,417	2,531	2,169	2,452	2,402	2,659	2,100	no result
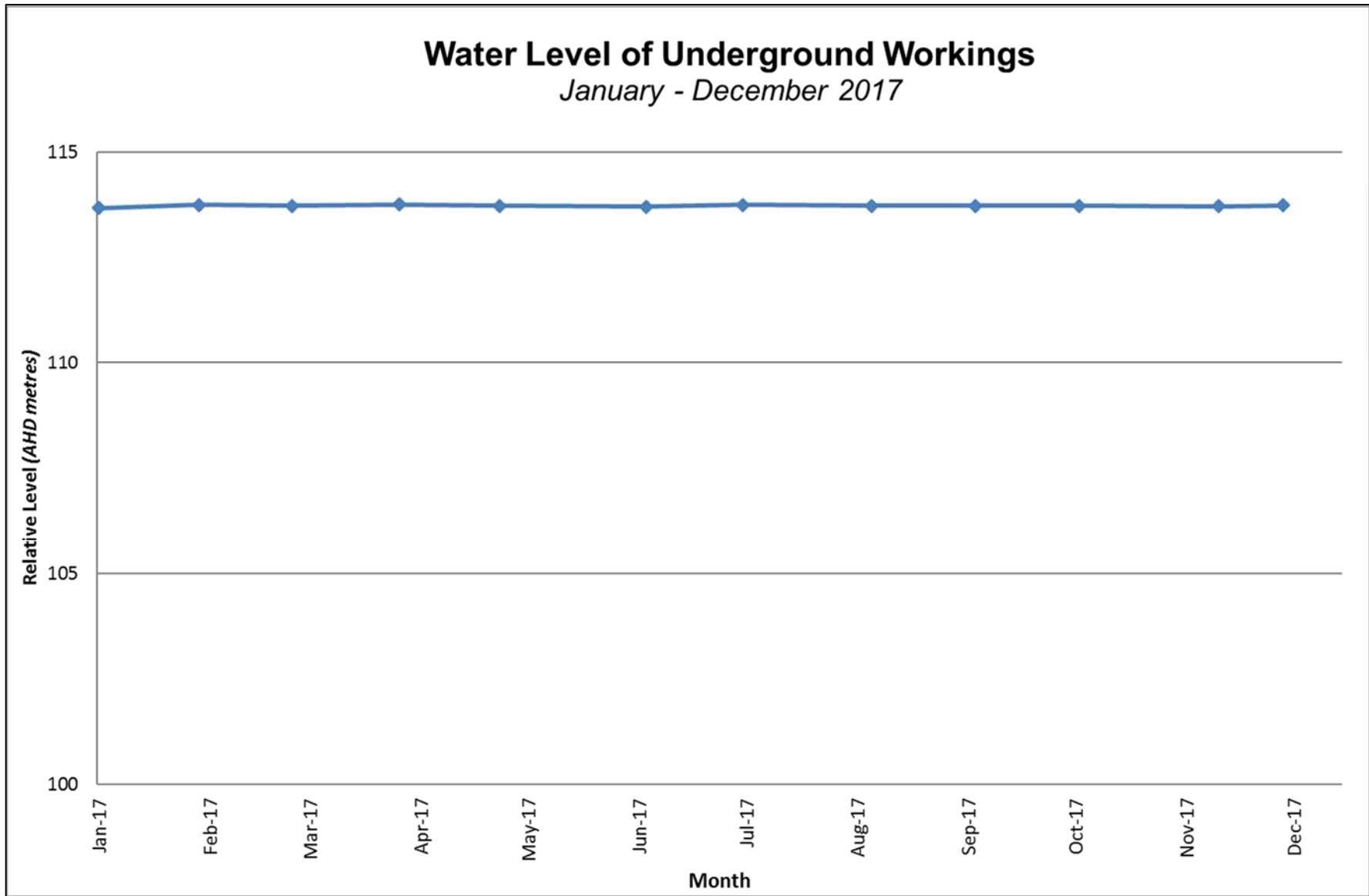
Figure 26: Water Level for Underground Workings
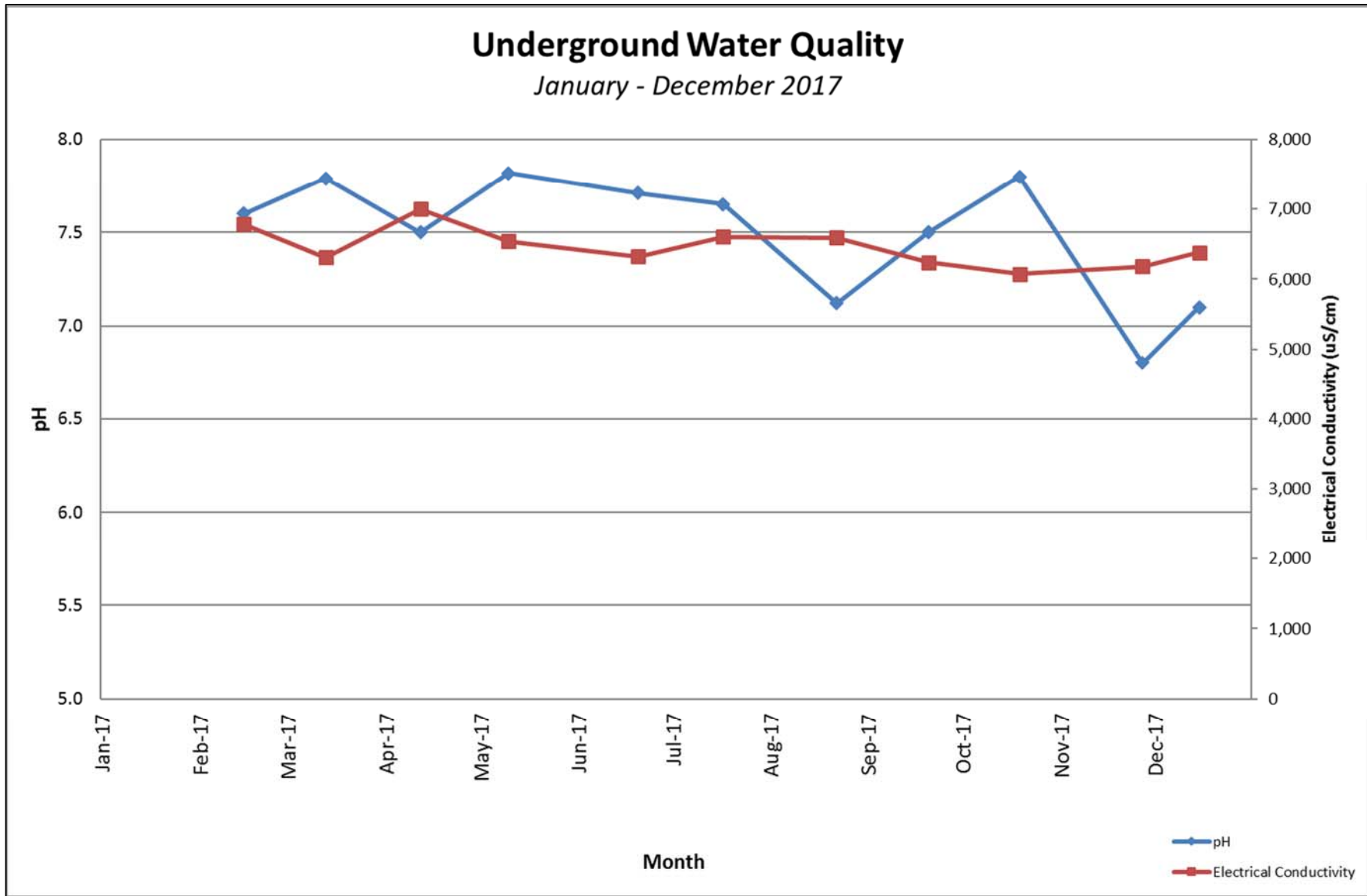
**Figure 27: Water Quality Data in Underground Workings**
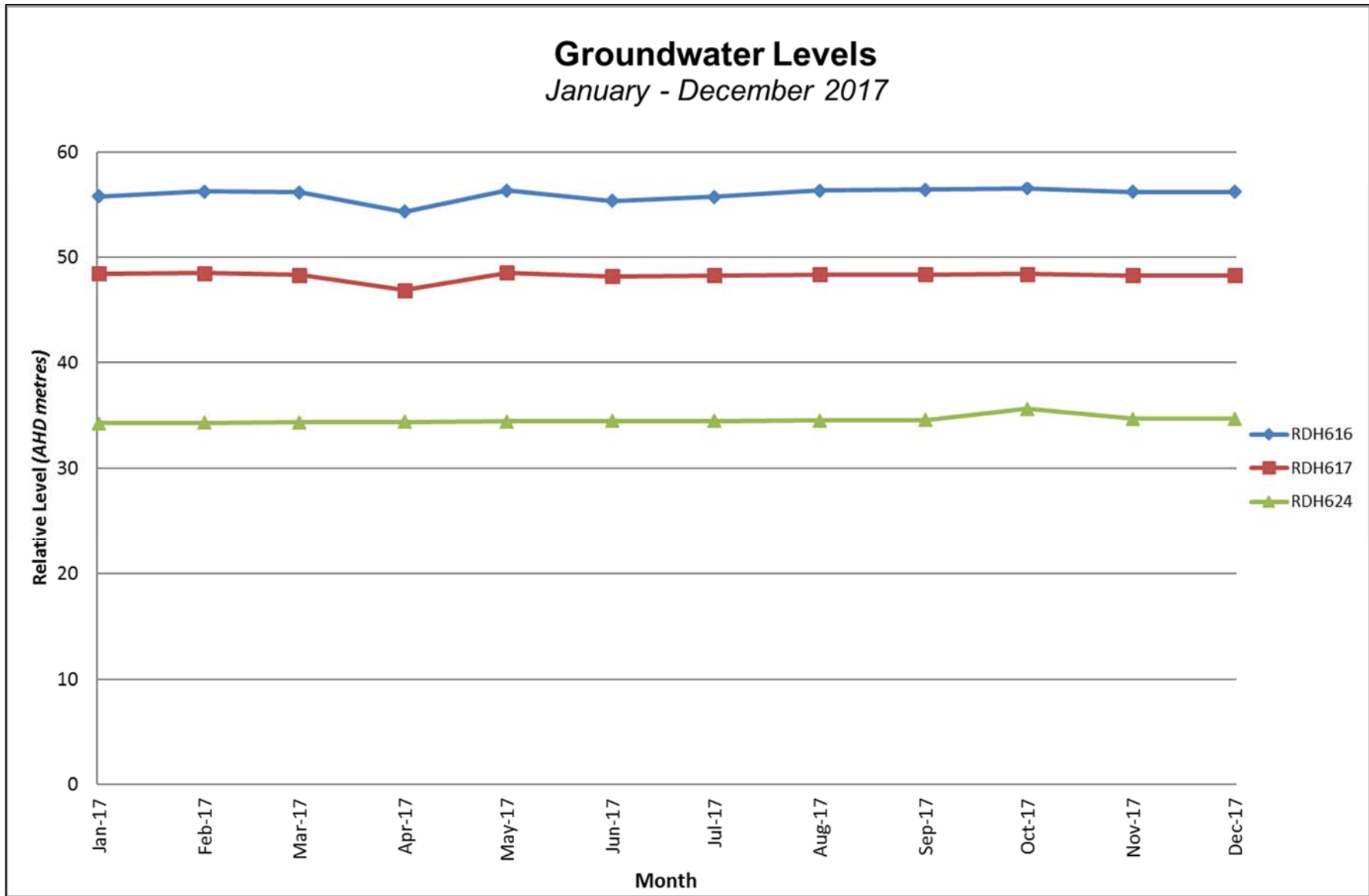
Figure 28: Water Level for Groundwater Monitoring on Site
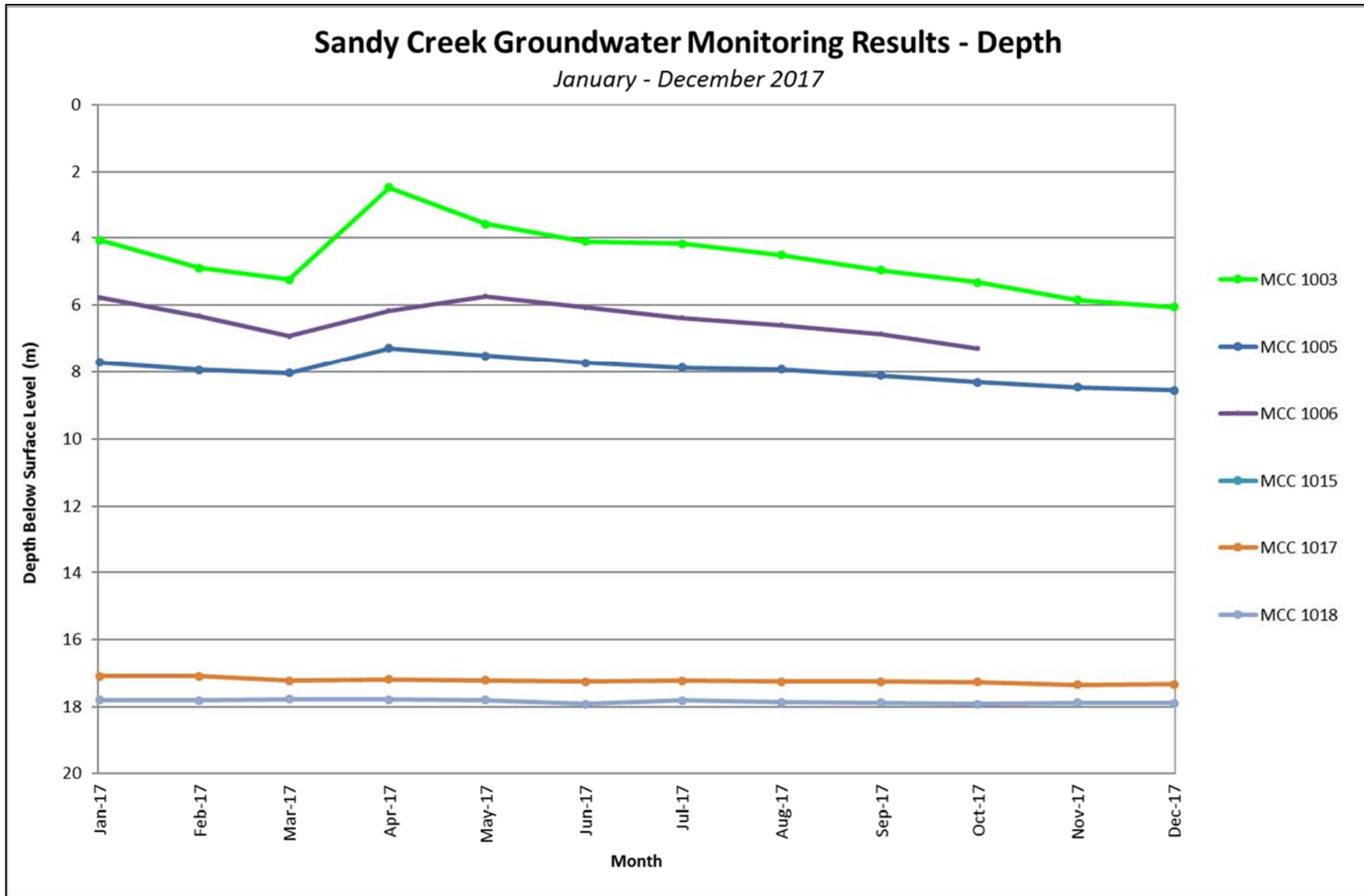
**Figure 29: Sandy Creek Groundwater Depth**
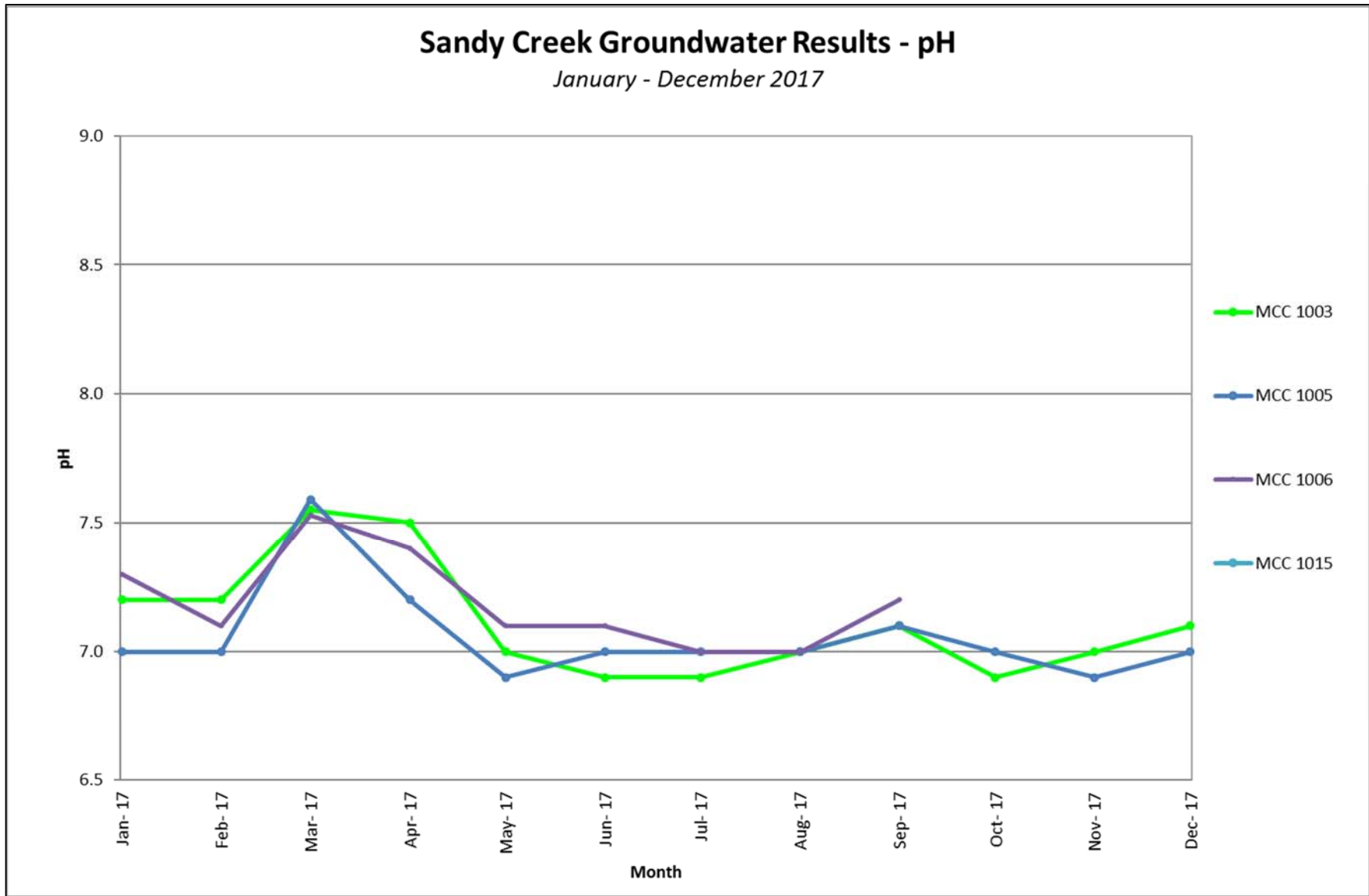
**Figure 30: Sandy Creek Water Quality – pH**
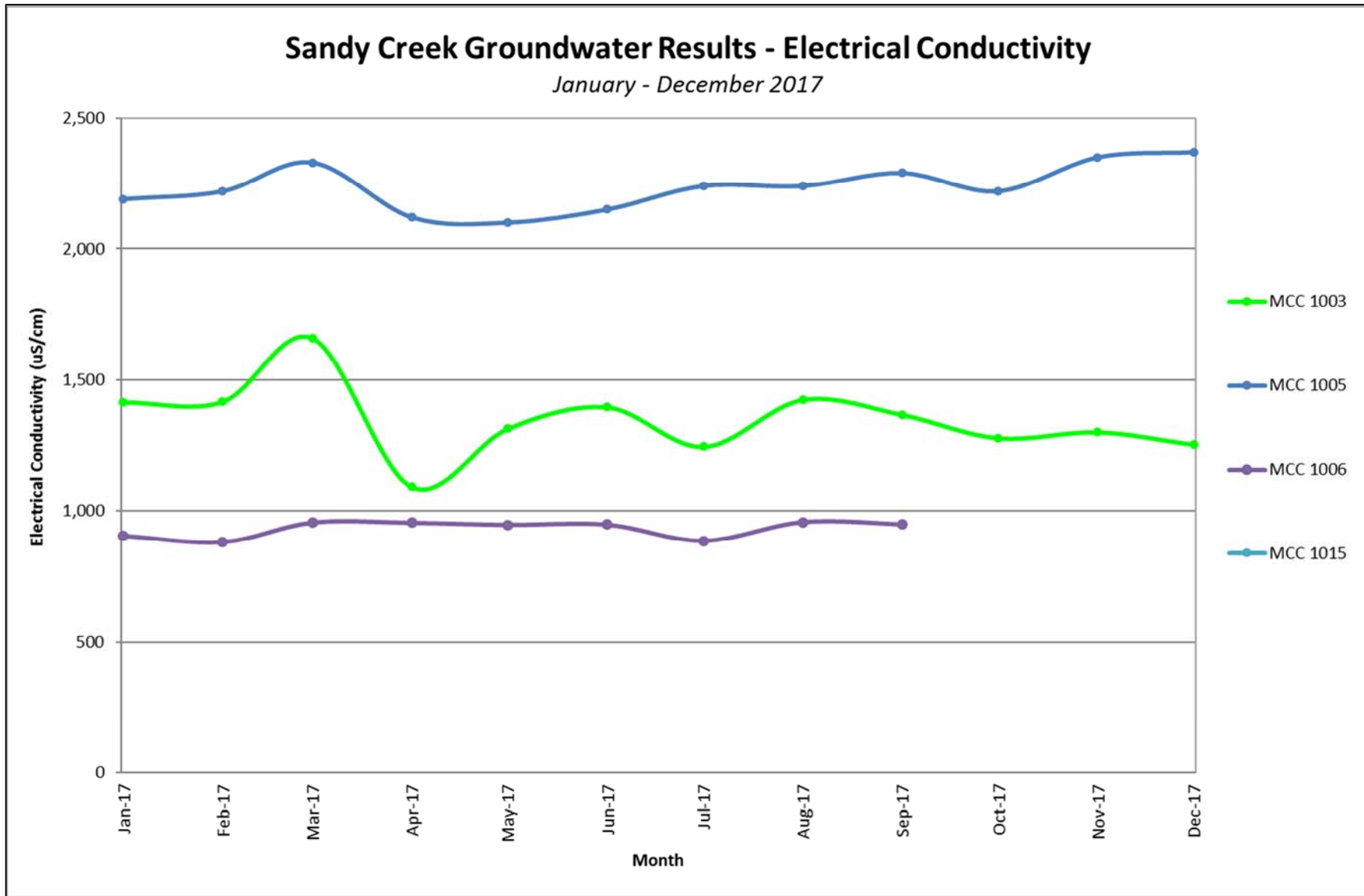
Figure 31: Sandy Creek Water Quality – Electrical Conductivity

Trigger levels have been established for selected sites with the trigger levels shown in **Table 39**. A groundwater level trigger will be initiated if the groundwater level in a piezometer fluctuates by greater than 5% from the historical minimum and maximum standing water level over a 3-month period. In addition, to initiate the trigger, the reduction in water level will also need to be at a level that is deeper than the natural variability measured across all monitoring bores for each aquifer. EC and pH are the main species regularly analysed at the groundwater monitoring sites to monitor water quality. The trigger levels are set at a variation of >15% from the baseline minimum and maximum EC and ±0.5pH units from the baseline minimum and maximum pH. The trigger levels are initiated if monitored conditions are outside the upper or lower trigger levels for 3 continuous monthly results. **Table 39** shows that there was no exceedance of the trigger levels during the reporting period.

Table 39: Sandy Creek Groundwater Monitoring Trigger Levels

WATER LEVELS					
Bore/Well	**Aquifer**	**Lower Trigger Level (m)TOC**	**Lower Trigger Exceeded in 2017**	**Upper Trigger Level (m)TOC**	**Upper Trigger Exceeded in 2017**
MCC1003	Alluvial	2.17	**No**	8.34	**No**
MCC1005	Alluvial	6.27	**No**	11.46	**No**
MCC1006	Alluvial	4.00	**No**	10.14	**No**
MCC1015	Alluvial	3.27	**No**	13.97	**No**
MCC1017	Hardrock	14.71	**No**	18.53	**No**
MCC1018	Hardrock	14.10	**No**	19.69	**No**
pH					
Bore/Well	**Aquifer**	**Lower Trigger pH**	**Lower Trigger Exceeded in 2017**	**Upper Trigger pH**	**Upper Trigger Exceeded in 2017**
MCC1003	Alluvial	6.3	**No**	8.8	**No**
MCC1005	Alluvial	5.9	**No**	8.3	**No**
MCC1006	Alluvial	6.2	**No**	8.1	**No**
MCC1015	Alluvial	6.3	**No**	8.1	**No**
ELECTRICAL CONDUCTIVITY					
Bore/Well	**Aquifer**	**Lower Trigger EC**	**Lower Trigger Exceeded in 2017**	**Upper Trigger EC**	**Upper Trigger Exceeded in 2017**
MCC1003	Alluvial	876	**No**	2,461	**No**
MCC1005	Alluvial	1,513	**No**	7,533	**No**
MCC1006	Alluvial	765	**No**	1,610	**No**
MCC1015	Alluvial	1,494	**No**	3,726	**No**

A sectional plan depicting the location of the monitoring sites in Sandy Creek area is shown in **Figure 32**. To assist in determining if any reversal in ground water gradient or other consequences to de-pressurisation in the ground water is occurring, a catenary transect has been developed and is presented in **Figure 33**. The transect graph clearly indicates no sign of a draw-down effect in the Sandy Creek area during the reporting period. Based on the monitoring data there appears to be no connection between the alluvial and hard rock aquifers.
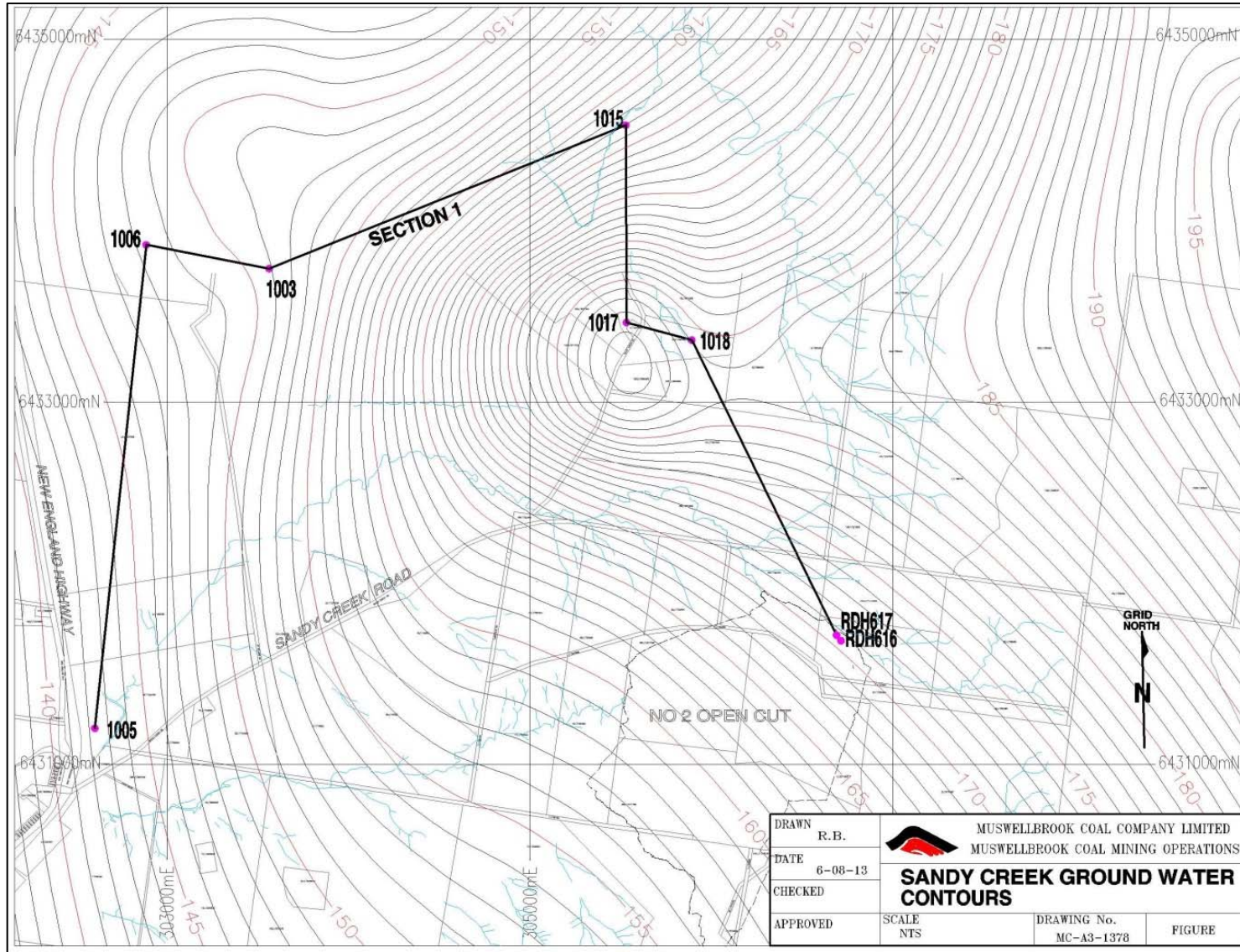
**Figure 32: Sandy Creek Groundwater Monitoring Network, Sectional Plan**
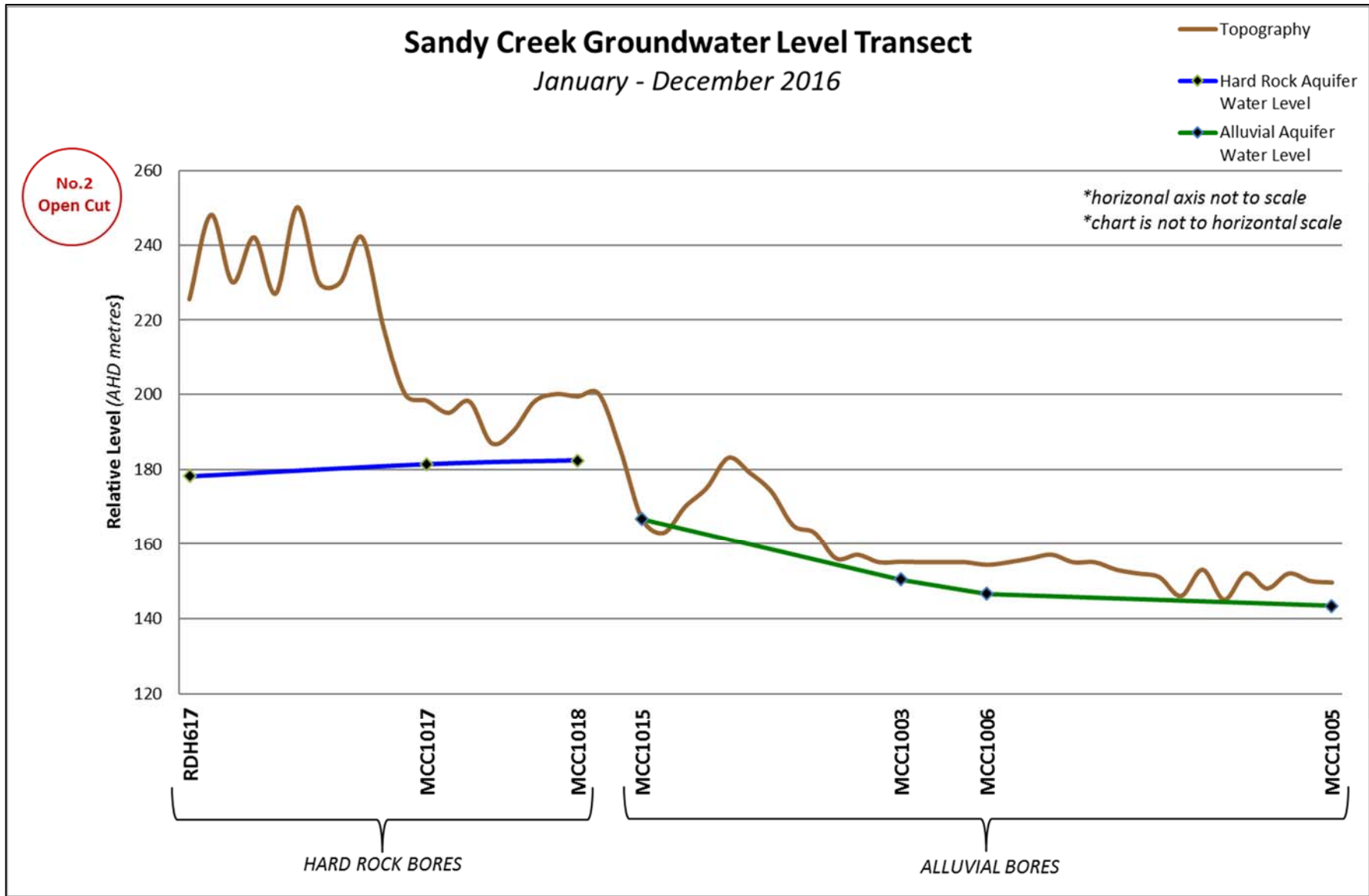
Figure 33: Sandy Creek Groundwater Level Catenary Transect

3.7.3   ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period, the approved WMP will be implemented and MCC will continue to manage and monitor groundwater quality impacts in accordance with the WMP.

3.8   CONTAMINATED LAND

MCC has a Bioremediation Area where material contaminated with hydrocarbons is managed and tested. When the test results indicate that the material is no longer contaminated it is removed and dumped in the mining areas.

3.9   FLORA AND FAUNA MANAGEMENT

3.9.1   ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage impacts on flora and fauna in accordance with the Mining Operations Plan (MOP). The latest modification to the development consent removed the requirement for a Flora and Fauna Management Plan with the management of flora and fauna impacts to be discussed in the MOP.

MCC is set amongst an area of existing disturbed and mined land. The area to be mined is extensively altered from its natural state through current and past mining operations.

Five vegetation communities have been identified at MCC. These are:
* Hunter Floodplain Red Gum Woodland;
* Central Hunter Grey Box-Ironbark Woodland;
* Regenerating Central Hunter Grey Box-Ironbark Woodland;
* Aquatic Forbland; and
* Mine Rehabilitation.

No threatened flora species have been identified at MCC. The area to be disturbed is not considered important habitat for threatened fauna. The area is also not considered critical habitat.

To allow for continued mining operations, tree clearing on historical rehabilitation was undertaken during the reporting period.   Prior to this clearing commencing, a pre-clearance survey was undertaken by an ecologist to identify any habitat features or threatened species that needed additional management. One tree with a potential bird's nest was identified during this survey and this site was managed during the clearing process.

3.9.2   FLORA AND FAUNA MONITORING

Inspections of nesting boxes are performed every 6 months. Results of the inspections completed during the reporting period are shown below.
* Sugar Glider (2) – not occupied at the time of inspection and no signs of activity were observed.
* Bat (4) – not occupied at the time of inspection and no signs of activity were observed.
* Brushtail Possum (2) – not occupied at the time of inspection with some signs of occupation at time.

As part of the rehabilitation monitoring for this reporting period, potential sites for the installation of new nest boxes were identified. These will be installed during the next reporting period.

3.9.3   ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage impacts on flora and fauna in accordance with the Mining Operations Plan (MOP). MCC will install additional nest boxes in older rehabilitation areas during the next reporting period.

3.10 WEEDS AND FERAL ANIMALS

3.10.1   ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to manage weeds and feral animals in accordance with the Mining Operations Plan (MOP). The latest modification to the development consent removed the requirement for a Land Management Plan with the management of weeds and feral animals to be discussed in the MOP.

The MOP contains a section on weed control, and specifies that all noxious weeds will be managed and controlled as per the requirements of Local Land Services and the Upper Hunter Weeds Authority, using a combination of control strategies.

Weed control and eradication techniques used at MCC include:
* Promotion of vigorous pasture growth to out-compete weeds;
* Minimisation of area available for weed infestation, through prompt revegetation of bare areas;
* Spraying with selective herbicides; and
* Physical removal by chipping/slashing.

During the reporting period MCC undertook weed control programs across the rehabilitation areas. The target species for this weed spraying included:
* Castor Oil Plant;
* Paterson's Curse;
* Galenia;
* Fennell;
* Pampas Grass;
* Noogoora Burr; and
* Bathurst Burr.

MCC undertook the following feral animal and pest control during the reporting period:
* A dog baiting program that was implemented in conjunction with surrounding landowners through the Hebden Wild Dog Association;
* Kangaroo cull on rehabilitation areas and on land surrounding the mining operations; and
* Control of rabbits through poisoning and destruction of a large warren.

3.10.2   ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage weed and feral animal impacts in accordance with the Mining Operations Plan (MOP).

3.11 BLASTING

3.11.1   ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC reviewed and updated the Blast Management Plan to reflect the updated requirements of the development consent and environmental protection licence. This review of the management plan did not make any changes to the management practices or monitoring programs at MCC.

Members of the public are notified of proposed blasting times by contacting the Blast Information Service Line where they hear a recorded message or by looking at the "Blasting Notices" page of the Muswellbrook Shire Council Website.

The intent of best practice goals in drill and blast activities is to comply with the fragmentation requirements for each blast. The use of best practice techniques will reduce air blast overpressure, ground vibration, fumes and odours from blasting activities.

Best practice drill and blast activities at MCC include:
- A high degree of accuracy in the placement of drill holes so that design spacing and burden is achieved using Automatic Positioning System (APS) or other survey control;
- Management of surface and groundwater in the drill holes (to reduce fume and odour issues);
- Blast design and delays are designed to avoid wavefront reinforcement;
- Regular inspections of ground and hole conditions to identify any geological abnormalities that may create a path for the uncontrolled release of gaseous products from explosive material;
- Loading of the explosive material so that holes are not loaded in excess of the design;
- Proper placement of decking charges if required;
- Effective placement of good quality stemming to design column height for containment of explosive product;
- Reduce the sleep time of the blast pattern to minimise the potential for deterioration of the explosive material;
- Take into account any adverse meteorological conditions at the time of the blast and defer or modify the blast to accommodate those conditions;
- Video recording of blasts to identify any causal factors contributing to any aberration from the predicted outcomes; and
- Vibration and overpressure monitoring for all blasting activities on site.

3.11.2 BLAST MONITORING

All blasts are monitored by four automatically triggered blast monitors. The monitors are maintained in accordance with the relevant standards and calibrated annually.

The blasting criteria that apply to MCC are shown in **Table 40**.

Table 40: Blast Criteria

Vibration (mm/s)	Allowable Exceedance
5	5% of total number of blasts over a 12 month period
10	0%
Overpressure (dB(L))	Allowable Exceedance
115	5% of total number of blasts over a 12 month period
120	0%

The blast monitoring network is provided in **Table 41** and locations are displayed in **Figure 34**.

Table 41: Blast Monitoring Network

Blast Monitor	Location
B1 (Queen St)	In the vicinity of the nearest non-company owned residence
B2 (School)	At the Muswellbrook Public School, Roger Street, North Muswellbrook
B3 (99 Queen St)	At the northern end of Queen Street, North Muswellbrook
B4 (Nisbet)	Sandy Creek Road, approximately 1.2km to the north of MCC
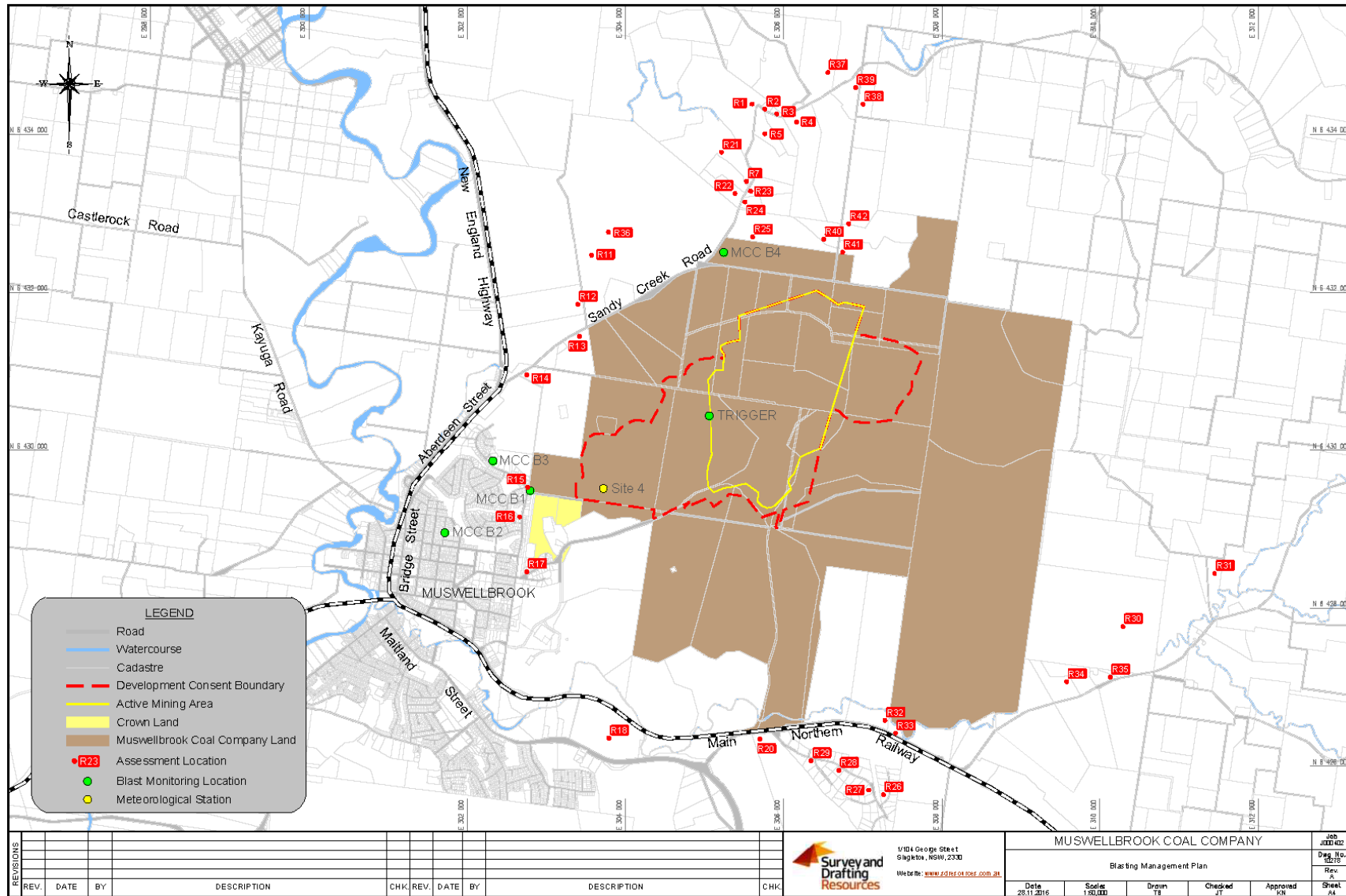
Figure 34: Blast Monitoring Locations

During the reporting period, 100 blast events occurred at MCC. All four blast monitors were operational throughout the reporting period, with 99.8% of data captured during the reporting period. There was one result from one monitor that wasn't captured and this was due to a monitor malfunction. Tests early in the day indicated that the monitor was working but at the time of blasting it was not working for an unknown reason.

There was no exceedance of criteria during the reporting period. 5% of blasts did have a result between 115dB and 120dB during the reporting period. The first of these blasts on 31 July 2017 was wind affected. The anticipated weather change came through earlier than expected, however due to hot product in the ground the blast had to be fired. The wind at the time of the blast was 8.3m/s from the west. The other four blasts were in November and December 2017 and these blasts were fired in the goaf area and were treated as hot shots. More information about these blasts is shown below:

- These blasts were treated as hot shots, and due to the steeply dipping coal seams and the geology of the anticline, the blasts were fired in a south-north direction, meaning the reinforcement was in the direction of the Nisbet blast monitor (where the high results were recorded).
- The risk of misfires is possible in hot shots due to the limitation in explosive products that can be used in hot ground. There is no timing down the hole, and all the control is on the surface. This means they are normally timed to fire faster so that the boosters down the hole received detonation signal, before the rock movement during the blasting phase causes any potential cut offs.
- Misfires are a serious safety concern and are reportable statutory incidents to the Resources Regulator. Increasing the speed of the firing can result in elevated overpressure from the blast, with results over 120dB being reportable statutory incidents to MSC and the EPA. The challenge MCC faced in this area was finding a firing time that prevented misfires while also reducing the overpressure from the blasts.
- To reduce the overpressure at Nisbet monitor, while reducing the risk of potential cut offs in the blast, the timing of one of the hot shots in the goaf was slowed down, and this resulted in an overpressure less than 115dB. However, while digging the material, the mining operations recovered a misfire from this blast with the root cause being ground movement causing cut off to the cord down the hole, meaning the booster in the hole didn't receive its detonation signal resulting in the misfire.
- A second monitor was set up at the Nisbet location to confirm that the results were valid.
- MCC management monitored the overpressure through site inspections to make personal observations of the overpressure at the time of blasting.
- There were no community complaints received for any of the blasts that exceeded 115dB.

MCC were granted permission by MSC to blast outside of the normal 9am-5pm blasting window on one occasion. This was to allow a blast to be fired at ~7:30am before the winds became too strong to blast. There had been a series of windy days and there was a hot shot that needed to be fired before it became a significant safety concern.

A summary of blast monitoring results is displayed in **Figure 35** to **Figure 38**. Blast data for all monitors is shown in **Appendix 3**.
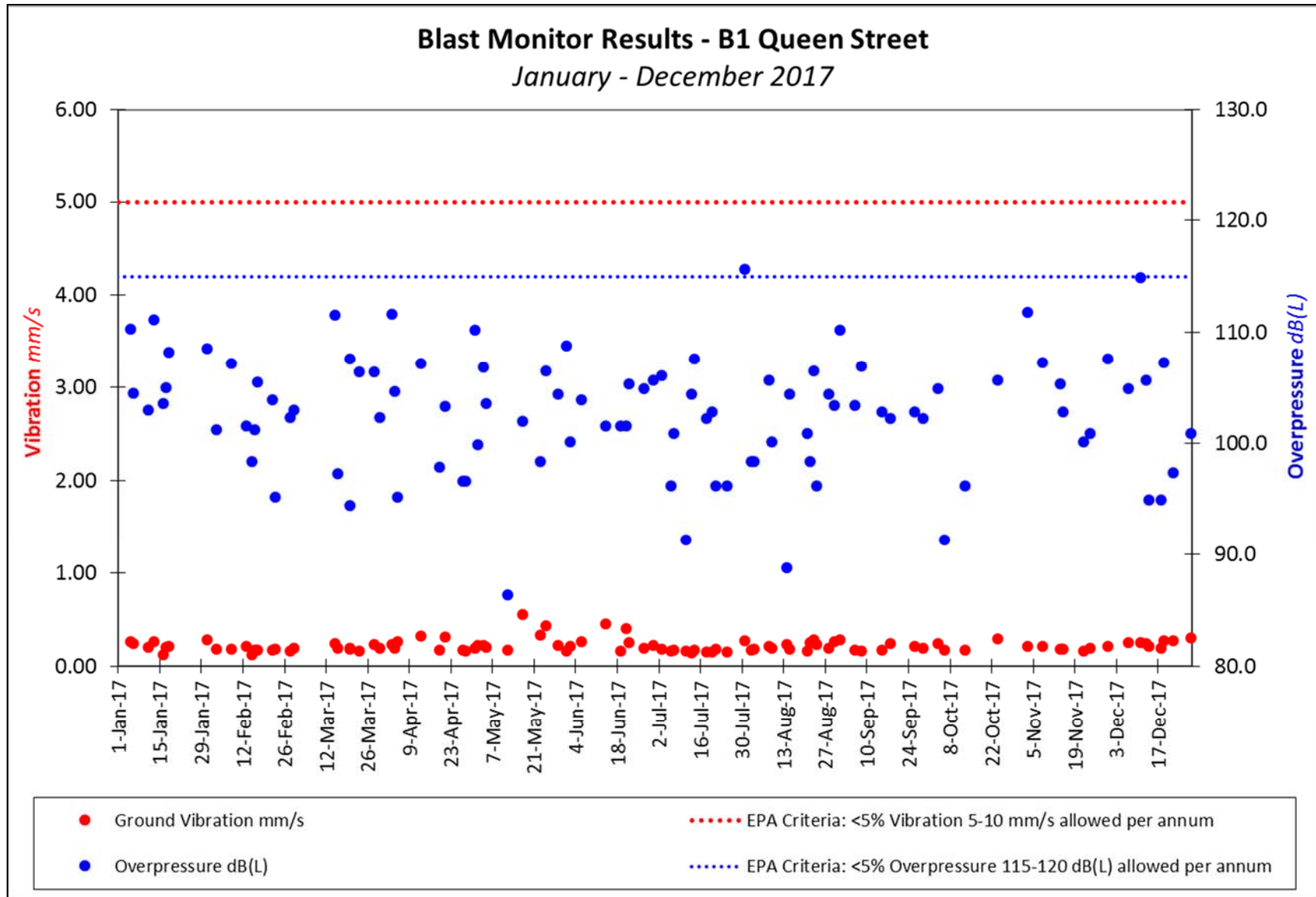
Figure 35: Queen Street Blast Monitoring Results
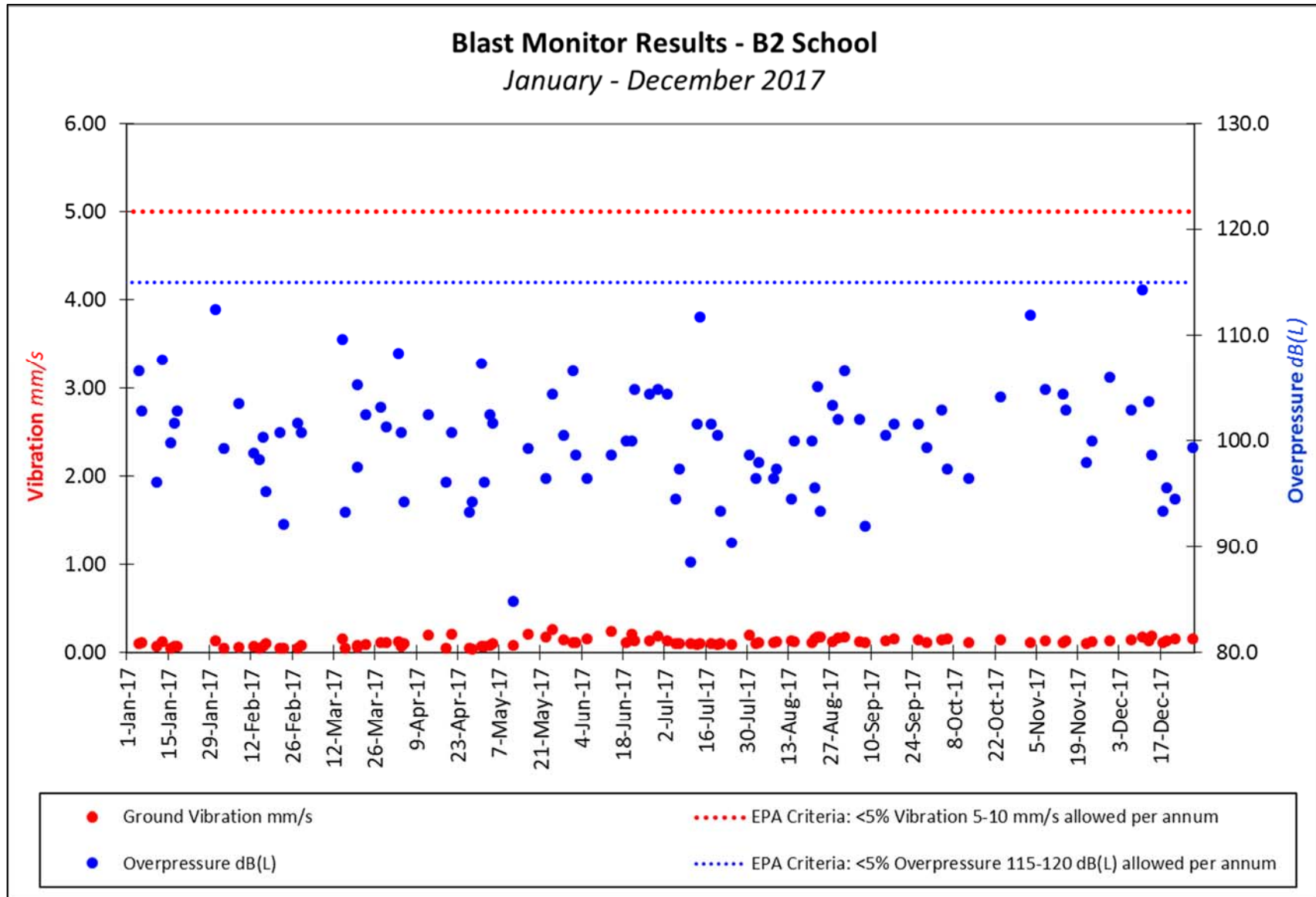
Figure 36: School Blast Monitoring Results
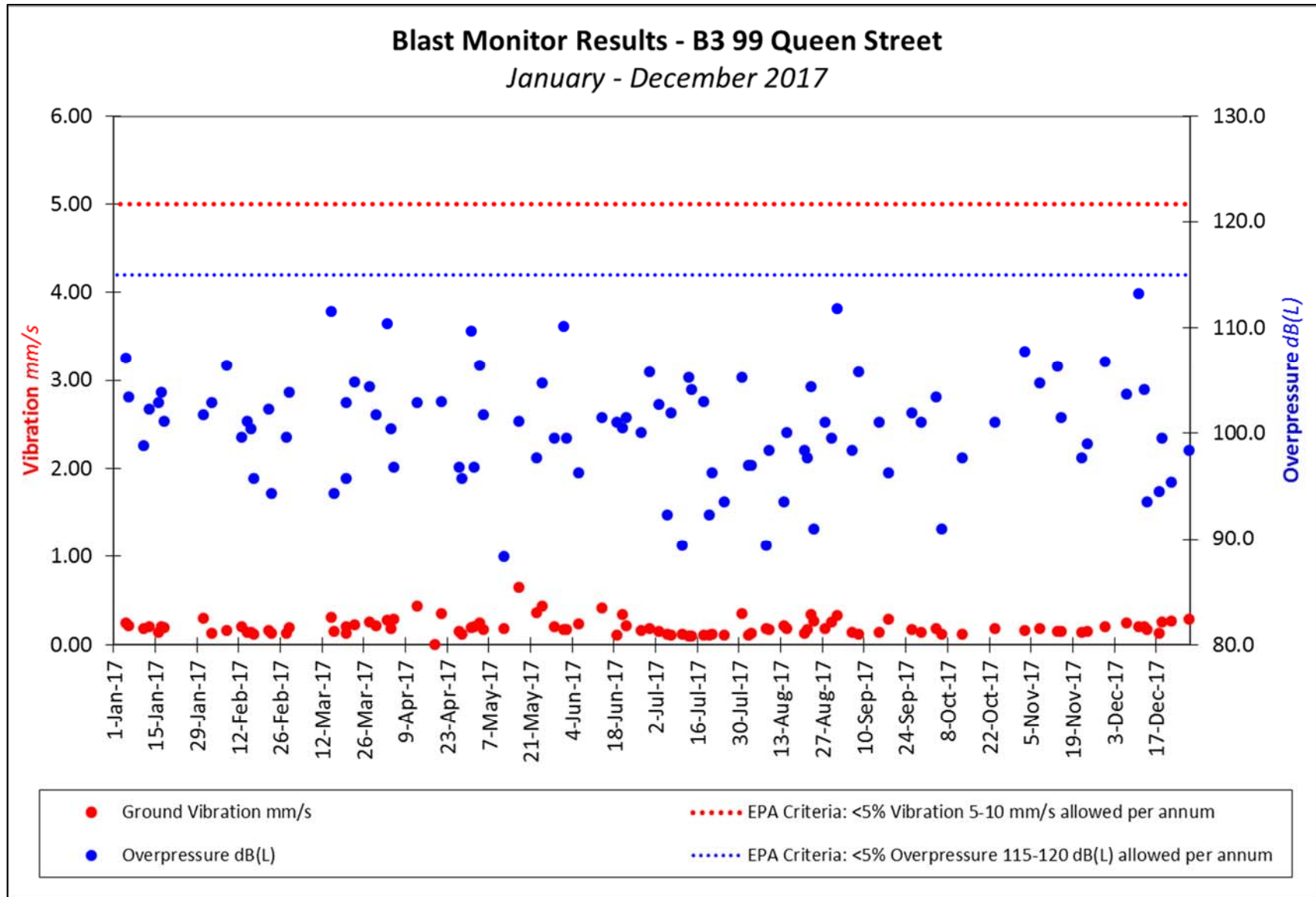
Figure 37: 99 Queen Street Blast Monitoring Results
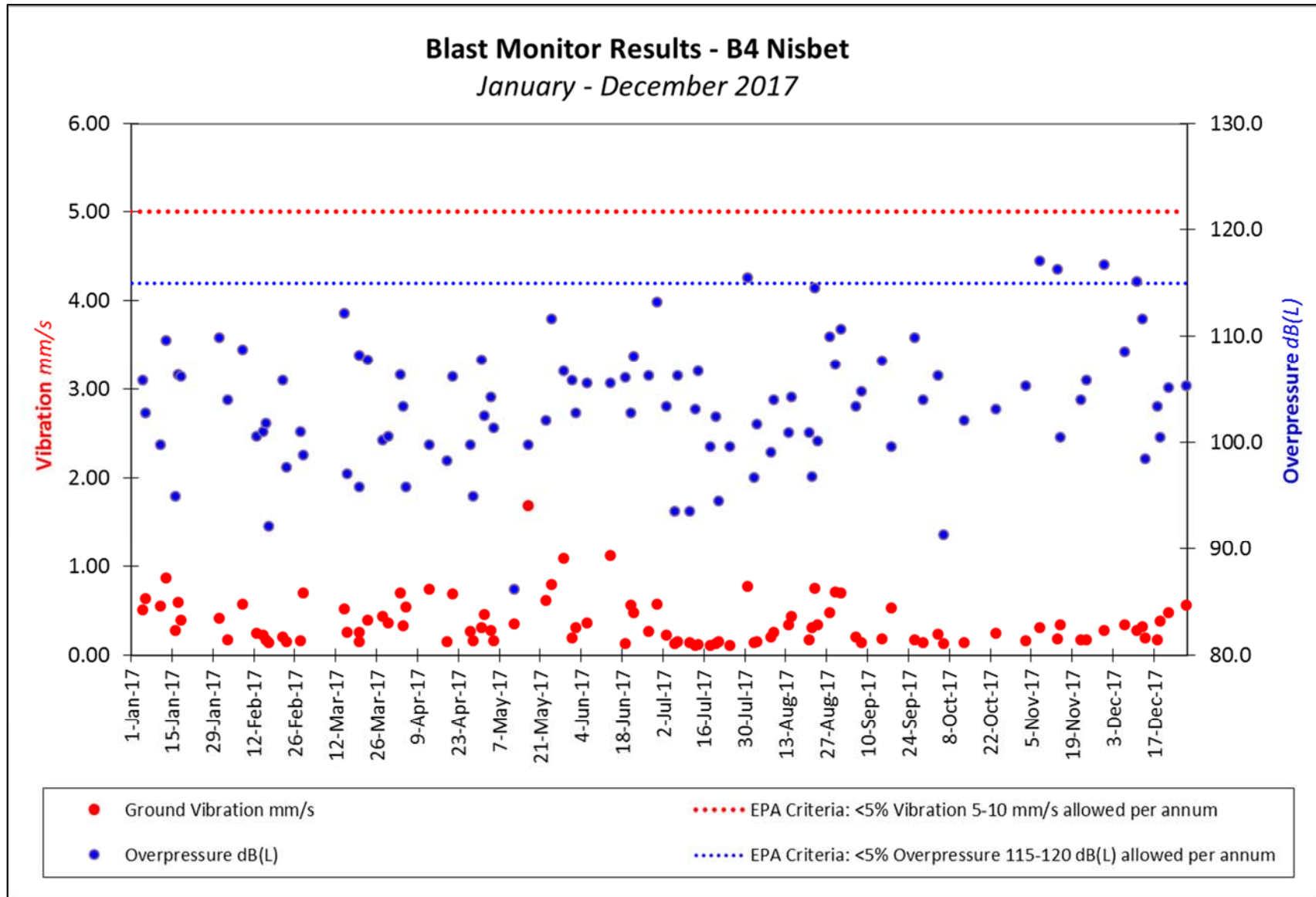
Figure 38: Nisbet Blast Monitoring Results

Table 42 compares the average results from the blast monitoring sites during this reporting period, historical monitoring results, and predictions made in the 2010 Environmental Assessment (EA) (for 2016 and earlier) and the 2016 Statement of Environmental Effects (SEE) (for 2017 data). When the SEE was prepared the predicted results were recalculated. The results in 2017 are generally consistent with historical monitoring results and below the predicted results in the EA and SEE.

Table 42: Comparison of Blasting Results

Year	Vibration (mm/s)		Overpressure (dBL)	
	Average Monitoring Results	EA Predicted Results	Average Monitoring Results	EA Predicted Results
2017	0.25	0.7	101.8	111.0
2016	0.22	2.2	101.0	114.0
2015	0.52	2.2	97.8	114.0
2014	0.11	2.2	98.0	114.0
2013-2014	0.15	2.2	99.1	114.0
2012-2013	0.16	2.2	98.6	114.0
2011-2012	0.19	2.2	97.3	114.0
2010-2011	0.17	2.2	99.5	114.0

3.11.3 ACTIVITIES NEXT REPORTING PERIOD
During the next reporting period MCC will continue to manage and monitor blasting impacts in accordance with the BMP. MCC will continue to investigate options to reduce overpressure and minimise the risk of misfires when blasting in the goaf area.

3.12 NOISE MANAGEMENT

3.12.1 ACTIVITIES THIS REPORTING PERIOD
During the reporting period MCC reviewed and updated the Noise Management Plan to reflect the updated requirements of the development consent and environmental protection licence. This review of the management plan did not make any changes to the management practices at MCC but there were changes made to the noise monitoring program. These changes include:
- Increase monitoring frequency to monthly;
- Decrease monitoring to nigh-time periods only; an
- Review of monitoring locations.

The main objective of the NMP is to manage and minimise the impact of noise from mining operations on the environment and nearby residences. The following actions will be undertaken to achieve this objective:
- Outline the measures to be undertaken on site to mitigate noise emissions;
- Maintain a noise monitoring program;
- Identify the risk levels at which mine operations may need to be modified to manage compliance;
- Define the mechanisms for community consultation;
- Detail the management measures to be undertaken where the noise levels are demonstrated to exceed the criterion;
- Detail the specifications and procedures to be used for the purpose of Independent Noise Investigations; and
- Specify the regulatory reporting requirements.

3.12.2 NOISE MONITORING

The noise monitoring network is provided in **Table 43** and locations are displayed in **Figure 39**.

Table 43: Noise Monitoring Network

Location	Description
R13	Sandy Creek Road
R15	Queen St
R17	Queen St
R25	Sandy Creek Road
R32	Muscle Creek Road

MCC has a network of five attended noise survey locations. Monitoring is conducted at these sites monthly. Monthly attended monitoring allows for a variety of operating configurations, weather conditions and seasonal variations to be measured. The noise consultant schedules the monitoring to occur at times unknown to MCC and they determine the intervals between surveys and the time of measurement. Each attended noise survey is conducted during night periods only.

All noise surveys are performed in accordance with the EPA " NSW Industrial Noise Policy" (INP) guidelines, the Periodic Noise Monitoring programme and Australian Standard 1055 "Acoustics, Description and Measurement of Environmental Noise" as specified in the NMP. Two six-monthly attended noise surveys were undertaken during the reporting period.

Measurements were taken in third-octave bands with an instrument that has Type 1 characteristics as defined in AS1259-1990 "Acoustics – Sound Level Meters". The instrument has a current calibration as per manufacturer's instructions and calibration was also confirmed prior to and at the completion of measurements with a Sound Level Calibrator. The LA_{eq} (15-minute) noise emission levels, at each monitoring site, were determined.

The actual noise level received at individual residences may vary because of:
- The location of mining equipment;
- The elevation of mining equipment;
- Impacts from other noise sources; and
- Prevailing meteorological conditions.

The revised attended noise monitoring program commenced in May 2017. A summary of the results are shown in **Table 44** and **Table 45** and **Figure 40** – **Figure 49** with the detailed results shown in **Appendix 4**.
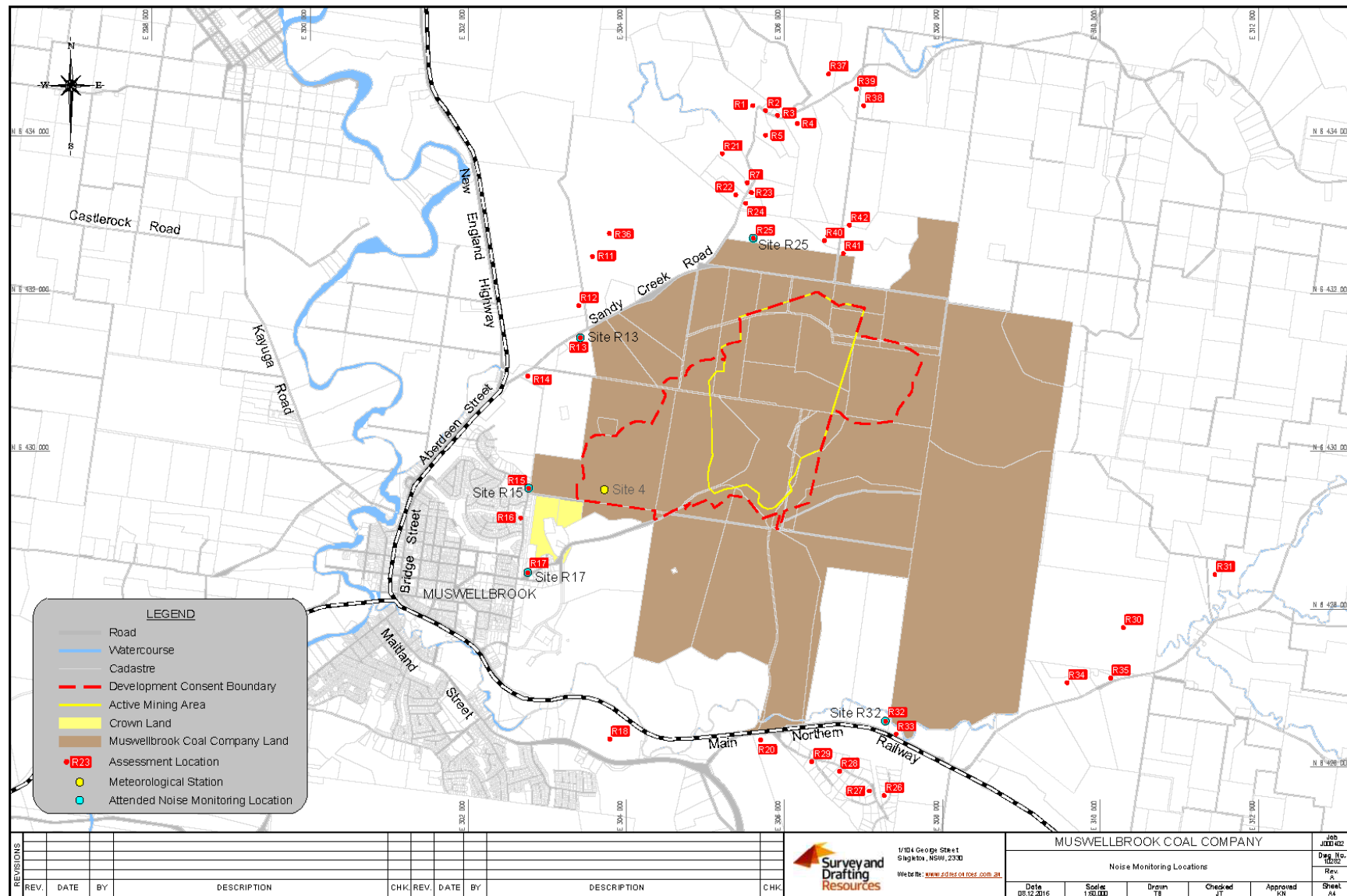
Figure 39: Noise Monitoring Locations

Table 44: Noise Monitoring Results – MCC Contribution LA$_{eq}$

Month	R13 Sandy Creek Rd	Criteria	R15 Queen St	Criteria	R17 Queen St	Criteria	R25 Sandy Creek Rd	Criteria	R32 Muscle Creek Rd	Criteria
May 17	32	41	33	37	30	35	29	42	25	35
Jun 17	25	41	25	37	30	35	27	42	29	35
Jul 17	37	41	33	37	30	35	30	42	29	35
Aug 17	35	41	30	37	32	35	36	42	20	35
Sep 17	25	41	25	37	15	35	30	42	34	35
Oct 17	20	41	Not audible	37	Not audible	35	Not audible	42	Not audible	35
Nov 17	35	41	26	37	Not audible	35	33	42	Not audible	35
Dec 17	Not audible	41	25	37	28	35	Not audible	42	32	35

Table 45: Noise Monitoring Results – MCC Contribution LA1$_{1min}$

Month	R13 Sandy Creek Rd	R15 Queen St	R17 Queen St	R25 Sandy Creek Rd	R32 Muscle Creek Rd	Criteria
May 17	39	40	38	37	28	45
Jun 17	30	30	39	30	36	45
Jul 17	43	40	35	39	36	45
Aug 17	41	37	35	42	25	45
Sep 17	30	33	15	34	38	45
Oct 17	20	Not audible	Not audible	Not audible	Not audible	45
Nov 17	42	30	Not audible	40	Not audible	45
Dec 17	Not audible	30	33	Not audible	37	45

The mining related noise sources were from engine noise, dozer tracks and CHPP operations.

With regards to the low frequency noise, the Industrial Noise Policy (INP) states that a 5dB modifying factor correction needs to be applied to the received noise level if the noise in dB(C) exceeds the noise in dB(A) by more than 15dB. Note that the correction applies to the mine noise component only. There are many sources of low frequency noise in the acoustic environment of each receiver area (including noise from road and rail traffic). During the reporting period, this penalty was applied on two occasions, R17 in August 2017 and R32 in September 2017. This is not a non-compliance with the criteria as it is a known flaw in the INP that is not related to mining operations but as a result of how the INP is written we are obligated to apply this penalty.
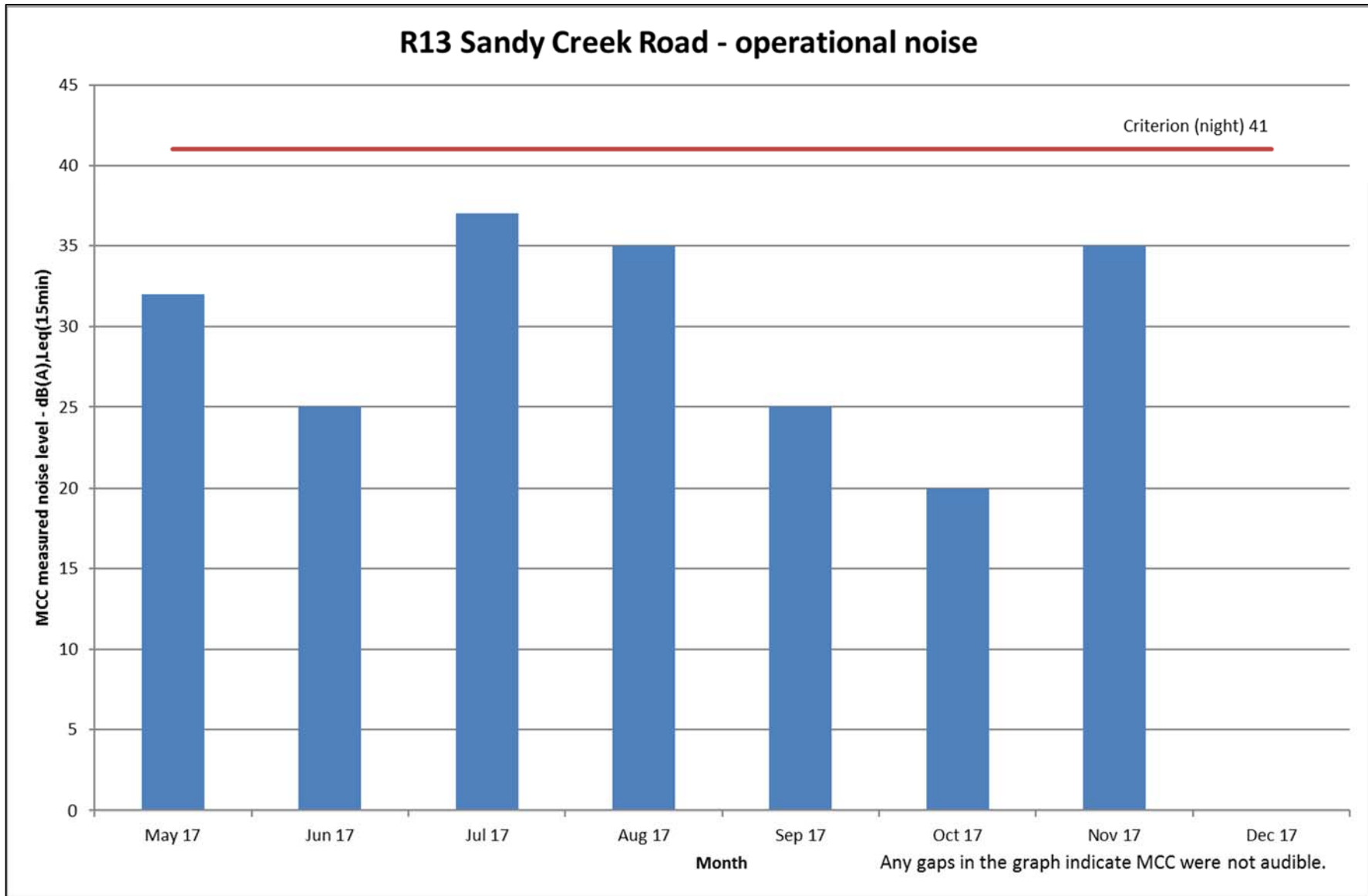
Figure 40: Noise Monitoring Results – LA$_{eq}$ R13 Sandy Creek Road
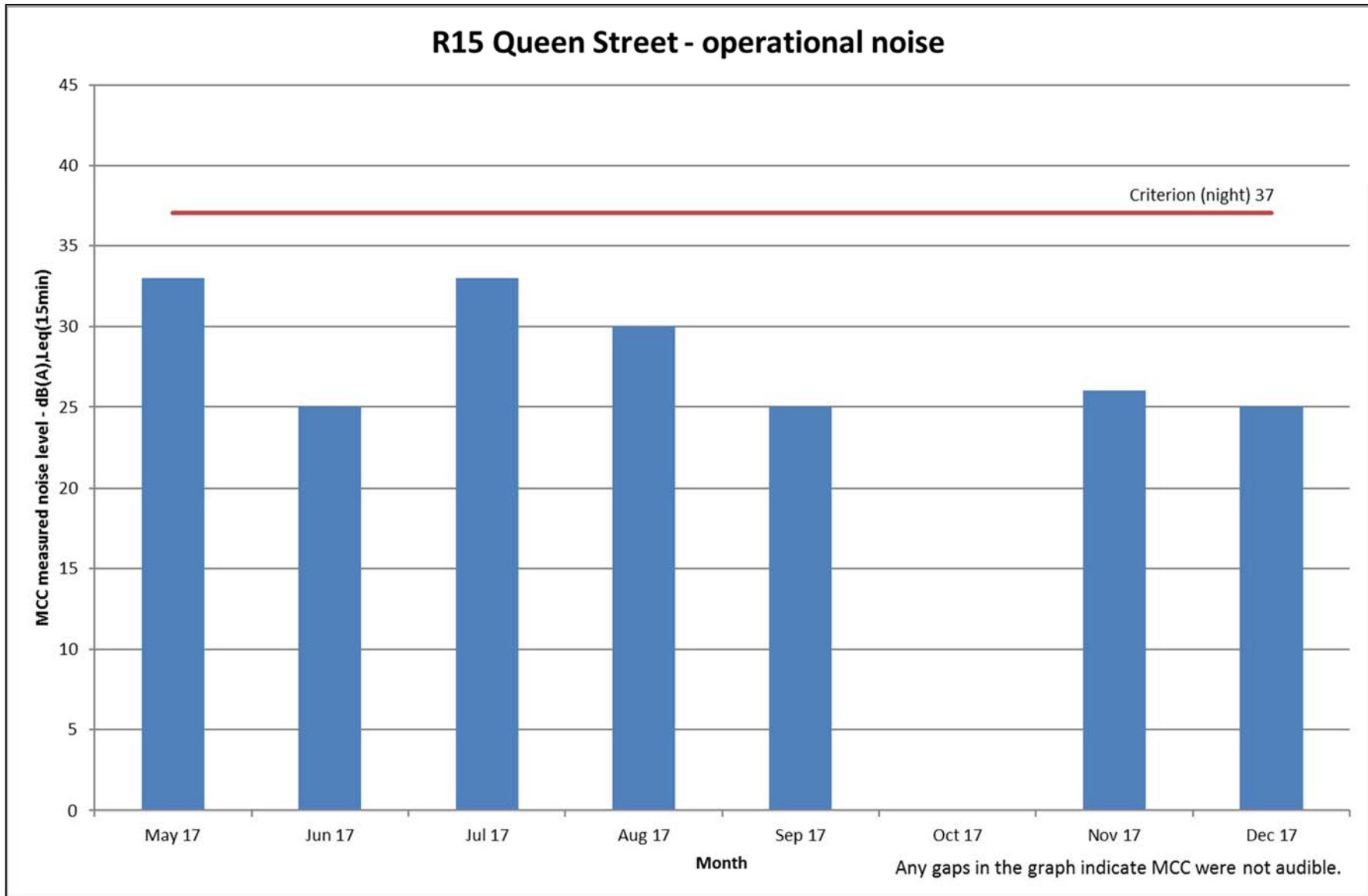
Figure 41: Noise Monitoring Results – LA$_{eq}$ R15 Queen Street
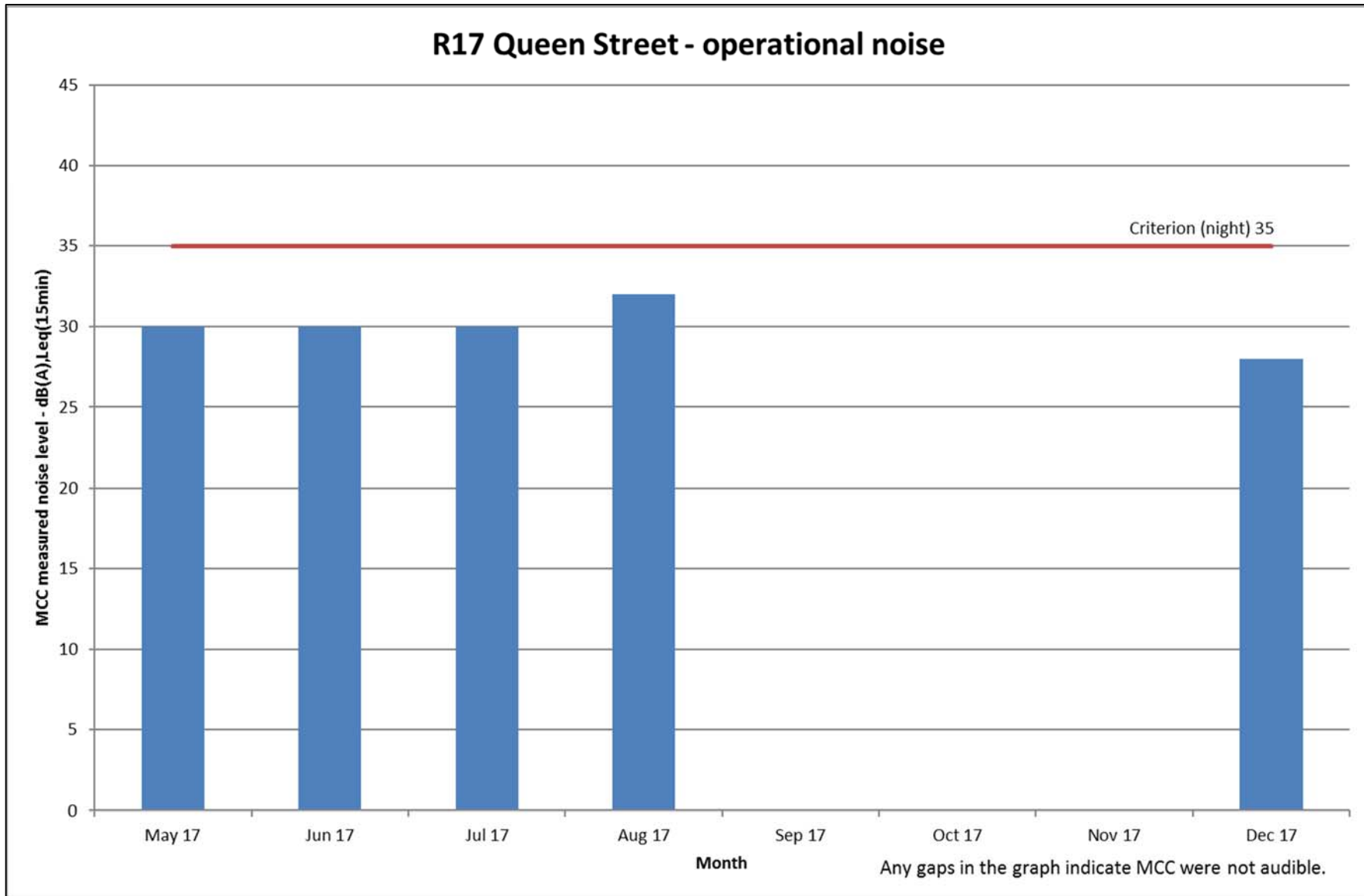
Figure 42: Noise Monitoring Results – LA$_{eq}$ R17 Queen Street
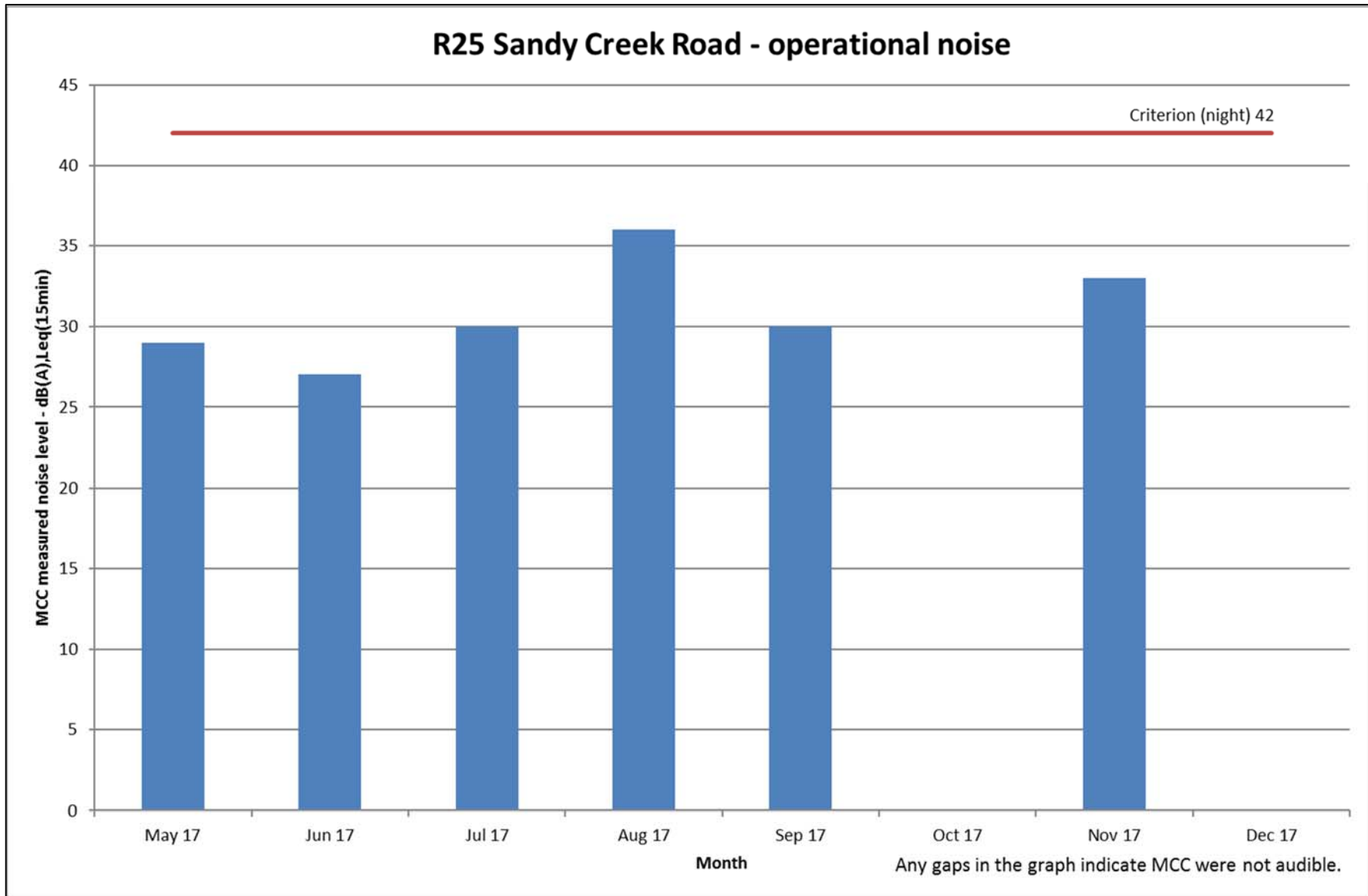
Figure 43: Noise Monitoring Results – LA$_{eq}$ R25 Sandy Creek Road
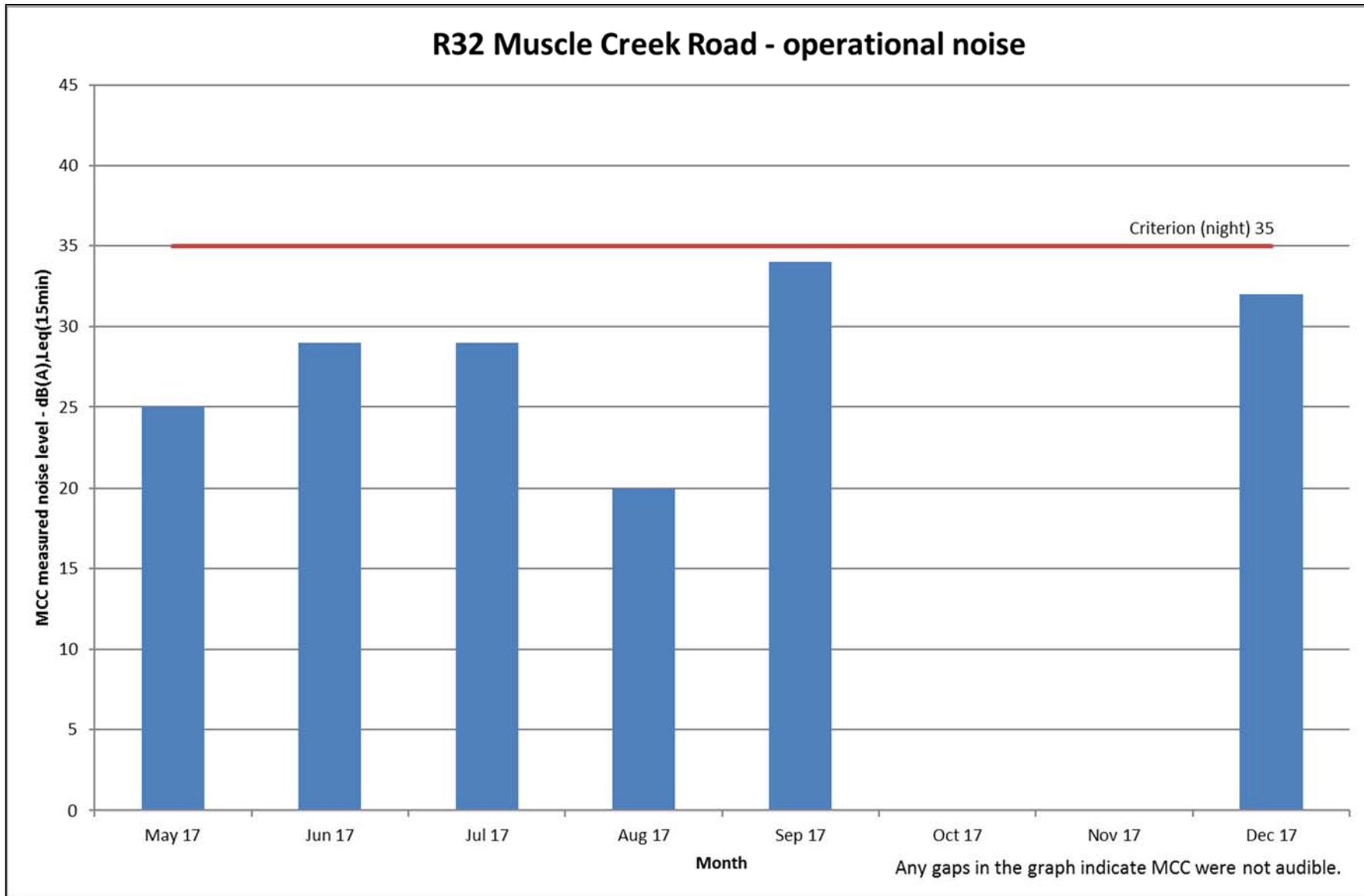
Figure 44: Noise Monitoring Results – LA$_{eq}$ R32 Muscle Creek Road
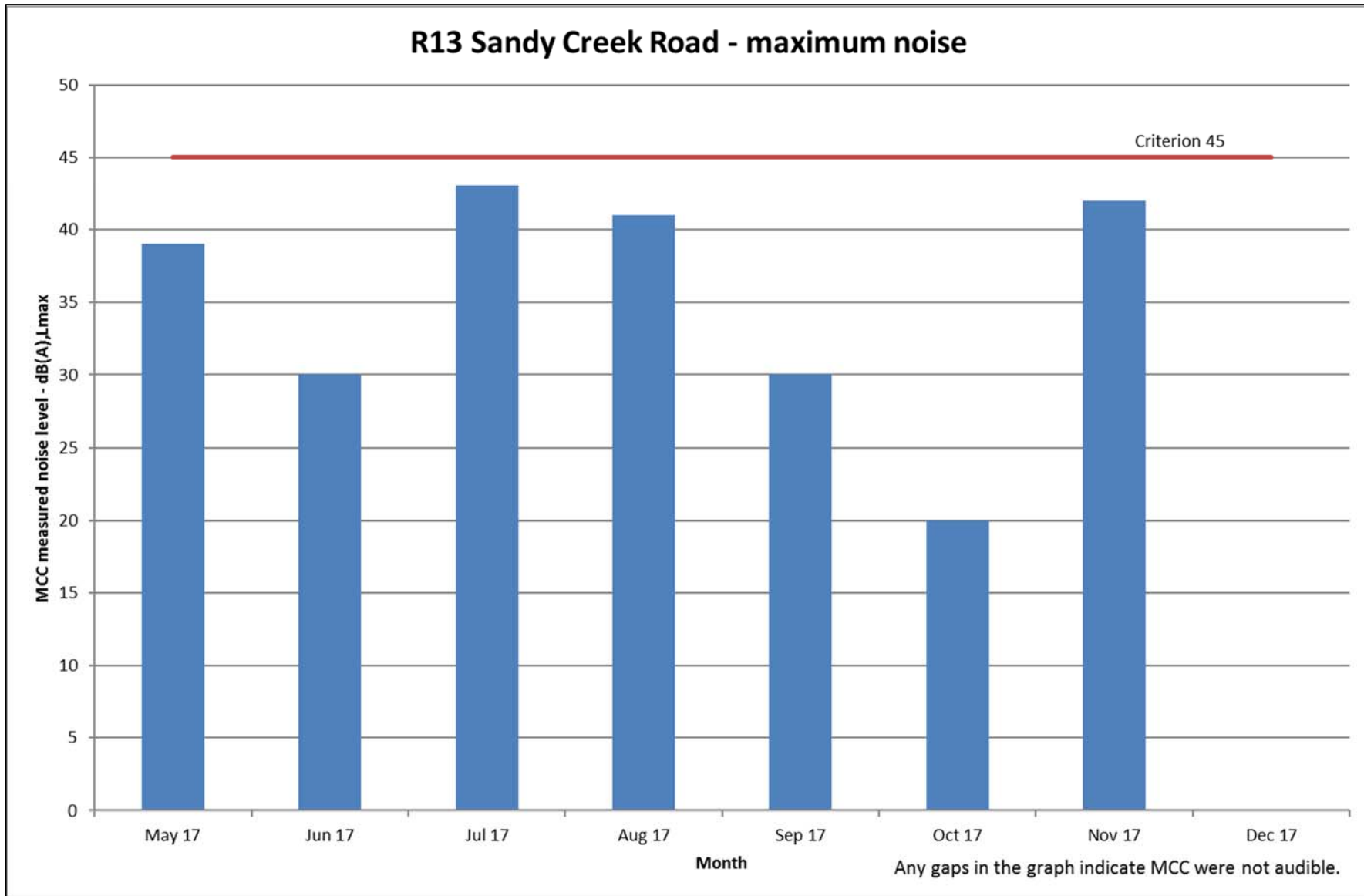
Figure 45: Noise Monitoring Results – LA1$_{1min}$ R13 Sandy Creek Road
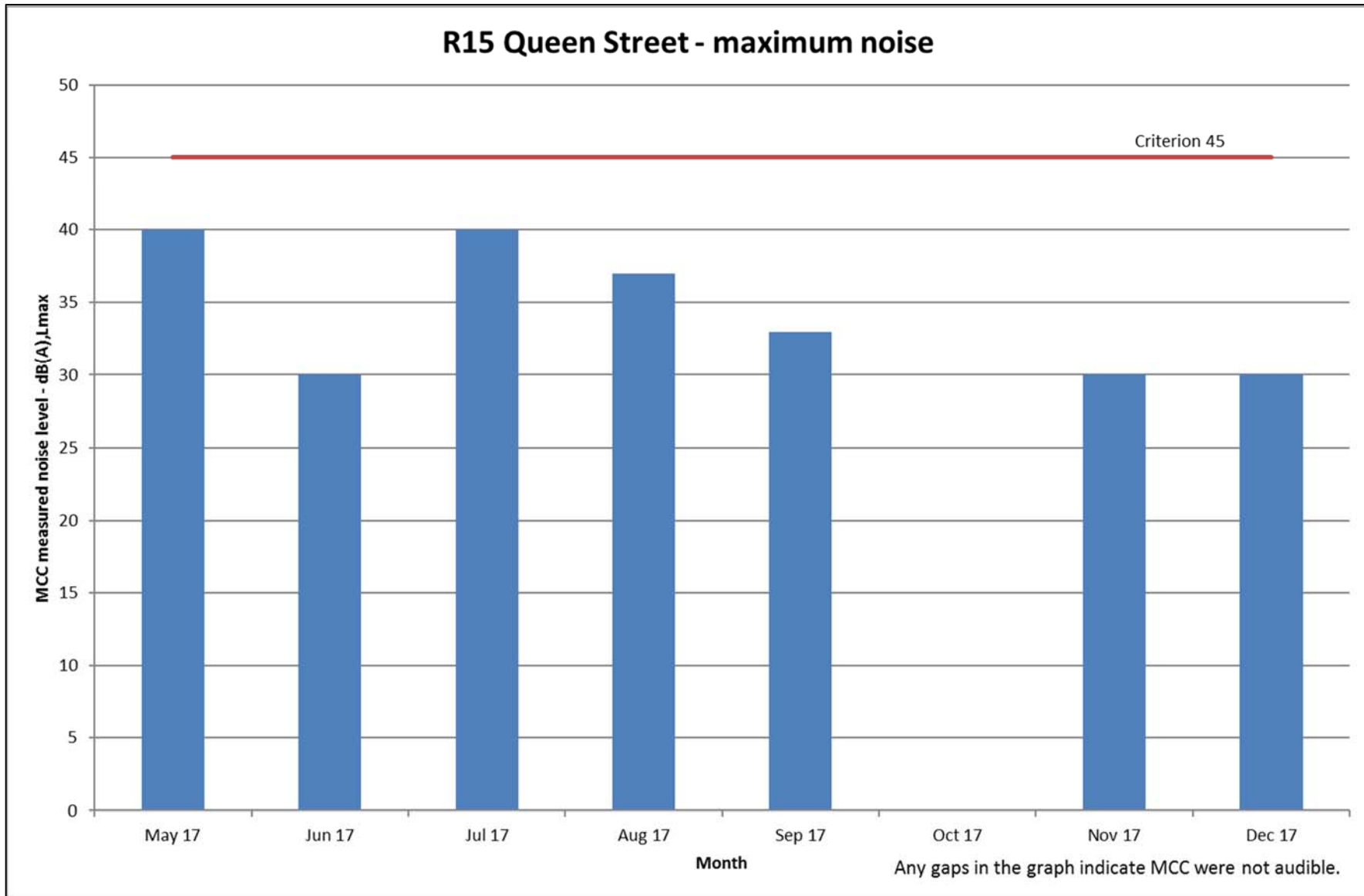
Figure 46: Noise Monitoring Results – LA1$_{1min}$ R15 Queen Street
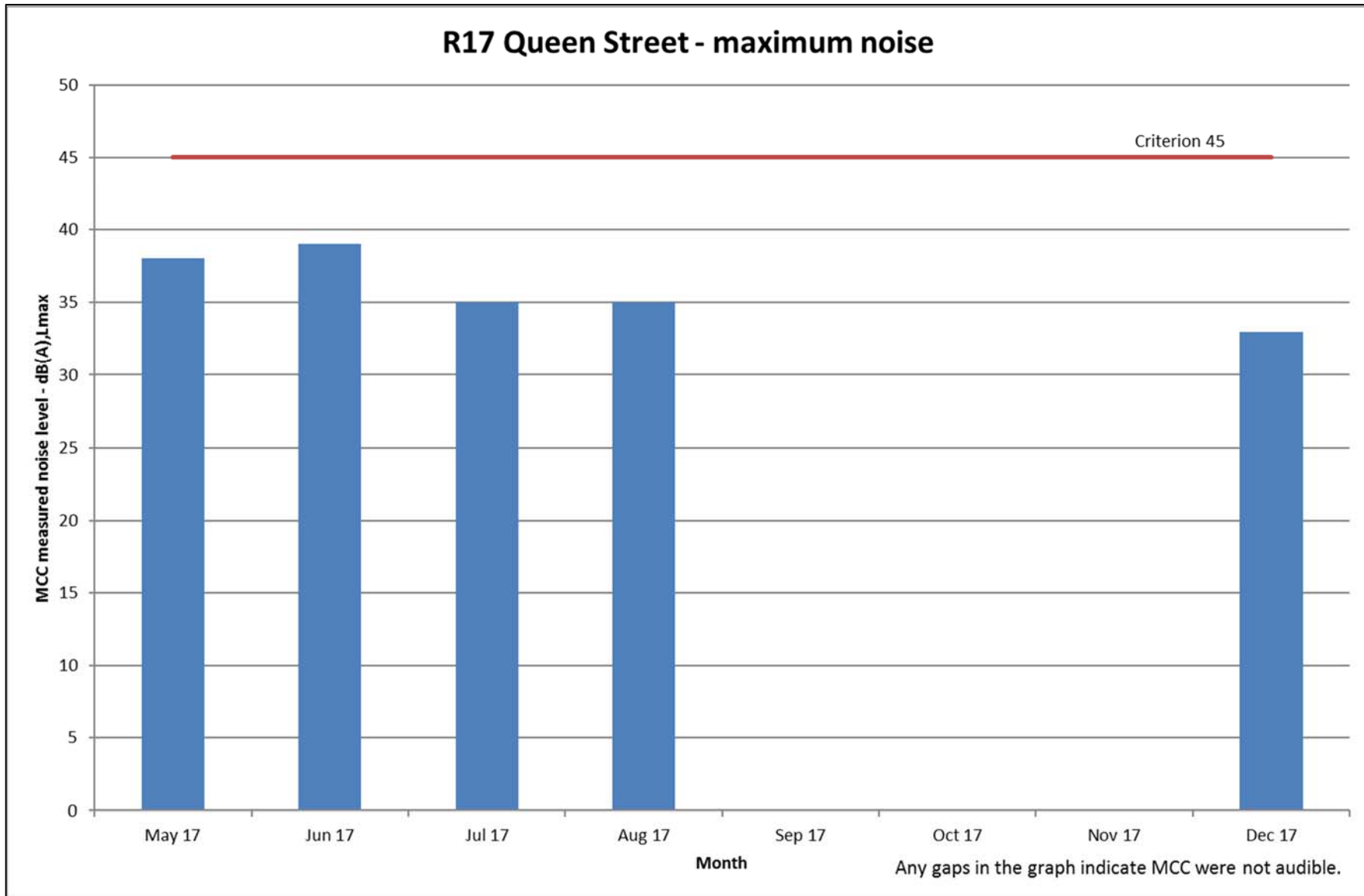
Figure 47: Noise Monitoring Results – LA1$_{1min}$ R17 Queen Street
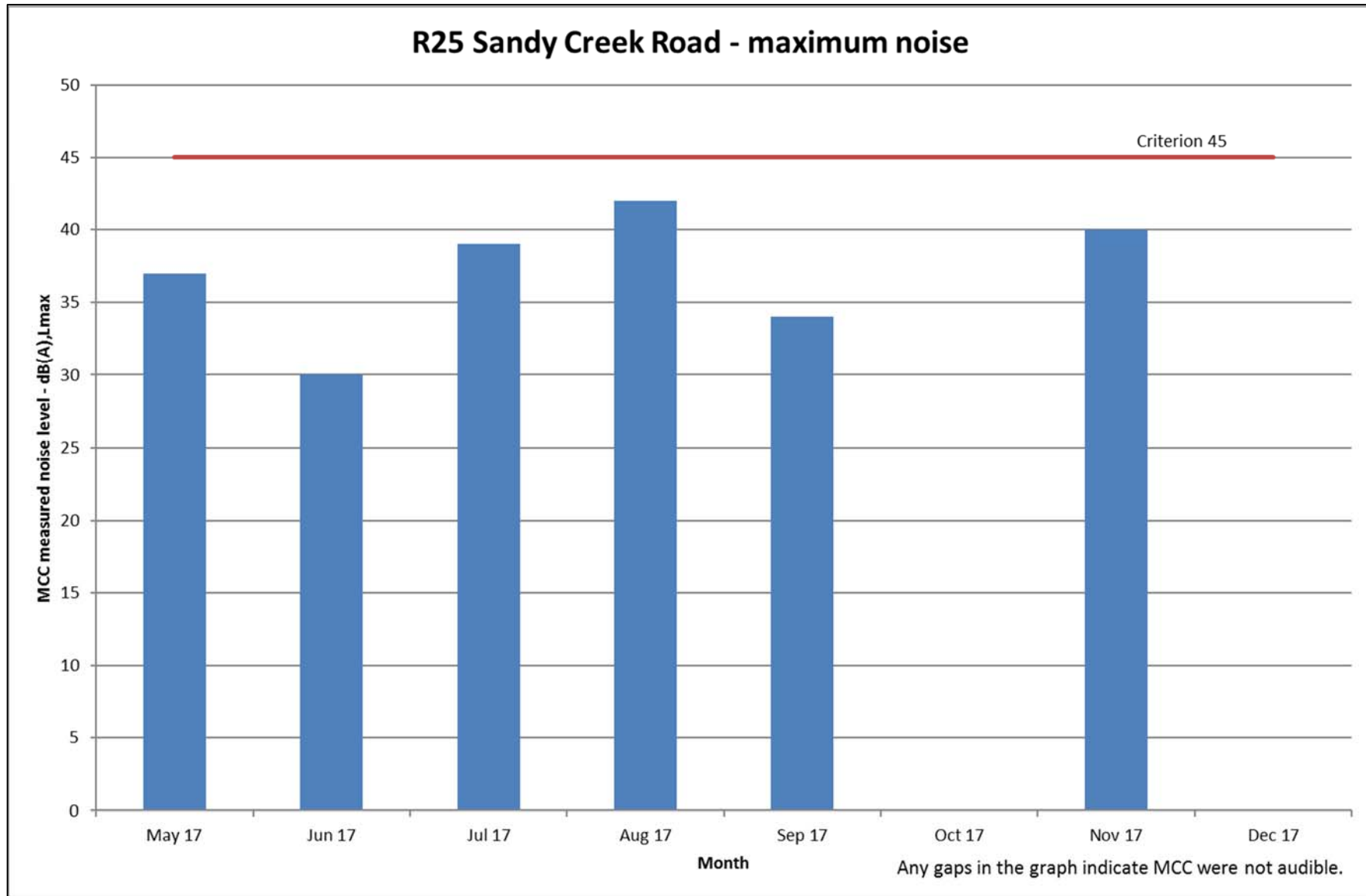
**Figure 48: Noise Monitoring Results – LA1$_{1min}$ R25 Sandy Creek Road**
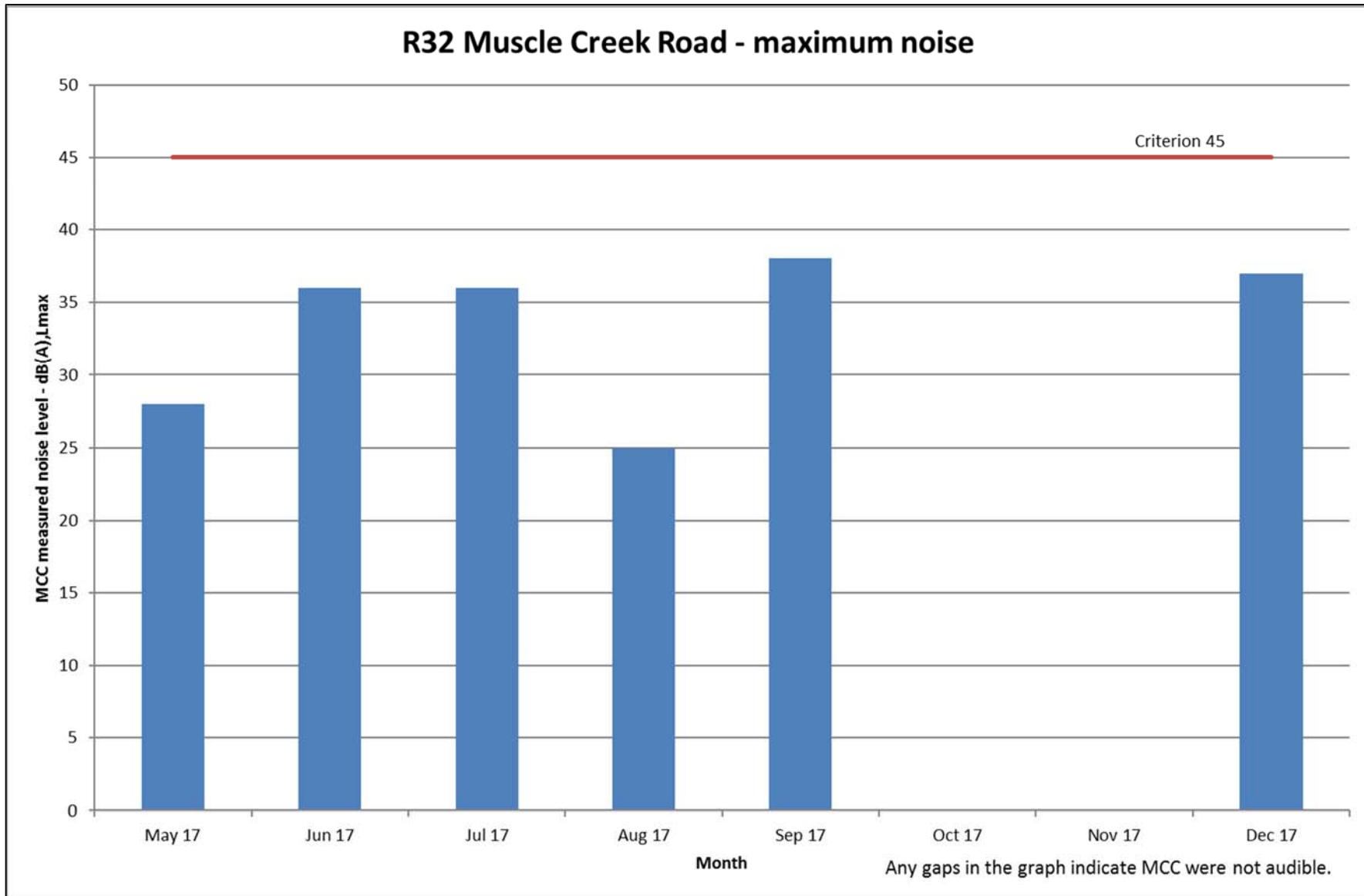
Figure 49: Noise Monitoring Results – LA1$_{1min}$ R32 Muscle Creek Road

Table 46 and **Table 47** compares the average noise monitoring results for this reporting period, historical monitoring results, and predictions made in the 2010 Environmental Assessment (EA) (for 2016 and earlier) and the 2016 Statement of Environmental Effects (SEE) (for 2017 data). When the SEE was prepared the predicted results were recalculated due to the changes in mine plan. The results in 2017 are generally consistent with historical monitoring results and below the predicted results in the EA and SEE.

Table 46: Comparison of Average LA$_{eq}$ Noise Results

Year	R13 Sandy Creek Road		R15 Queen Street		R17 Queen Street		R25 Sandy Creek Road		R32 Muscle Creek Road	
	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted
2017	28	40	27	37	24	34	27	41	25	32
2016	28	38	20	35	23	33	no data		no data	
2015	29	38	28	35	31	33	no data		no data	
2014	35	38	25	35	23	33	no data		no data	
2013-2014	33	38	29	35	27	33	no data		no data	
2012-2013	33	38	21	35	18	33	no data		no data	
2011-2012	35	38	36	35	25	33	no data		no data	
2010-2011	30	385	26	35	21	33	no data		no data	

Table 47: Comparison of Average LA1$_{1min}$ Noise Results

Year	R13 Sandy Creek Road		R15 Queen Street		R17 Queen Street		R25 Sandy Creek Road		R32 Muscle Creek Road	
	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted
2017	33	37	32	33	28	31	32	40	29	32
2016	28	no data	24	no data	23	no data	no data		no data	
2015	32	no data	30	no data	37	no data	no data		no data	
2014	40	no data	29	no data	25	no data	no data		no data	
2013-2014	34	no data	32	no data	25	no data	no data		no data	
2012-2013	41	no data	28	no data	19	no data	no data		no data	
2011-2012	46	no data	46	no data	30	no data	no data		no data	
2010-2011	47	no data	31	no data	25	no data	no data		no data	

3.12.3 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage and monitor noise related impacts in accordance with the NMP.

3.13 VISUAL AMENITY, LIGHTING AND LANDSCAPING

During the reporting period the Visual Amenity, Lighting and Landscaping Management Plan (VALLMP) was updated to reflect the revised consent conditions and was prepared to the satisfaction of MSC.

The primary objectives of the VALLMP are to implement visual reduction strategies in order to minimise the visual, lighting and landscape impact on the community and meet the development consent requirements. MCC will continue to employ measures to minimise the potential for visual related impacts on the nearest receptors by:

- Undertaking rehabilitation progressively where possible; and
- Orientating lights away from sensitive receptors where practical.

During the next reporting period MCC will continue to manage visual, lighting and landscaping in accordance with the VALLMP.

3.14 ABORIGINAL HERITAGE

MCC has successfully completed salvage operations and continues to maintain and protect one Aboriginal cultural site located within the mine lease boundary.

During the reporting period, no ground disturbance operations required consultation with Aboriginal groups. A member of the Wanaruah Local Aboriginal Lands Council presently sits on the MCC Community Consultative Committee (CCC).

3.15 EUROPEAN HERITAGE

There are no European Heritage sites located within the disturbance boundary at MCC that require ongoing management.

3.16 SPONTANEOUS COMBUSTION

3.16.1 ACTIVITIES THIS REPORTING PERIOD

During the reporting period the Spontaneous Combustion Management Plan (SCMP) was reviewed and updated to reflect the revised consent conditions. The SCMP was developed in to the satisfaction of MSC.

The main objective of the SCMP is to minimise the occurrence and manage the effect from spontaneous combustion in:

- The highwall and existing U/G mine workings in Open Cut 1;
- The overburden/interburden removal and coal removal in Open Cut 1;
- Active and recent emplacement areas within Open Cut 1;
- Open Cut 2;
- Coal emplacement and storage areas; and
- Elsewhere with the disturbance area.

The SCMP lists the preventative measures, control measures and trigger response action plans (TARP's) for each of these areas.

Regular spontaneous combustion reports are provided to both DRG and EPA. These reports identify existing and new incidents of spontaneous combustion, mitigation procedures and improvements to these procedures, effectiveness of actions, areas capped, areas mined, areas under water infusion and

complaints received. The report also includes a plan showing the extent and location of problem areas.

Four spontaneous combustion reports were submitted to DRG and EPA during the reporting period. The majority of affected areas were within the open cut and overburden emplacement areas. The areas that were treated each month are shown in **Table 48.** A historical comparison of affected areas without active control measures is provided in **Table 49**. The areas without active control has reduced from the last reporting period and is the lowest in previous 11 years. This reflects the ongoing effort from MCC in relation to spontaneous combustion management.

Table 48: Spontaneous Combustion Report Summary

Reporting Month	Spontaneous Combustion Areas Capped (m²)	Spontaneous Combustion Areas Mined (m²)	Area Under Water Infusion (m²)
Jan-17	12	20	5,700
Feb-17	0	0	0
Mar-17	24	4	2,400
Apr-17	0	0	2,400
May-17	12	0	4,880
Jun-17	0	12	8,380
Jul-17	4	0	8,380
Aug-17	0	0	8,380
Sep-17	4	0	8,580
Oct-17	4	4	9,880
Nov-17	4	0	4,980
Dec-17	0	8	11,380

Note: Areas capped and areas mined are the total of the areas treated during that month. Area under water infusion is the area at the end of the month. This area may change during the month.

Table 49: Summary of Spontaneous Combustion Affected Areas Without Active Control

Total Area Affected by Spontaneous Combustion (m²)										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Jan-Mar	6,694	1,726	641	40	215	71	65	156	145	248	24
Apr-Jun	25,546	661	187	85	95	53	57		232	182	48
Jul-Sep	37,21	1,076	34	135	85	45	149	177	190	48	52
Oct-Dec	3,918	646	70	45	64	57	45	119	242	56	52
Yearly Average	**9,970**	**1,027**	**233**	**76**	**115**	**57**	**79**	**151**	**203**	**133**	**44**

Note: These values are the values at the end of the respective reporting period. These areas may change during the reporting period.

As part of the spontaneous combustion management activities this reporting period the following was carried out:
- Establishment of 38 fly ash seals using both dry fly ash and slurry. A total of 9,793 tonnes of fly ash and 3,441 tonnes of aggregate were used.
- Sprayed/injected 420.5 megalitres of water onto/into spontaneous combustion areas to minimise the impacts.
- Hauled and dumped 230,000m³ of clay overburden for short term control of spontaneous combustion.
- Brought spontaneous combustion in overburden dumps under control.

Planned Versus Actual Activities

One of the requirements of the revised SCMP is to prepare an annual plan in relation to spontaneous combustion management activities and then at the end of the reporting period to review the actual activities against the planned activities and identify any opportunities for improvement in relation to spontaneous combustion management. Below is a summary of the review of the action plan from this reporting period.

As part of the development of the annual spontaneous combustion action plan for this reporting period, the numerous meetings were held to:

- confirm the sequence of mining;
- identify crucial areas for action to manage, minimise and extinguish or, by mining of the coal, to eliminate the spontaneous combustion;
- develop a monitoring system;
- continue the overburden dumping sequence/material type developed to manage spontaneous combustion; and
- continue the process of relating management control requirements to the level of spontaneous combustion, and the likely period that the control measure is required until the mining of the coal or extinguishment.

Following these meetings, the planned spontaneous combustion management activities for this reporting period were developed and are shown in **Figure 50** and **Figure 51**.
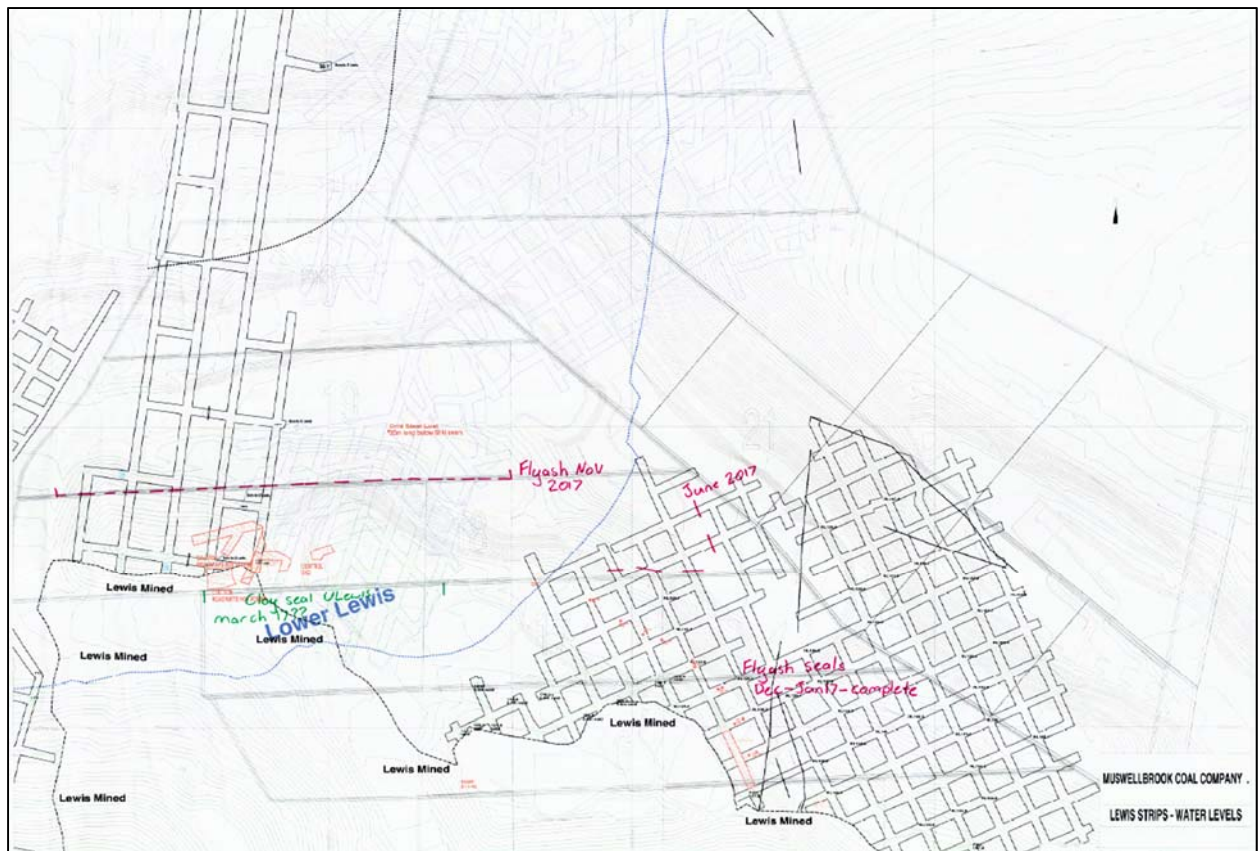
Figure 50: Planned Spontaneous Combustion Management in Upper Lewis and Lower Lewis seams
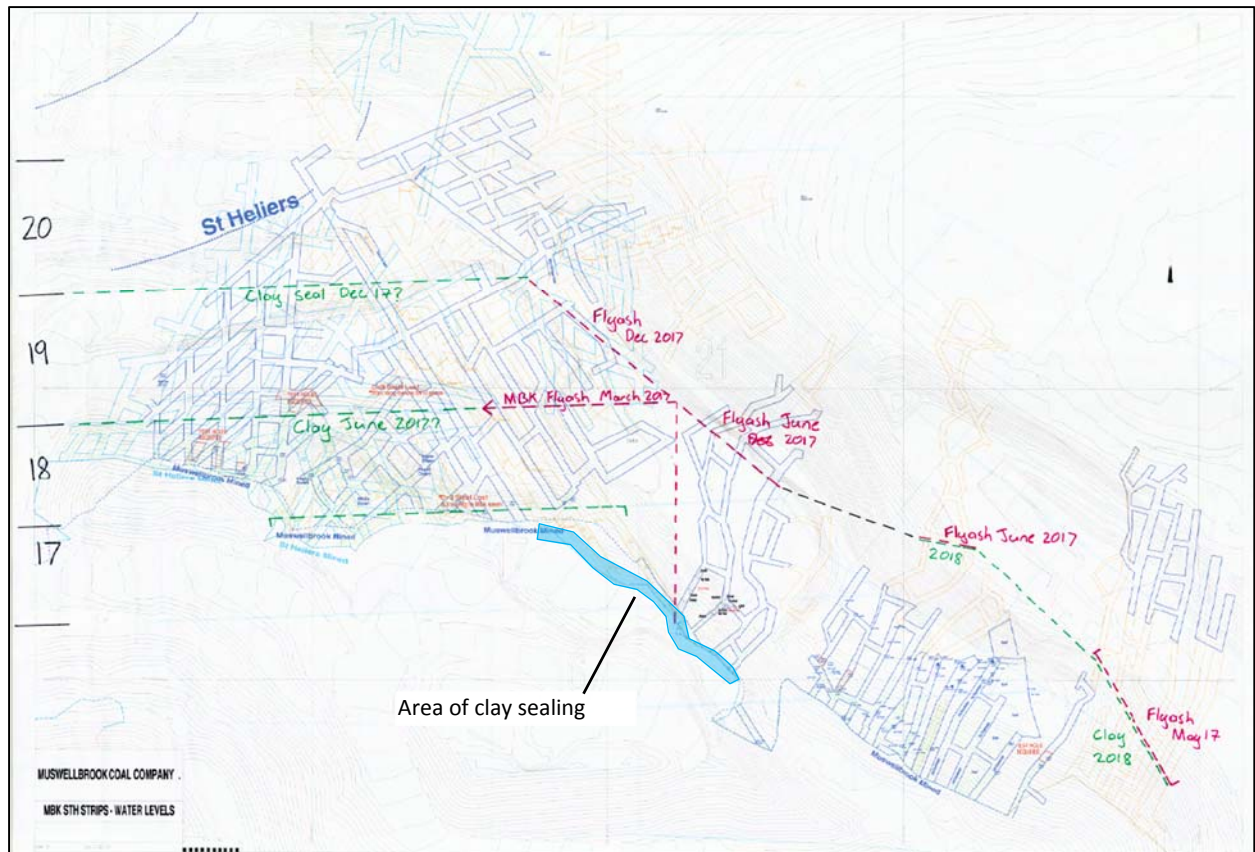
Figure 51: Planned Spontaneous Combustion Management in Muswellbrook, Upper St Heliers and Lower St Heliers seams

The actual spontaneous combustion management activities for this reporting period are shown in **Figure 52** to **Figure 56**.

In the reporting period, the fly ash seals in the eastern side of the Lower Lewis were in line with the plan. Because of the intense fire and heat in this area, all fly ash seals had to be reinforced with a clay sealing to maintain a minimum level of fire control over the spontaneous combustion.
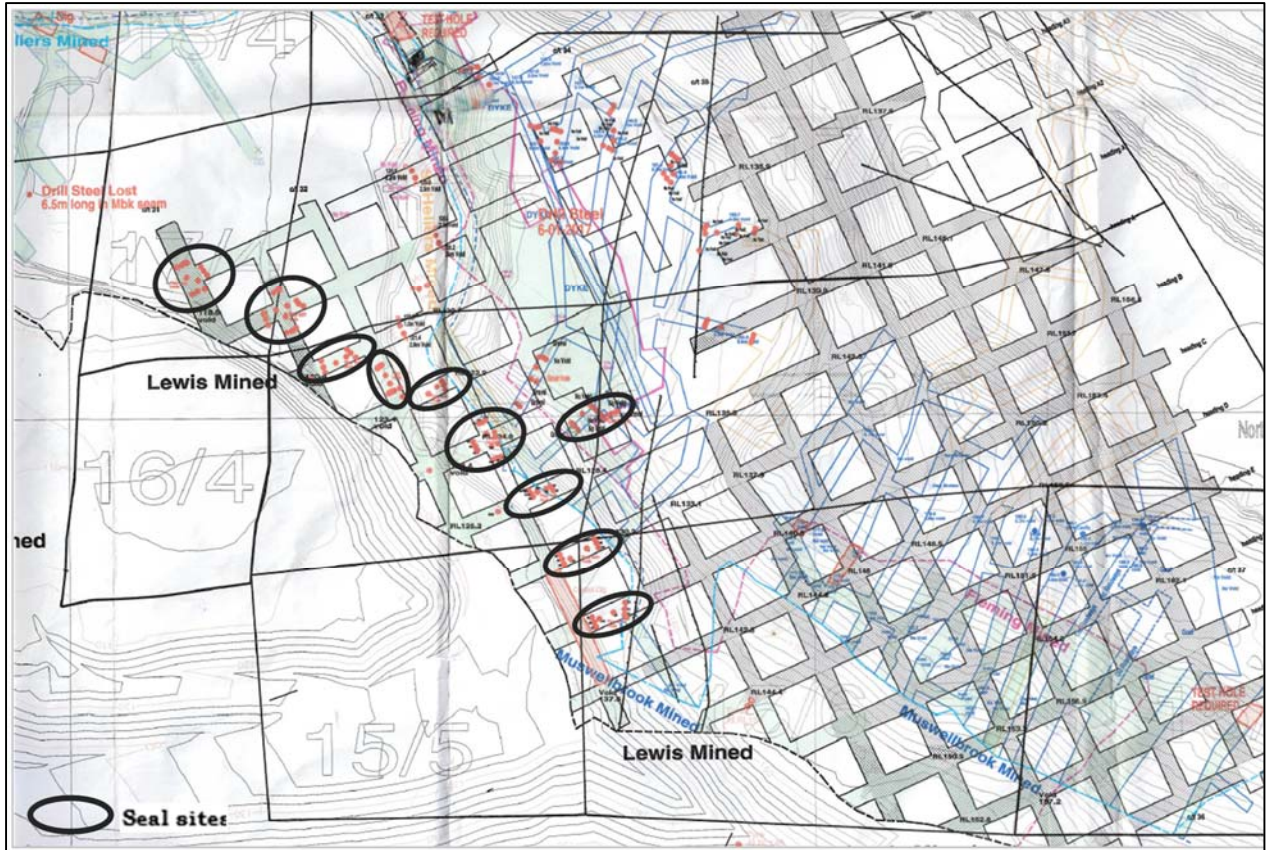
Figure 52: Actual Spontaneous Combustion Management in Lower Lewis Seams (S16-S17)
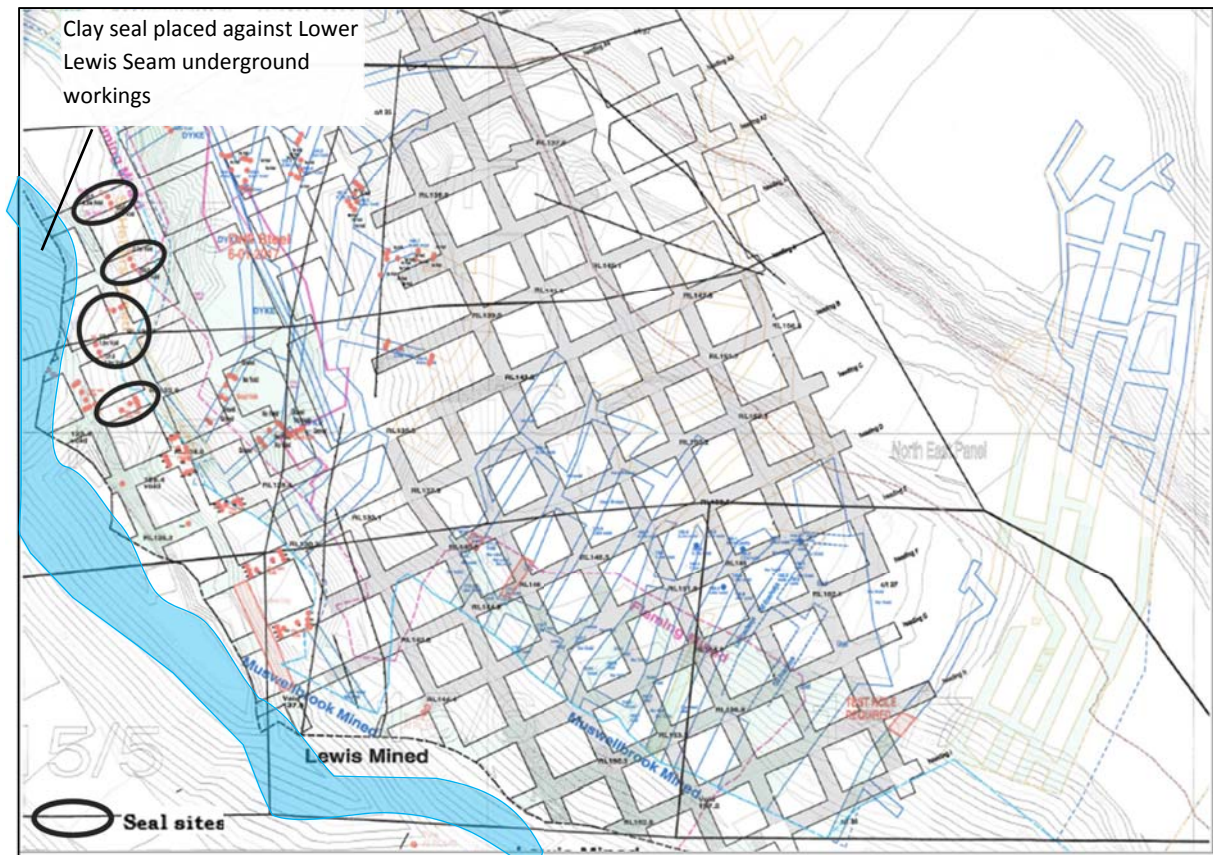

Figure 53: Actual Spontaneous Combustion Management in Lower Lewis Seams (S18)

No fly ash seals were placed in the interim highwall for the Lower Lewis along the Strip 18 highwall because of the absence of spontaneous combustion and the expected time until Strip 19 was mined i.e. less than the time that it would take for any heating to develop.
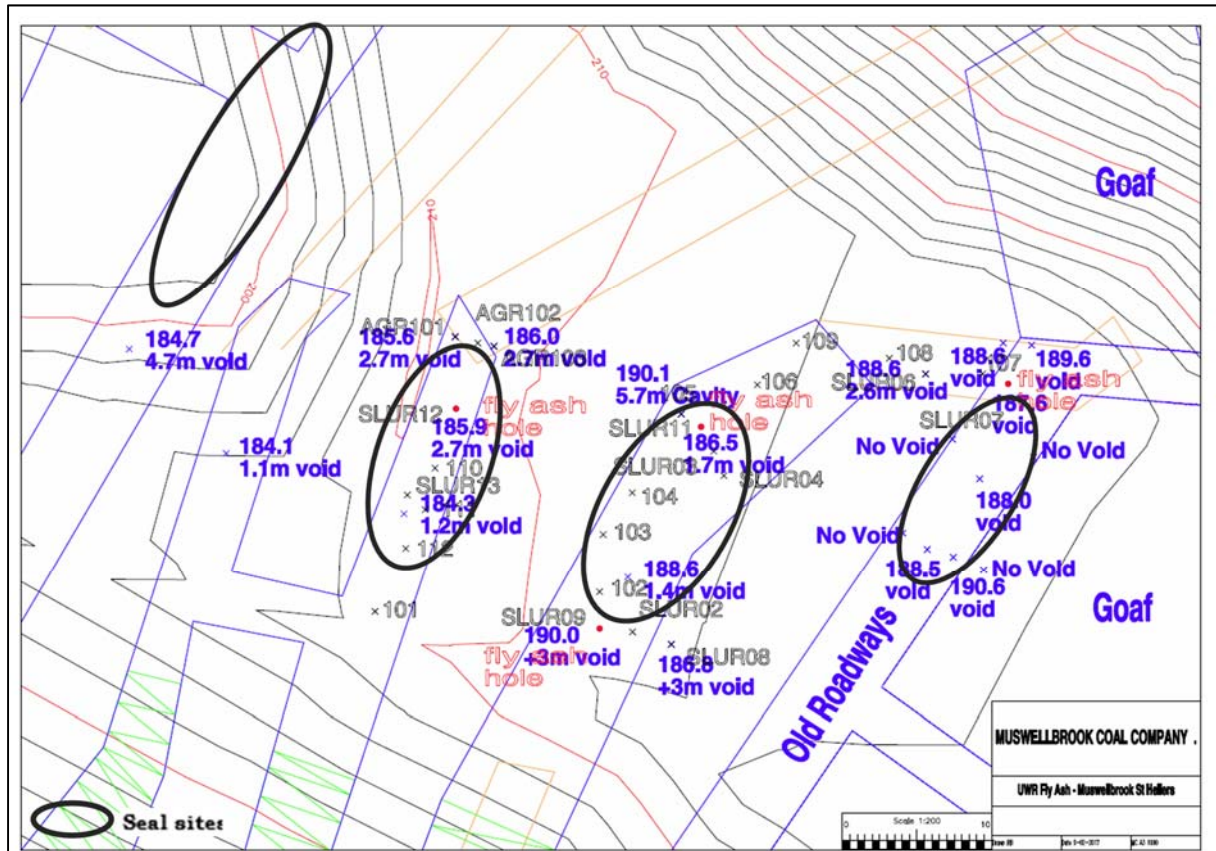
Figure 54: Actual Spontaneous Combustion Management in Upper West Road

No fly ash seals were placed in the eastern most in the Muswellbrook and St Heliers Seam underground workings nearest the anticline due to a change in mining sequence and the extreme heat of the spontaneous combustion area. Water injection was successfully used to cool the area and control the heating and no clay seals were established.

In the underground workings area containing goaf extraction, four seals were placed immediately against the low wall side as this was the only area with access. The remainder of the workings could not be safely accessed for either fly ash or clay seals.
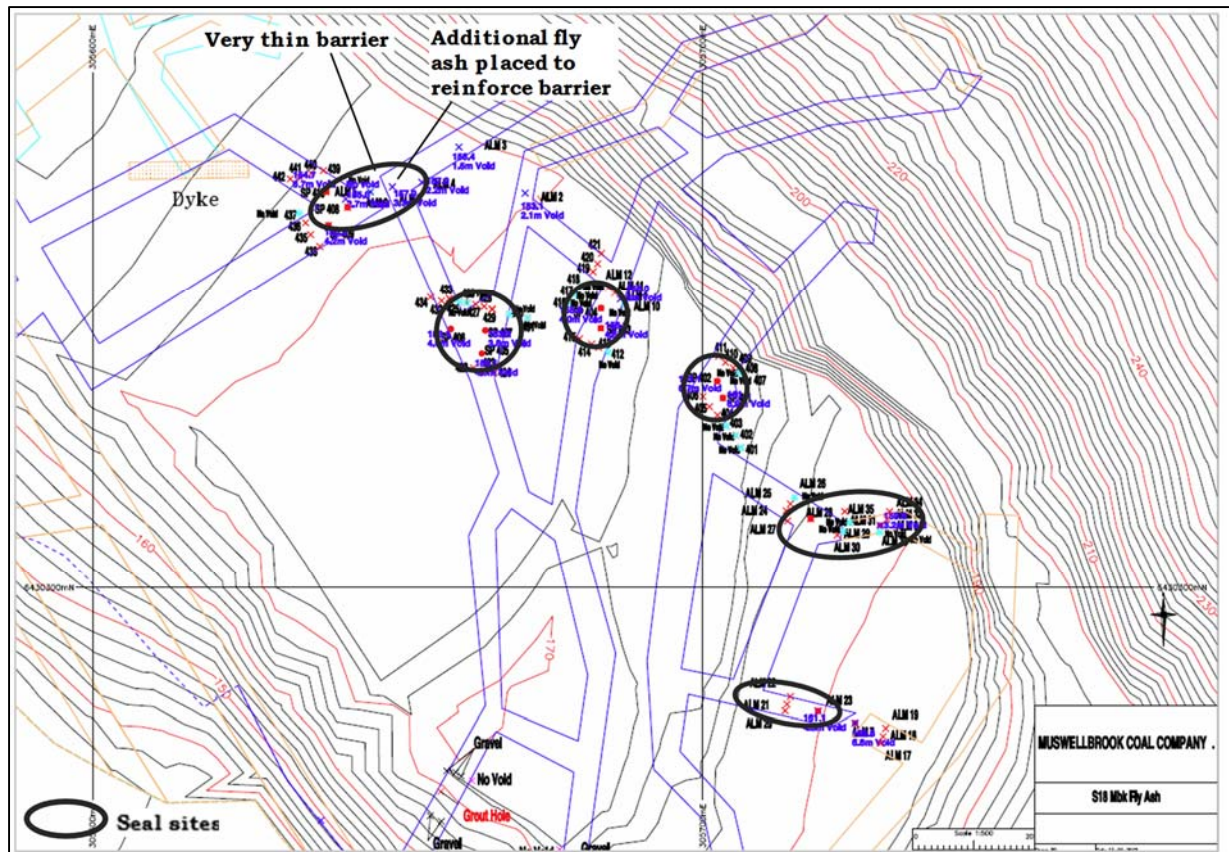
Figure 55: Actual Spontaneous Combustion Management in Muswellbrook Seam

The fly ash seal sites shown in **Figure 55** were established in accordance with the spontaneous combustion action plan. Due to a very thin barrier, an additional seal was included to maintain seal integrity.

As several seal sites could not be sealed due to high wall collapse and as this area was not mined during the reporting period, heating developed in the roadways between the seals and the lowwall necessitating a section of clay sealing.
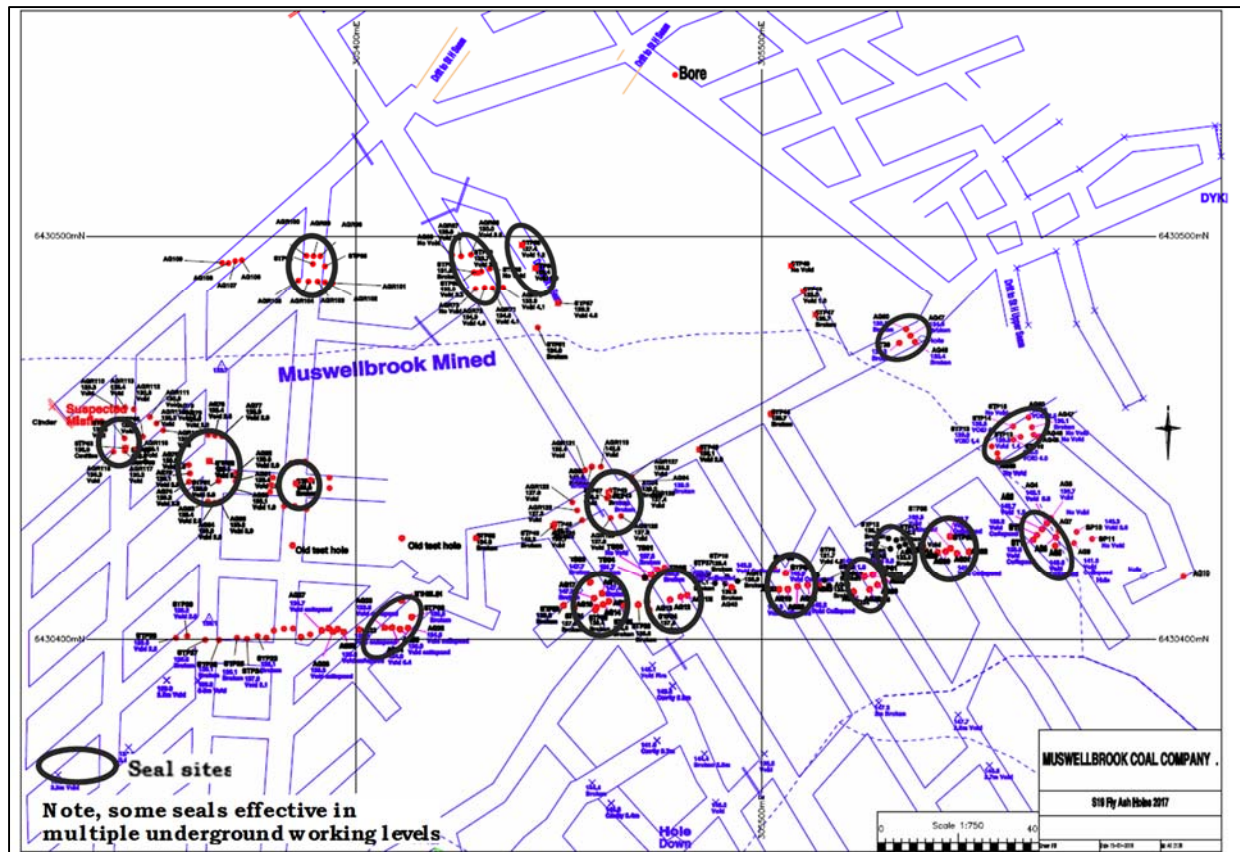
Figure 56: Actual Spontaneous Combustion Management Highwall Seals and Interim Seals

No fly ash or clay seals were initially placed along the Strip 18 highwall.

The level of fire and the rate of spread required an intensive fly ash seal programme, which extended from the Strip 18/19 interface across Strip 19, part of the eastern wall of Strip 19 highwall. The Strip 18/19 interface and across Strip 19 seals provided sufficient time for this area to be mined with minimal spontaneous combustion.

The seals against Strip 20 and on the eastern side of Strip 19 were either not able to be established due to access and plan accuracy issues or because of drill limitations with multilevel underground workings.

No clay seal was established along Strip 19 highwall as accelerated mining of Strip 20 has been recommended as part of the action plan for the next reporting period.

What Worked Well
The following spontaneous combustion management activities worked well during the reporting period.
- The use of slurry and dry fly ash has proven to be effective.
- Where access to seal sites was provided over an adequate area for sufficient time, good to excellent seal results and resultant low fire impacts were achieved.
- Water injection worked well on intense fire areas.
- Sprays on outer faces of highwalls minimised venting.
- Good control and management of spontaneous combustion in dump areas was achieved.
- Limiting coal residence time on the ROM and clearing the ROM before planned CHPP shutdowns and the Christmas break.

Lessons Learnt

The following lessons regarding spontaneous combustion management were learnt during this reporting period.

- Scheduling of access to areas to allow drilling was, at times, not able to be achieved in the desired timeframes.
- Scheduling of access to areas to allow placement of aggregate and then fly ash was, at times, not able to be achieved in the desired timeframes. This was very much impacted by ongoing major or problems with fly ash supply from the power stations.
- Ability to maintain sufficient water use for slurry generation during periods of very high temperatures became a problem. The option to use mains pressure water instead of water carts was often not available, as the water line had to be removed for operational purposes.
- When intense fires have developed past where seals are to be, or are located, fly ash alone is not sufficient to maintain its integrity for the normal 12 months.
- There was not provision of sufficient gas/temperature monitoring holes. Much of this related to the configuration of the drill rig.
- Pipelines to water sprays were damaged by equipment and the sprays were not operational while repairs were completed to the pipes.
- Pipelines to water sprays were damaged by hot ground and the sprays were not operational while repairs were completed to the pipes.

3.16.2 ACTIVITIES NEXT REPORTING PERIOD

During the next reporting period MCC will continue to manage spontaneous combustion in accordance with the SCMP. Building on the spontaneous combustion management activities from this reporting period, the following activities will also be undertaken in the next reporting period.

- Continue to install fly ash and clay seals as mining operations progress.
- Continue to use water to cool hot areas.
- Improvements to the bench areas to improve drilling access. Drilling can then occur so that seals can be established in such a way as to virtually eliminate broken coal in collapsed roadways, thereby removing the main fuel source for spontaneous combustion.
- An additional main water line will be in operation early in the reporting period. This will allow supply of water for both the eastern and western sides of the mine and greatly reduce the time water is not available cooling areas susceptible to heating. It can also be used for slurry generation and reduce water cart requirements, freeing these units for dust suppression. Further, a sump will be established in pit and this will be a third water source for spontaneous combustion control. Available water delivery volume will increase by 100%.
- Following a review of supply interruptions and options to improve reliability, MCC have elected to install a silo/s on site for fly ash storage. Delivery of fly ash over the night period is much more easily achieved and the silo will be filled at night and drawn down during the day time. Delivery of "top up" fly ash during the day will occur but queuing delays will not stop seal establishment. A fly ash truck dedicated to MCC will then truck the ash from the silo to the seal site.
- A new drill rig with a deeper drilling capability will commence work at MCC early in the reporting period. This will provide more opportunities for monitoring hole establishment.
- Reviews to the production schedule have been undertaken and mining of Strip 20 will commence earlier. This was, in large part, due to the presence of spontaneous combustion in broken coal in roadways. Earlier mining of this area eliminates this spontaneous combustion before winter. It also allows use of the final pit highwall area as a sump for water storage as a third supply.
- A secondary row of seals using cement as an additive to the fly ash to create a water barrier against the seals will be trialled to manage an intense fire in old underground roadways.

In addition to these activities, MCC will undertake an independent audit of spontaneous combustion management as required by our EPL. This audit will include a review of Best Practice Literature and a

review of on-ground management practices along with any recommendations for improvement in the implementation of the monitoring and the long-term management of spontaneous combustion at MCC.

3.17 BUSHFIRE

Management of bushfire risks are undertaken in accordance with the Bushfire Management Plan (BFMP). The BFMP was reviewed and updated during the reporting period to the satisfaction of MSC.

The objectives of the Bushfire Management Plan are:
* To manage activities on site are to minimise the risk of outbreak of fire;
* Contain fuel loads to acceptable levels to moderate fire intensity;
* To put in place hazard mitigation measures to contain an outbreak of fire should one occur; and
* To put in place arrangements to liaise with and support the Rural Fire Service (RFS) should an outbreak of fire occur at MCC or threaten MCC's operations.

There were no bushfire outbreaks with the development consent area during the reporting period.

3.18 HYDROCARBON CONTAMINATION

Hydrocarbon storage facilities were constructed as part of the workshop, stores and blasting facilities. These storage facilities comply with the requirements of *AS1940 – The storage and handling of flammable and combustible liquids*. Activities undertaken on site to reduce the risk of hydrocarbon contamination include:
* Above ground fuel storage tanks are self-bunded to contain any spillage which may occur;
* Waste oil from the workshop is stored in a bunded waste oil tank and is removed as required;
* Oily water runoff from the re-fuelling bay drains into an above ground sump which is fully bunded; and
* Runoff from the hardstand wash-down bay passes through a three-staged silt trap and an oil/water separator. The collected silt is routinely cleaned out.

A Bioremediation Management Plan has been developed by MCC to provide guidance on how to manage material that is potentially contaminated with hydrocarbons. This Bioremediation Management Plan was developed at the request of DRG and has been provided to them following this request. DRG did not provide any comment on the Bioremediation Management Plan and the plan has been implemented by MCC.

Any material that is potentially contaminated is tested with the results being compared to the limits in the *NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014)*. If the material is classified as solid waste it is disposed on site. If the material is classified as contaminated it is either treated on site prior to disposal or it is taken off site for disposal.

3.19 METHANE DRAINAGE/VENTILATION

As no underground mining occurred at MCC during the reporting period, no methane drainage or ventilation was required.

3.20 PUBLIC SAFETY

During the reporting period, public safety was managed in accordance with current MCC procedures. Fences surrounding the operational areas and along property boundaries were inspected and maintained.

A security patrol is conducted by a local security firm over weekends and other nominated periods (Christmas, shutdowns, etc.) when the site is not manned.

3.21 OTHER ISSUES AND RISKS

No incidents of damage to surface infrastructure were recorded during this reporting period.

4.0   COMMUNITY RELATIONS

MCC undertakes community consultation through the Community Consultative Committee, discussions with community members and operating a toll free 24-hour Environmental Contact Line (1800 600 205).

4.1   ENVIRONMENTAL COMPLAINTS

MCC operates a toll free 24-hour Environmental Contact Line where community members can communicate their concerns to site personnel. On receiving a complaint, MCC staff investigate the complaint, take action to reduce impact as required and report back to the complainant with the findings. The recording of environmental complaints and the operation of the Environmental Contact Line is conducted in accordance with the MCC Development Consent and Environmental Protection Licence conditions.

94 complaints were received during the reporting period. More details on the complaints are provided in **Appendix 5**. **Table 50** and **Figure 57** provide a summary of the complaints received during the reporting period.

Table 50: Summary of Complaints

Type of Complaint	Number	Percentage
Odour	58	66.7%
Blast	9	10.3%
Dust	8	9.2%
Haulage	2	2.3%
Light	3	3.4%
Noise	4	4.6%
Visual	2	2.3%
Other	1	1.1%
Total	**87**	**100%**

In comparison, there has been a decrease in the number of complaints received during this reporting period compared to the last reporting period. The complaint history chart is shown in **Figure 58**. In comparison to the last reporting period, there has been a significant decrease in the number of odour complaints this reporting period (58 for this reporting period compared to 78 for the previous reporting period).
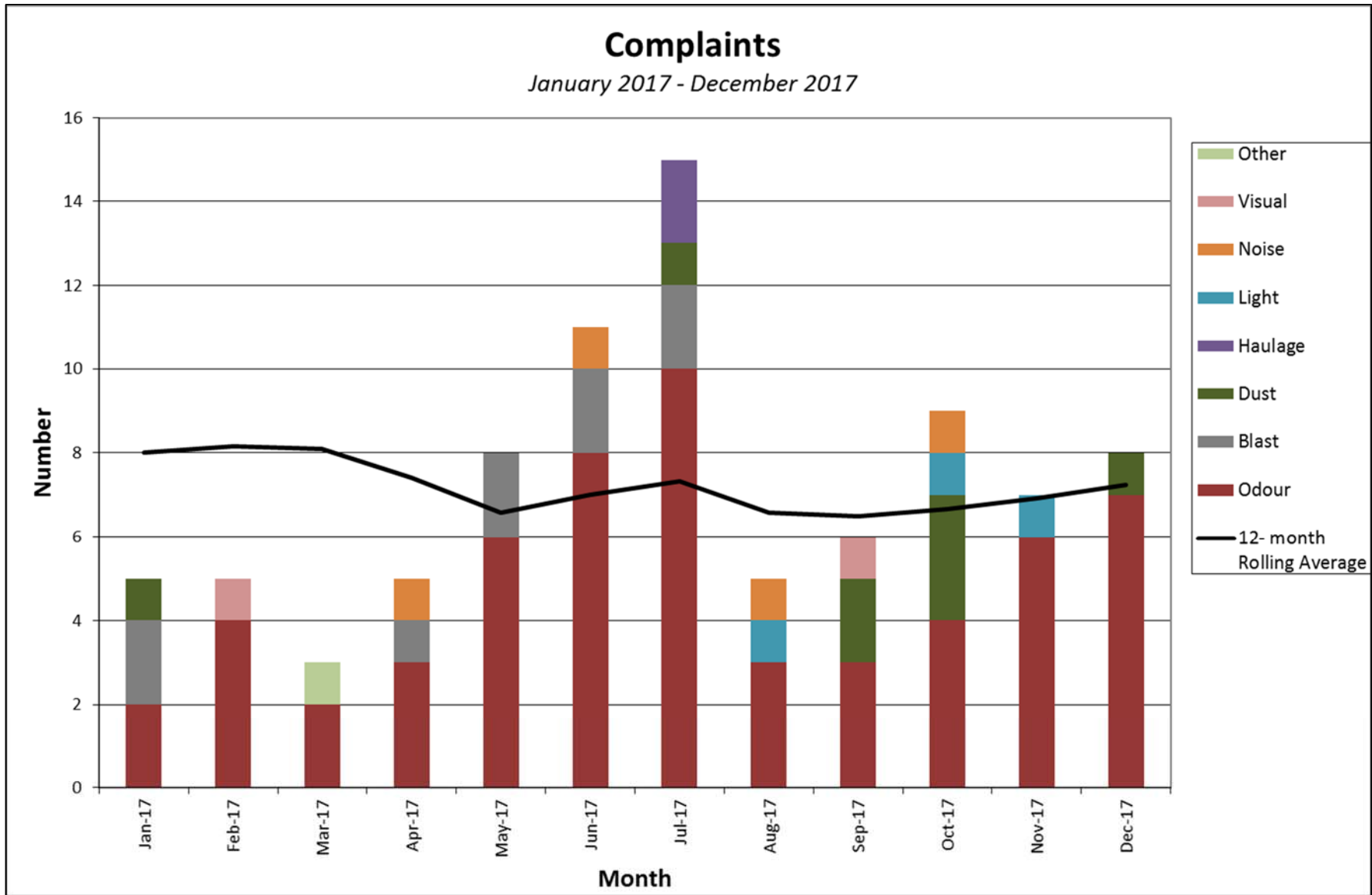
Figure 57: Complaint Summary
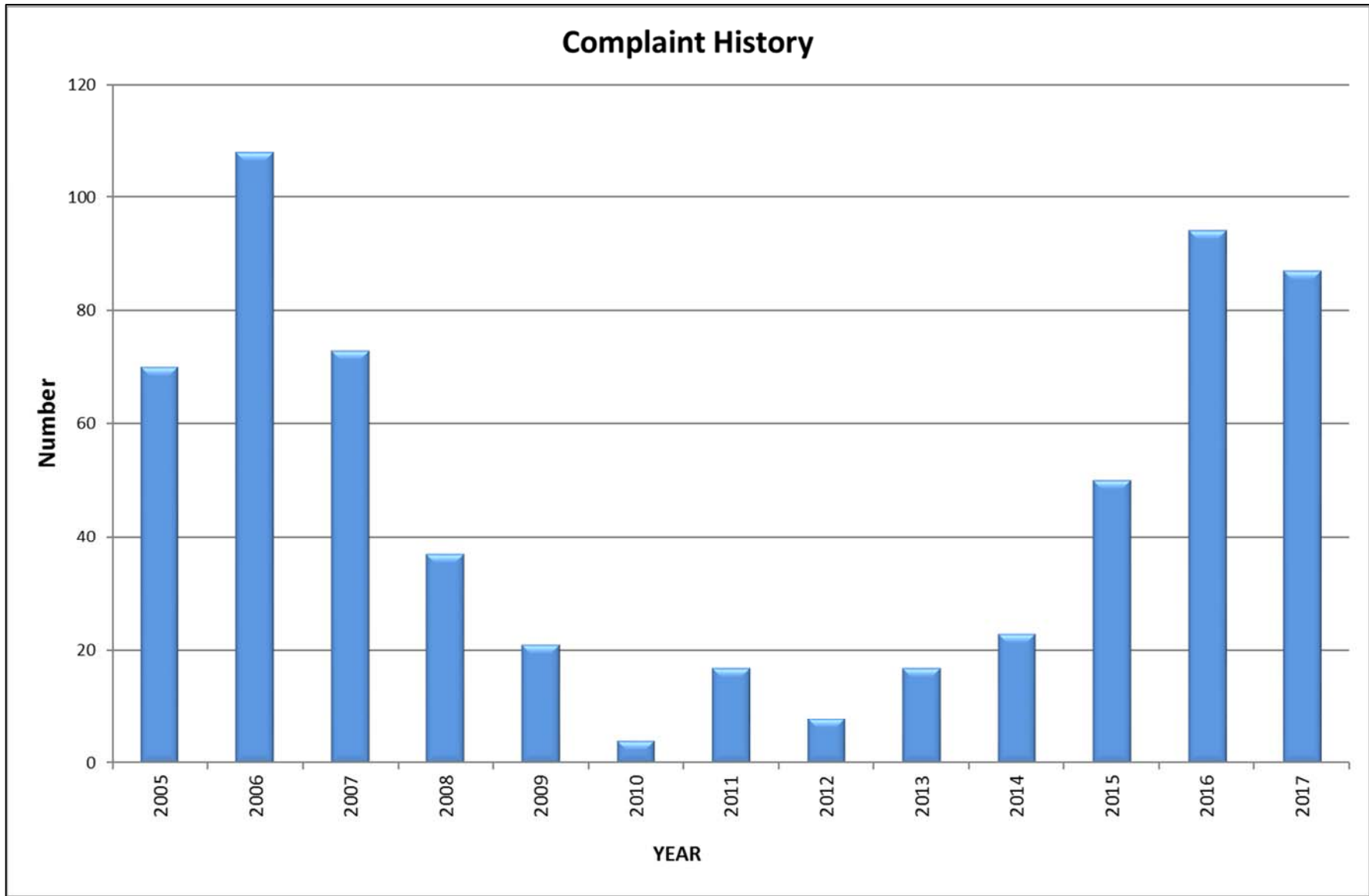
Figure 58: Complaint History

4.2 COMMUNITY LIAISON, SPONSORSHIPS AND DONATIONS

MCC personnel maintain contact with nearby residents and are committed to continually fostering and developing strong links with the community.

Community support throughout the reporting period included donations to the following organisations:

- Role Models and Leaders Australia – Girls Academy Program
- Hebden Wild Dog Association – assistance with regional dog baiting program
- Wybong Wild Dog Association – assistance with regional dog baiting program
- Endeavour Group – appreciation lunch for assisting with newsletter distribution
- Muswellbrook Rotary – Charity Ball
- Largs Football Club – playing equipment
- Muswellbrook Race Club – annual sponsorship
- Muscle Creek Fire Brigade – Christmas Tree event

4.3 COMMUNITY CONSULTATIVE COMMITTEE

MCC's Community Consultative Committee (CCC) provides information regarding mine operations to the local community. The aim of the committee is to provide an effective communication mechanism so that members of the local community have adequate information on mining and environmental matters. CCC meetings are generally held quarterly at the MCC office and committee members are actively involved in the review of environmental monitoring data and are kept up to date on mining operations through presentations and site visits.

During the reporting period MCC advertised for new community members to join the CCC. Three new community members applied to be part of the CCC and these three applications were endorsed by MSC. The existing CCC members were invited to be part of the revised CCC with one of the existing members advising that they would take this opportunity to retire from the CCC and the other two members electing to stay on the committee. Also, the Councillor representation on the CCC changed during the reporting period. The CCC is currently comprised of one Councillor, one council staff representative, five community representatives (including one from the Wanaruah Local Aboriginal Lands Council) and two MCC representatives.

During the reporting period meetings were held on 6 June 2017, 5 September 2017 and 5 December 2017. The meeting scheduled for 7 March 2017 was cancelled as this was during the time that the CCC membership was being reviewed.

5.0   REHABILITATION

During the reporting period MCC revised and updated the Mining Operations Plan/Rehabilitation Plan (MOP) in consultation with Office of Environment and Heritage (OEH), MSC, and the CCC to the satisfaction of DRG. This MOP was approved in March 2017 and covers mining and rehabilitation activities until 2023, which is post mining activities. As a MOP can only have a maximum approval period of 7 years the approval date could not be extended out to cover all post coal mining rehabilitation, however, the MOP does show the rehabilitation activities to 2026 and details the criteria for mine closure. The extension of the approval date for the MOP will then only be an administrative change and won't require any extensive changes to the rehabilitation activities or closure criteria.

Rehabilitation activities at MCC are conducted in accordance with the MOP.

5.1   BUILDINGS

No buildings were demolished or rehabilitated during the reporting period.

5.2   REHABILITATION OF DISTURBED LANDS

5.2.1   REHABILITATION PROCESS

The rehabilitation process at MCC includes:
- Shaping is conducted in accordance with the design requirements outlined in the MOP.
- In the areas where trees are the final vegetation topsoil is spread to a depth of approximately 10cm (if sufficient topsoil is available).
- Contour banks are constructed in accordance with the Erosion and Sediment Control Plan.
- In the areas where pasture is the final vegetation OGM is spread at a rate of approximately 80-100 tonnes/ha.
- Prior to seeding, topsoil and/or OGM are incorporated into the underlying soil.

MCC's rehabilitation program aims to link existing remnant vegetation in Bells Mountain and Skelletar Ridge areas north and south of the lease area by planting corridors of native vegetation across the lease area creating a viable wildlife corridor. Rehabilitation planning for MCC includes the incorporation of native vegetation areas to continue the corridor. There has been no change to the agricultural land suitability of the site during the reporting period.

5.2.2   SPECIES SELECTION

The recommended native vegetation seed mix used at MCC during the reporting period is shown in **Table 51** and is based on species that were present in the area prior to mining and is based on the Central Hunter Grey Box-Ironbark Woodland. Use of these species in the final landform is dependent on availability of seed at the time of seeding. This list was reviewed during the reporting period and included in the MOP that was approved in March 2017. Different seed mixes have been used on historical rehabilitation so the species present in historical areas could differ from these species.

Table 51: Recommended Native Vegetation Species List

Botanical Name	Common Name
Acacia decora	Western Silver Wattle
Acacia falcata	Sally Wattle
Acacia implexa	Hickory Wattle
Acacia paradoxa	Kangaroo Thorn
Allocasuarina luehmannii	Bulloak

Botanical Name	Common Name
Brachychiton populneus	Kurrajong
Bursaria spinosa	Blackthorn
Calotis lappulacea	Yellow Burr-daisy
Cheilanthes sieberi	Poison Rock Fern
Chloris ventricosa	Plump Windmill Grass
Cyperus gracilis	Slender Flat-sedge
Enchylaena tomentosa	Ruby Saltbush
Eremophlia debilis	Winter Apple
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus moluccana	Gum Topped Box
Eucalyptus punctata	Grey Gum
Glycine tabacina	-
Goodenia hederacea	Forest Goodenia
Hardenbergia violacea	False Sarsaparilla
Indigofera australis	Australian Indigo
Lomandra confertifolia	Mat-Rush
Lomandra multiflora	Mat-Rush
Myoporum montanum	Western Boobialla
Rytidosperma bipartitum	Wallaby Grass
Rytidosperma racemosum	Wallaby Grass
Veroncia calycina	Hairy Speedwell

Native vegetation establishment may be supplemented with tubestock. Tubestock planting is generally to be undertaken in spring and autumn when weather conditions are optimised for vegetation establishment, however opportunistic rehabilitation may be undertaken in summer and winter months if areas become available and prevailing weather conditions are favourable. Only frost tolerant species are planted in winter due to avoid frost damage to newly planted tubestock.

The recommended pasture species mix used at MCC during the reporting period is shown in **Table 52**. Use of these species in the final landform is dependent on availability of seed at the time of seeding. This list was reviewed during the reporting period and included in the MOP that was approved in March 2017. Different seed mixes have been used on historical rehabilitation so the species present in historical areas could differ from these species.

Table 52: Recommended Pasture Species List

Botanical Name	Common Name
Bromus wildenowie	Prairie Grass (sown in Autumn only)
Cynodon dactylon	Couch
Festuca arundinacea	Tall Fescue
Lolium perenne	Perennial Rye grass
Lolium rigidum	Annual Rye grass
Medicago sativa	Lucerne
Pennisetum clandestinum	Kikuyu grass
Phalaris aquatic	Phalaris
Setaria sphacelata	Setaria
Trifolium repens	White Clover
Trifolium subterraneum	Subterranean Clover

5.2.3 REHABILITATION ACTIVITIES THIS REPORTING PERIOD

During the reporting period MCC continued to undertake rehabilitation activities around site. Five main areas were targeted this reporting period with the activities in these areas including:

- 264 Dump – weed control, and re-seeding with tree and pasture species.
- West Crib Hut –bulk shaping.
- No.2 Open Cut –weed control, rock raking and re-seeding with tree species.
- Blues Road – finalised removal of redundant equipment, bulk shaping activities, spreading of OGM and seeding with pasture species.
- Western Depression – water management repair works to prevent erosion, pest control, spreading of OGM and re-seeding with pasture species in areas where the pasture was not establishing.

There were minimal new areas available for rehabilitation during the reporting period so the focus this reporting period was on rehabilitation maintenance including weed control, pest animal control, re-seeding and reviewing the performance of the older rehabilitation areas.

During the reporting period MCC engaged a rehabilitation specialist to undertake a review of the rehabilitation performance on site. This review included the following:

- A literature review of documents relating to rehabilitation at MCC;
- Species diversity compared to the seeding mix;
- A site visit to review on ground performance;
- Assessment of the soil conditions; and
- Assessment of the weather conditions prior to and following seeding activities.

The recommendations from this review along with MCC's response are shown in **Table 53**.

Table 53: Recommendations from Rehabilitation Review

Review Recommendation	MCC Response
Growing Media	
The use of OGM as a growing media for native plant based communities should be trialed. This may assist in mitigating the weed incursion problems, which are often associated with topsoil, whilst also providing much needed organic matter.	MCC will trial the use of OGM as a growing media for native plant based communities when the next assigned area for this type of rehabilitation is available.
To address deficiencies in calcium in areas of low Ca:Mg, further soil assessments should be undertaken by a competent agronomist to confirm applications rates of calcium that should be undertaken as part of the site maintenance program.	During 2018 MCC will engage an agronomist to conduct further soil assessments to confirm application rates of calcium as part of the site's maintenance program.
Organic material – whether it is a cover crop plant applied at rates of up to 20kg/ ha and allowed to die off prior to seeding, or OGM, mulched timber, or hay/ straw should be considered for all areas.	As OGM will be required as the growing medium on the vast majority of the remaining rehabilitation areas this will add more organic material to new rehabilitation areas. MCC will monitor this and consider using additional methods to introduce organic material if required.
Future soil sampling and analysis programs are to include an assessment of zinc.	Zinc is to be included in future soil sampling and analysis programs.

Review Recommendation	MCC Response
Laboratory analysis information pertaining to the current and future supplies of OGM is to be reviewed in context of potential sources of elevated levels of micro and macro nutrients that may impact on the revegetation program.	MCC will review the laboratory analysis of the OGM to identify if elevated sources of micro and macro nutrients are present in the OGM.
Utilise routine soil sampling program to inform the use of lime rather than recycled gyprock in rehabilitation areas where pH readings are less than 6.	MCC will continue to undertake soil analysis prior to rehabilitation activities to identify if lime is required.
Revegetation	
The seeding mix which is used for areas returning to native plant based communities should be reviewed. Mid and over storey species that are known to germinate and survive on post-mined lands in the Hunter region and those which align to the prerequisite plant communities should be incorporated. Indicative species additional to those that are known to grow at MCM, that should be considered may include (though not be limited to): *Acacia salicina, A. decurrens, Corymbia maculata* and *Eucalyptus albens*.	MCC will review the recommended native tree seed mix during 2018 and consult with DRG and MSC on any changes to the seed mix used at MCC.
Species that are known to be difficult to establish via seed are be introduced to the site via the planting of tube stock. This is to be undertaken via a patch planting approach, where 200 -300 plants of mixed strata are planted with 3-5m spacing allowing for ease of maintenance watering and weeding.	MCC will identify what species are difficult to introduce via seed and will look to introduce these species via tube stock.
Native species that have not been recorded in the rehabilitation and the analogue sites should be removed from the seeding mix.	MCC will review the recommended native tree seed mix during 2018 and consult with DRG and MSC on any changes to the seed mix used at MCC.
Clarification should be sought from the seed supplier on seed viability rates and the treatment of seed in terms of triggers to germination e.g. hot water, scarification. Once this information is obtained then seeding rates can be better defined.	MCC will ask the seed supplier to supply more information about seed viability rates and the treatment of seed.
Seeding rates of native species used should be reviewed in context of the MOP objectives of species diversity and stem density.	MCC will review the recommended seeding rates during 2018.
The seeding mix which is used for rehabilitation areas returning to pasture should be reviewed and consideration be given to incorporating species which are known to germinate, survive and provide productive pastures for beef cattle across the Hunter region.	MCC will review the recommended pasture seed mix during 2018 and consult with DRG and Muswellbrook Shire Council on any changes to the seed mix used at MCC.

Review Recommendation	MCC Response
Records on seed treatment are to be maintained by MCM staff. This information is to be captured by revegetation contractors at the time of taking delivery of the seed. Details are also to be recorded on the time frames from the implementation of the treatment to the spreading of the seed.	MCC will ask the seed supplier to supply information about the treatment of seed and maintain these records.
Acacia saligna is not be used in the seeding mix.	*Acacia saligna* is not part of the current seeding mix used at MCC.
An assessment of the Eucalypt species is to be undertaken of the previously revegetated areas where dense stands of this genus exist. This information can then be used to inform the seeding mix – both in terms of the suitability of the species (focusing on species endemic to the MCM area) and the seeding rates that were used in those areas.	MCC will undertake an assessment of the Eucalypt species during 2018.
A review is to be undertaken on the advantages / disadvantages in context of the use of Rhodes Grass in the areas returning to pasture. Issues to assess are to include: • historic seeding rates for Rhodes Grass at MCM; • impact of Rhodes Grass spreading from areas of pasture onto post mined lands returning to native plant based communities, in context of ground cover, surface stability and species diversity; • pasture productivity, carrying capacity and stocking rates comparing Rhodes Grass and non-Rhodes Grass dominated pastures	MCC will undertake a review of the advantages/disadvantages of using Rhodes Grass in the pasture areas during 2018.
Weather	
To optimise the success of the revegetation program, direct seeding works should be undertaken in late summer – early autumn following the seasonal rains of last summer and mitigating the risk of the extremes summer temperatures.	MCC will seed rehabilitaiton areas during late summer – early autumn where operational restrictions allow.

Review Recommendation	MCC Response
Weed Control	
Implement targeted weed control focusing on the management of *Galenia pubescens*. The program of works is to be undertaken in following seasonal conditions when the plant is turgid and soil moisture adequate to ensure plant growth and ideally prior to flowering. This timing helps to reduce the risk of offsite impact of the registered herbicides that are used to control this species, whilst also optimising the impact of the herbicide of the plant and reducing the risk of seed set. The control program is to include areas rehabilitated within the previous 12 months, in doing so ensuring optimum control on seedling Galenia which may germinate from topsoil seed load.	MCC commenced a weed control program in December 2017, which is focusing on *Galenia pubescens* but treating other weeds as well. This will continue during 2018.
For areas where topsoil is used, undertake a trial weed control program, (with the added potential advantage of increasing soil organic matter) as follows: • spread topsoil as per site based procedures • direct seed with cover crop species at rates of 20-25kg/ha within 1-3 weeks of spreading topsoil. The purpose of the cover crop is to assist with surface stability, mitigated the risk of rill erosion and surface crusting and enhance organic matter as it hays off; • undertake weed control using non-selective herbicide. This would cause a knock down of the green plant growth from the cover crop, in turn creating a cover of dead vegetative material, whist also killing weed seedlings that have germinated from soil born seed; • pending suitable conditions, direct seed as per site based procedures, seeding mixes and rates aligned to post mine land use; • throughout the trial monitor the weed and preferred species population and the organic content of the soil.	There is limited topsoil stockpiled at MCC for use in rehabilitation activities. Where this topsoil is used, MCC will aim to follow this recommendation for weed control and increasing soil organic matter.
Kangaroo Population	
Culling of kangaroos should be undertaken in accordance with the relevant licensing requirements.	MCC commenced a kangaroo control program in December 2017, which will continue during 2018.

The rehabilitation and maintenance summary for the reporting period can be found in **Table 54** and **Table 55**.

Table 54: Rehabilitation Summary

		AREA AFFECTED / REHABILITATED (hectares)			
			To Date	**Last Report**	**Next Report (Est.)**
A		**MINE LEASE AREA**			
	A1	**Mine Lease Area: CCL 713, ML 1304 and ML1562**	**1788**	**1788**	**1788**
B		**DISTURBED AREAS**			
	B1	**Infrastructure Area**	48.2	48.7	48.2
	B2	**Active Mining Area** (excluding items B3-B5 below)	67.4	71.1	66.2
	B3	**Waste Emplacements** (active/unshaped/in or out-of-pit)	129.2	113.1	136.5
	B4	**Tailing Emplacements** (active/unshaped/uncapped)	0.0	0.0	0.0
	B5	**Shaped Waste Emplacement** (awaits final vegetation)	1.7	2.3	3.0
	B6	**Temporary Stabilisation** (vegetation area for dust control)	32.2	0.0	24.5
		ALL DISTURBED AREAS	**278.7**	**235.2**	**278.4**
C		**REHABILITATION PROGRESS**			
	C1	**Total Rehabilitation Area** (except for maintenance)	**339.5**	**377.5**	**331.8**
D		**REHABILITATION ON SLOPES**			
	D1	**10 to 18 degrees**	45.7	45.7	45.7
	D2	**Greater than 18 degrees**	0.0	0.0	0.0
E		**SURFACE OF REHABILITATED LAND**			
	E1	**Pasture and grasses**	245.2	238.7	247.7
	E2	**Native forest/ecosystems**	94.3	124.8	94.3
	E3	**Plantation and crops**	0.0	0.0	0.0
	E4	**Other** (include non-vegetative outcomes)	0.0	0.0	0.0
F		**DE-HAB -** *disturbed areas previously rehabilitated, figures reflected in Section E*			
	F1	**Pasture and grasses**	0.0	4.5	0.0
	F2	**Native forest/ecosystems**	40.4	4.7	0.0
G		**SURFACE CONVERSION -** *previously reported pasture (cover crop) areas planted to trees, hectares reflected in Section E)*			
	G1	**Pasture/Cover Crop areas planted to Trees**	0.0	0.0	0.0

Table 55: Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	AREA TREATED (Ha)		Comment / Control Strategies / Treatment Detail
	Report Period	Next Period	
Additional erosion control works (drains, re-contouring, rock protection)	1.0	1.0	Regarding of road and contour drains to redirect water
Re-covering (detail - further topsoil, subsoil sealing etc.)	5.0	0.0	Spreading of OGM on bare areas
Soil Treatment (detail - fertiliser, lime gypsum etc.)	5.0	0.0	Spreading of OGM on bare areas
Treatment / Management (detail - grazing, cropping, slashing)	0.0	0.0	None completed
Re-seeding / Replanting (detail - species density, season etc.)	20.0	0.0	Re-seeding bare areas and newer rehabilitation areas
Adversely Affected by Weeds (detail – type and treatment)	25.0	20.0	Spraying of weeds
Feral Animal Control (detail – additional fencing, trapping, shooting, baiting etc.)	Unknown	Unknown	Regional dog baiting program with areas of MCC land being included in the program Rabbit control program Kangaroo cull program

5.2.4   REHABILITATION ACTIVITIES NEXT REPORTING PERIOD

There are minimal areas available for rehabilitation during the next reporting period. MCC will undertake seeding activities on a small area on the West Crib Hut rehabilitation area and will commence bulk shaping activities in Open Cut 2. These areas are shown on **Figure 59**.

MCC will also review and implement the recommendations from the rehabilitation review as listed in **Table 53**. MCC will engage a rehabilitation specialist to conduct further reviews of rehabilitation performance.

During the next reporting period MCC will commence cleaning out dams in old rehabilitation areas as part of the mine closure process. This will include the removal of sediment and maintaining access for stock to use these dams for water. MCC will commence repair works on the erosion around the Brickworks Dams.
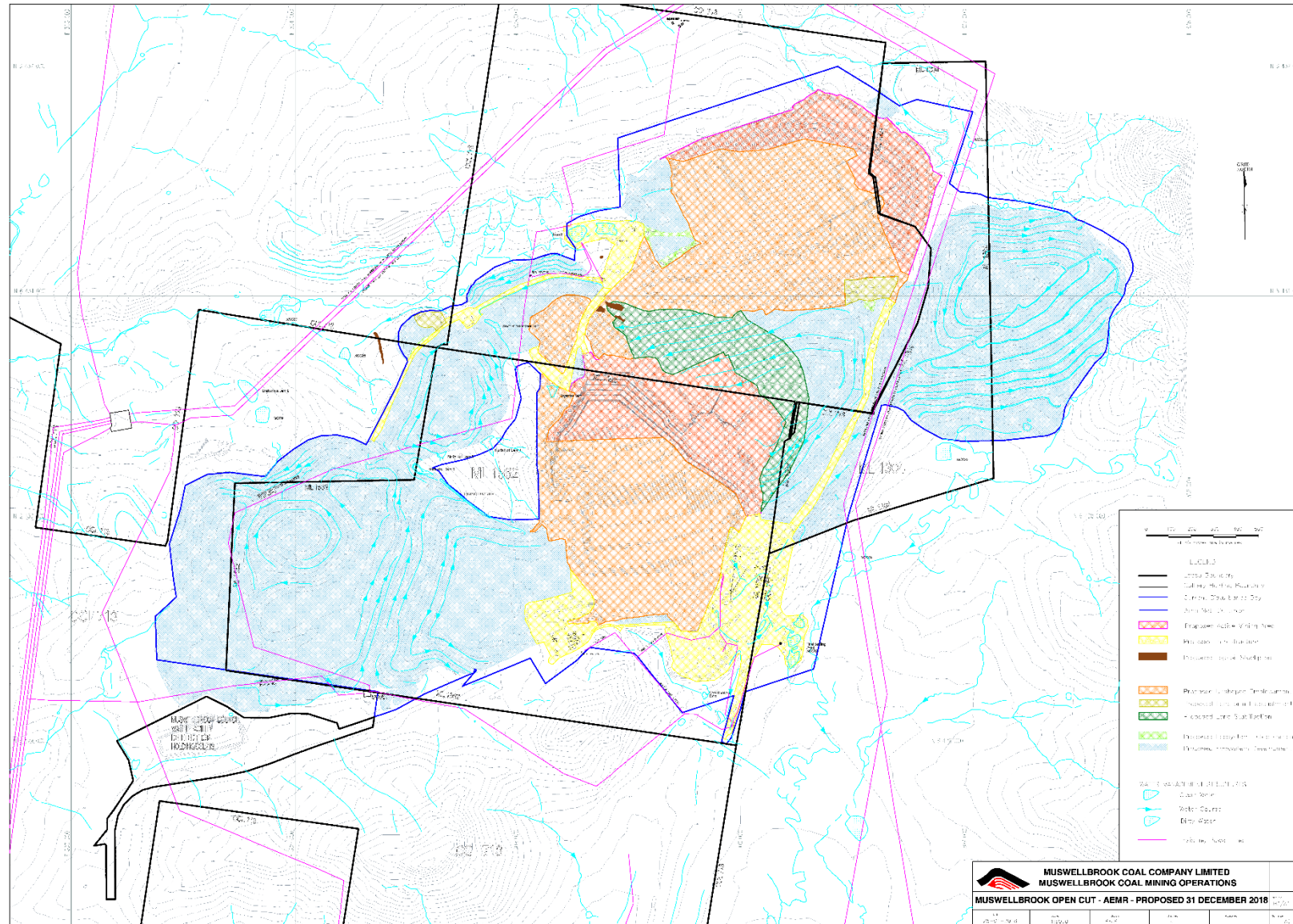
Figure 59: Proposed Activities Next Reporting Period

5.3   REHABILITATION MONITORING

During the reporting period, the rehabilitation monitoring program was revised and included in the MOP, which was approved in March 2017. The changes to the program included:

- Reduction in the frequency of the analogue and offset monitoring from annually to every three years; and
- Reduction in the frequency of the soil monitoring from annually to every three years.

During the reporting period, the closure criteria that are applicable at MCC were also revised and included in the MOP. These revised criteria were developed from baseline monitoring conducted in 2015 and 2016.

5.3.1   SITE SELECTION

A total of ten permanent sites, five rehabilitation woodland sites and five rehabilitation pasture sites, were surveyed during the reporting period. Monitoring of analogue woodland and pasture sites was not required during this reporting period. The locations of these monitoring sites are the same as the monitoring sites in 2015 and 2016. One rehabilitation woodland site and one rehabilitation pasture site were removed from the monitoring program this reporting period as these sites have been disturbed by mining operations.

Within the woodland sites, three analogue sites were established within remnant patches of the Endangered Ecological Community (EEC) *Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregion* listed under the *Threatened Species Conservation Act 1995* (TSC Act). The remaining five locations were established within each of the three Rehabilitations Blocks (A, B and C).

The pasture sites monitored included three within remnant pasture areas and the remaining five were established within each of the three Rehabilitations Blocks (A, B and C).

Table 56 lists the identification numbers for each monitoring location, the Plant Community Type (PCT) (where applicable), flora assemblage present, condition and the fauna monitoring undertaken. **Figure 60** indicates the location of the monitoring sites and **Figure 61** indicates where fauna monitoring equipment has been set up.

Table 56: Flora Assemblage and Fauna Monitoring for Rehabilitation Monitoring Sites

Site Category	Monitoring Site ID	Plant Community Type (PCT) or Rehabilitation Vegetation Composition	EEC Equivalent	Condition	Fauna Monitoring
Analogue	RWoodNew1	PCT - 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter	*Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregion*	Moderate – Good	1 Remote Camera 1 Songmeter
Analogue	RWoodNew2	PCT - 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter	*Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregion*	Moderate – Good	1 Remote Camera 1 Songmeter
Analogue	RWoodNew3	PCT - 1603 Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter	*Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregion*	Moderate	1 Remote Camera 1 Songmeter
Rehabilitation	RW2	*A. saligna* dominated canopy and weedy groundcover	-	Low	1 Remote Camera 1 Songmeter
Rehabilitation	RW3	*C. maculata, E. crebra* and *Eucalyptus* sp. stunted canopy with sparse *A. saligna* and *Acacia sp.* midstorey and a weedy groundcover	-	Low	1 Remote Camera 1 Songmeter
Rehabilitation	RW4	*C. maculata*, *E. cladocalyx* and *C. citriodora* canopy with a native/weedy groundcover	-	Moderate	1 Songmeter
Rehabilitation	RW5	Stunted *C. maculata* canopy with an Acacia dominated midstorey and a weedy grass understorey	-	Low	1 Remote Camera 1 Songmeter
Rehabilitation	RW6	*C. maculata* and *C. citriodora* stunted canopy with an Acacia dominated midstorey and a weedy grass understorey	-	Low	1 Remote Camera 1 Songmeter

Site Category	Monitoring Site ID	Plant Community Type (PCT) or Rehabilitation Vegetation Composition	EEC Equivalent	Condition	Fauna Monitoring
Analogue	RPastNew1	Disturbed remnant pasture comprising a mixture of native grasses, sedges and desirable species including *Cymbopogon refractus* (Barbed-wire Grass), *Dichelachne micrantha* (Shorthair Plumegrass), *Lomandra filiformis* subsp. *filiformis* (Wattle mat-rush), *Dicopogon* sp. (Chocolate Lily) and *Trifolium repens* (White clover). Weed species include *Carthamus lanatus* (Saffron thistle) and *Galenia pubescens* (Galenia).	-	Low – Moderate	-
Analogue	RPastNew2	Disturbed remnant pasture comprising a mixture of native grasses, sedges and desirable species including *Cymbopogon refractus* (Barbed-wire Grass), *Dichelachne micrantha* (Shorthair Plumegrass), *Sporobolus creber* (Western Ratstail grass), *Lomandra filiformis subsp. Filiformis, Lolium* sp. (A Rye grass) and weed species including *Plantago lanceolata* (Ribwort), *Hypochaeris radicata* (Flatweed) and *Linum trigynum* (French Flax).	-	Low – Moderate	-
Analogue	RPast03	Disturbed remnant pasture comprising a mixture of native grasses and forbs including *Cymbopogon refractus* (Barbed-wire Grass), *Dichelachne* sp. (Plumegrass) and *Cheilanthes sieberi* subsp. *Sieberi* (Rock fern). Weed species include *Anagallis arvensis* (Scarlet pimpernel), *Bromus molliformis* (Soft Brome), *Briza minors* (Quaking grass) and *Chloris gayana* (Rhodes grass).	-	Low – Moderate	-

Site Category	Monitoring Site ID	Plant Community Type (PCT) or Rehabilitation Vegetation Composition	EEC Equivalent	Condition	Fauna Monitoring
Rehabilitation	RP1	Rehabilitated pasture composed primarily of *Chloris gayana* (Tall windmill grass) and a considerable number of weed species including *L. trigynum*, *Sonchus oleraceus* (Milk thistle) and *S. madagascariensis*. The desirable species *Trifolium repens* (White clover) is also present.	-	Low	-
Rehabilitation	RP3	Rehabilitated pasture composed primarily of *C. gayana, B. molliformis, Briza maxima* (Quaking grass), *Hypochaeris radicata* (Flatweed), *melilotis indicus* (Sour clover), *P. lanceolata* and *Trifolium campestre* (Hop Clover). A small amount of native *C. refractus* and the desirable species *Lolium rigidum* (Ryegrass) is also present.	-	Low	-
Rehabilitation	RP4	Rehabilitated pasture composed primarily of *C. gayana*, and weed species including *A. arvensis, L. trigynum, P. lanceolata*. The desirable species *Trifolium repens* (White clover) and native species *Erodium crinitum* (Stork's bill) is also present.	-	Low	-
Rehabilitation	RP5	Rehabilitated pasture composed of *C. gayana* and a high proportion of weed species including *G. pubescens, A. arvensis, Capsella bursapastoris* and *M. indicus*. The desirable species *L. rigidum* is also present as is the native species *E. crinitum*.	-	Low	-
Rehabilitation	RP6	Rehabilitated pasture composed primarily of *C. gayana*. Weeds include *A. arvensis, S. madagascariensis, M. indicus, G. pubescens and Conyza bonariensis* (Tall fleabane). The desirable species *L. rigidum* and *T. repense* is also present.	-	Low	-
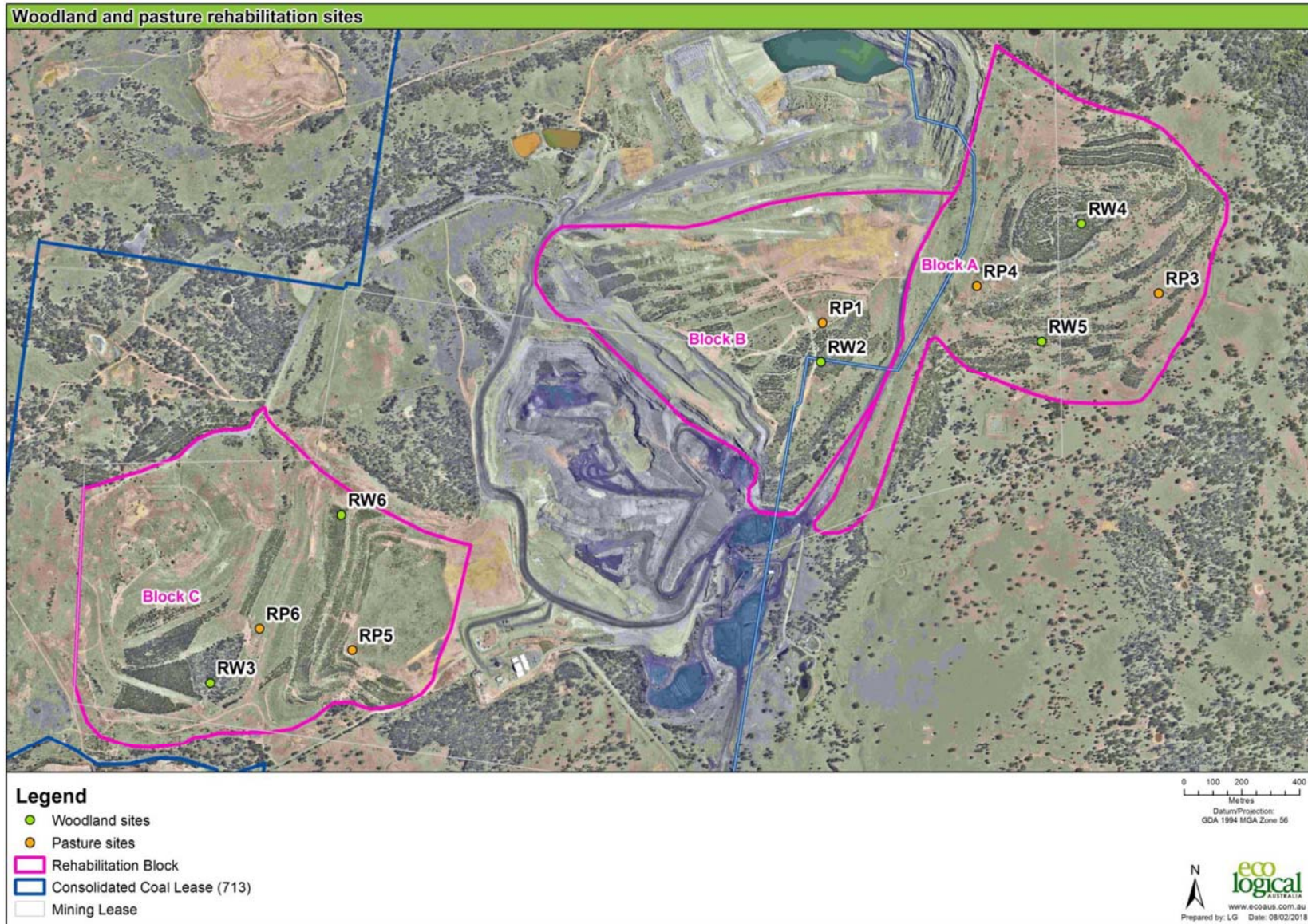
Figure 60: Rehabilitation Monitoring Program – Flora Sites
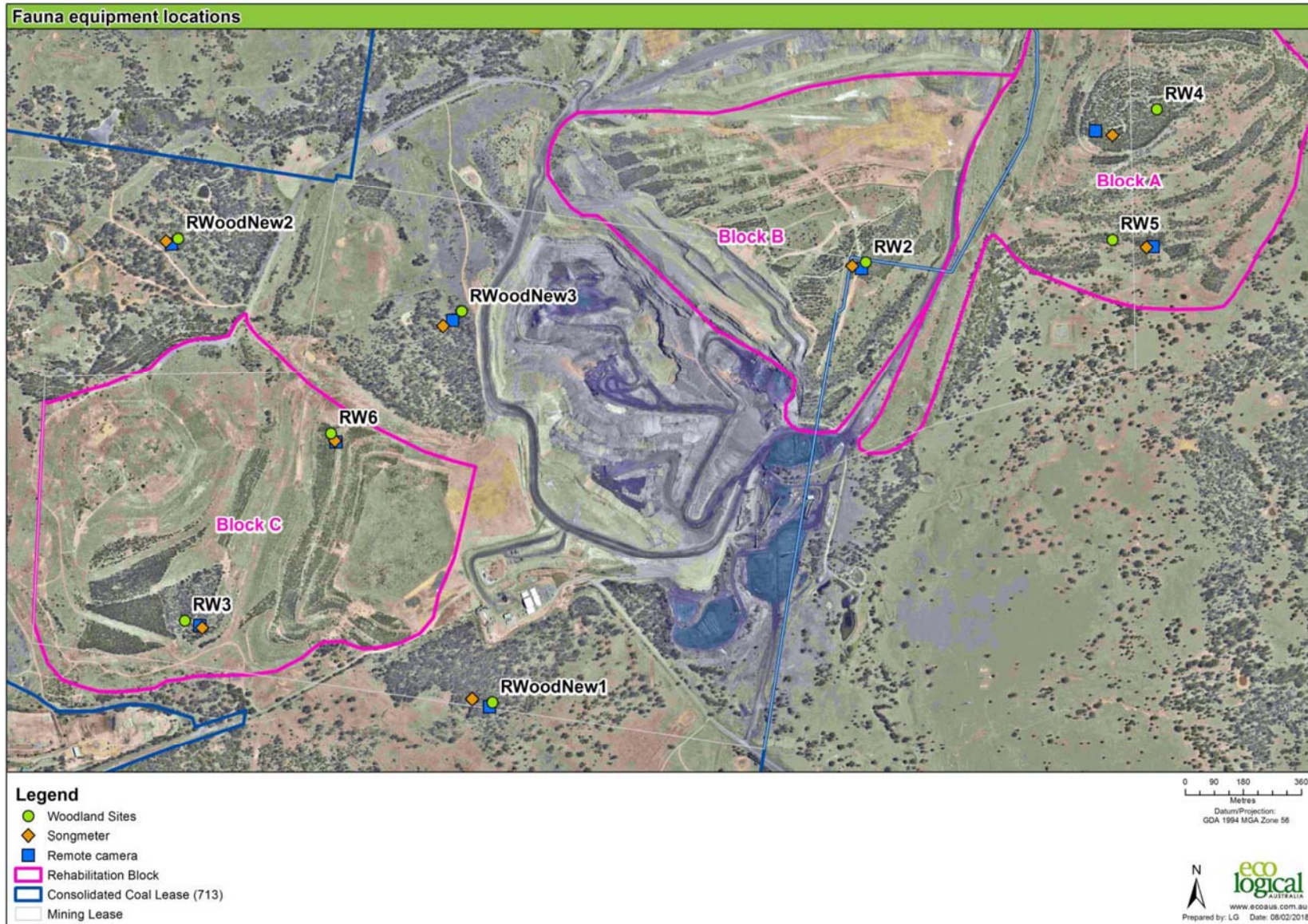
Figure 61: Rehabilitation Monitoring Program – Fauna Sites

5.4 FLORA MONITORING METHODOLOGY – WOODLAND

5.4.1 PERMANENT MONITORING TRANSECTS/PLOTS

At each of the woodland sites, 20m x 50m plots with a nested 20m x 20m full floristic plot were established centred over a 50m transect marked using star pickets the start and end of (**Figure 62**). GPS coordinates were taken at the start and finish points of the transect and site details were recorded. All plots were established across the slope (approximately 45 degrees) to avoid collecting data biased towards vegetation and soil characteristics in rip lines and/or planted rows.
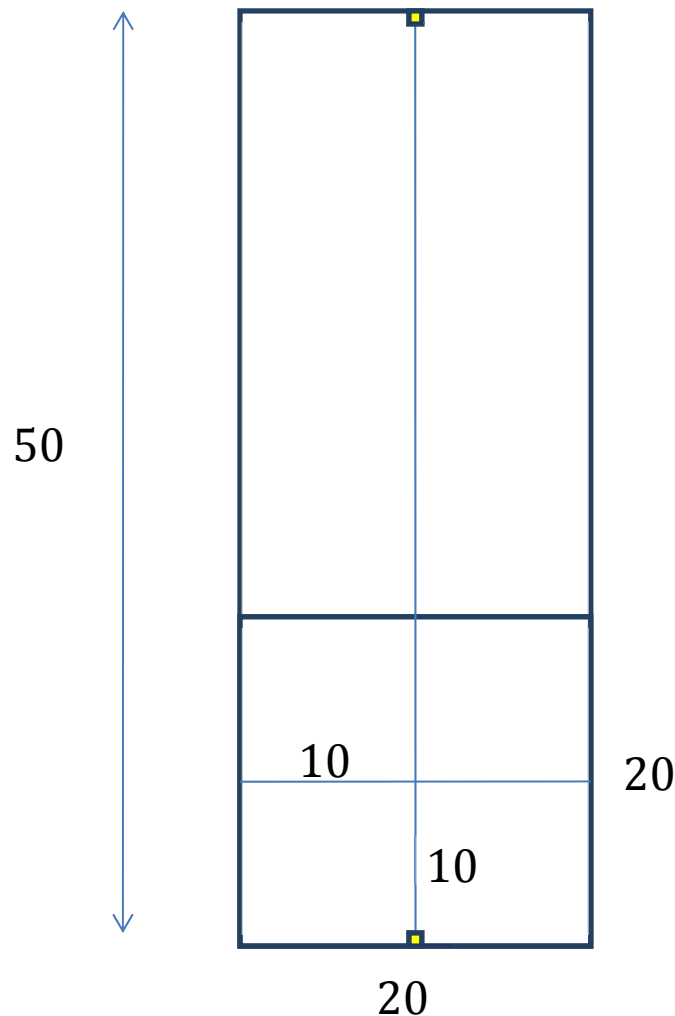
Figure 62: Floristic Plot Diagram

5.4.2 FULL FLORISTIC AND STRUCTURE

Floristic assessments for species richness were conducted within the 20m x 20m plot (**Figure 62**). This was a measure of both species presence, including cover and abundance (**Table 57**). Within each plot the attribute for native and exotic species is recorded in accordance with the *BioBanking Assessment Methodology 2014*.

Table 57: Data Gathered for Floristic Assessment of the Woodland Sites

Attribute	Survey Requirement
Stratum	Stratum and layer in which each species occurs
Growth form	Growth form for each recorded species
Species name	Scientific name and common name
Cover	A measure or estimate of the appropriate cover measure for each recorded species; recorded from 1–5% and then to the nearest 5%. If the cover of a species is less than 1% and the species is considered important, then the estimated cover should be entered (e.g. 0.4)
Abundance rating	A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000 or specify a number greater than 1000 if required

All vascular plants species were recorded and identified to the lowest taxonomic level possible, with samples of unknown species collected for further identification. Nomenclature followed the Flora of New South Wales (Harden 1992; 1993; 2000; 2002), and any subsequent recent taxonomic changes as presented on PlantNET (RBGDT 2012) and other specific botanical sources.

In addition to this, the total number of each species regenerating was assessed and recorded from across the entire vegetation zone.

5.4.3   BIOMETRIC SURVEY

Within the 20 m x 50 m plot, biometric attributes were recorded using the Biobanking Assessment Methodology (DECC 2008). Attributes included canopy cover and mid-storey cover every five metres along the 50m transect. Shrub cover, grass cover, other (herbs, forbs, sedges) cover, exotic species cover were recorded every one metre. Length of logs, number of hollow bearing trees and whether regeneration (trees less than 5cm DBH) was occurring were all recorded.

5.5   FLORA MONITORING RESULTS – WOODLAND

To demonstrate compliance with the completion criteria indicated in the MOP for woodland sites, monitoring survey results was compared to benchmarks derived through the monitoring of analogue sites. The completion criteria states that '>50% of the species established are comparative to the seed mix utilised at the time of planting and the total Projected Foliage Cover (PFC) is greater than or equal to 70%' and 'weeds presence is comparable to analogue sites and <20% are listed Weeds of National Significance'.

5.5.1   SPECIES RICHNESS

The species richness measured at each woodland monitoring site is represented in **Figure 63** and is based on the average number of native species. As data was not collected at the remnant woodland sites during the 2017 monitoring period, the rehabilitation woodland sites for 2017 have been compared with the average species richness for remnant woodland sites across the 2015 and 2016 monitoring period. This relates to the recommended species list in **Table 51** as well as those species considered desired native species consistent with the Central Hunter Grey Box – Ironbark Woodland community in the remnant sites.

The average number of native species present within the remnant woodland sites for 2015/2016 monitoring period is more than double (36) of the native species present across the rehabilitation woodland sites (13.5) recorded during 2017.
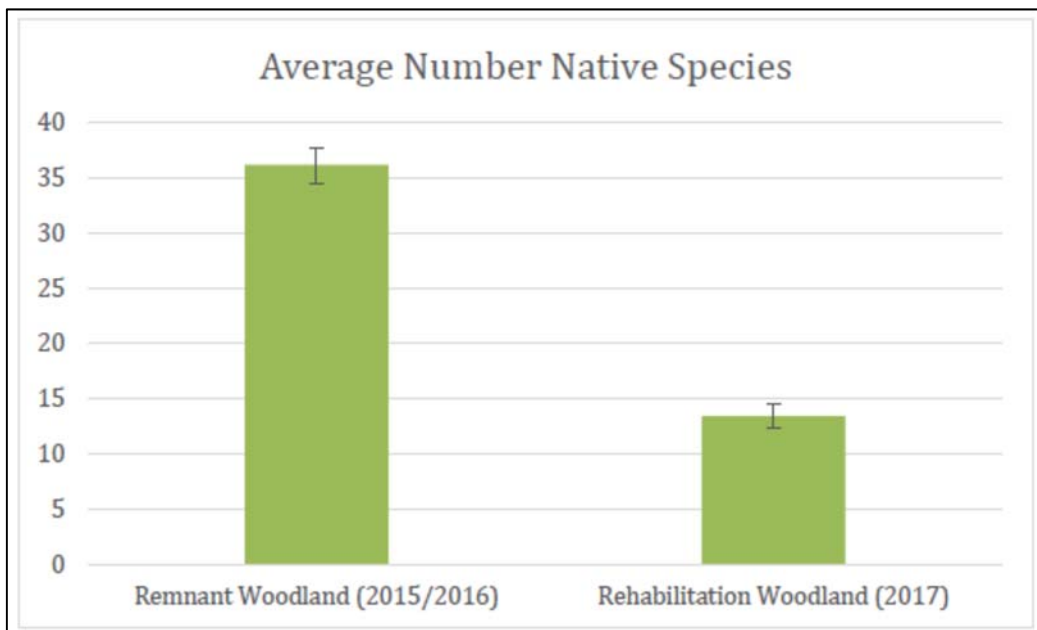
Figure 63: Comparison of Average Native Species

The average weed species present at both remnant and rehabilitation woodland sites was fairly similar, with remnant woodland sites comprising 14 species and rehabilitation woodland sites comprising 12 weed species.

Rehabilitation woodland site RW2 comprises 18 weed species and one Weed of National Significance (WoNS), RW3 comprises 15 weed species and one WoNS, RW4 comprises eight weeds and two WoNS, RW5 comprises 16 weed species and one WoNS and RW6 comprises 11 weed species and one WoNS.
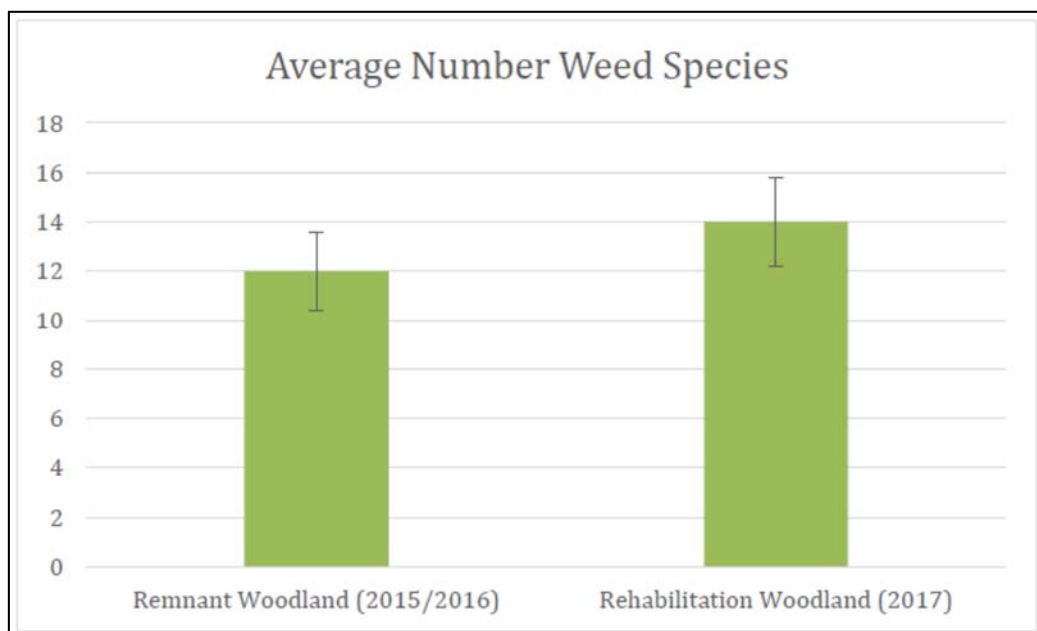
Figure 64: Comparison of Average Number of Weed Species

5.5.2   BIOMETRIC DATA

Average percentage of native over-storey and mid-storey cover and native grass, shrub, and native other cover was measured for remnant and rehabilitated woodland sites (**Figure 65**). As no data was collected during the 2017 monitoring period for remnant woodland sites, the average from the 2015 and 2016 monitoring periods has been utilised. Exotic plant cover, litter and bare ground was also recorded and provides a comparison between remnant and rehabilitation woodland sites.

The remnant woodland sites contained a greater proportion of native species in general with a slightly higher proportion in over-storey, grass cover, and native other cover. Foliage cover within the canopy at rehabilitation woodland sites is comparable to that at remnant woodland sites. No exotic over-storey and mid-storey cover was present at remnant or rehabilitation woodland sites. Exotic ground cover at rehabilitation woodland sites was just over double that found at remnant woodland sites. Litter cover at rehabilitation woodland sites was just over double that found at remnant woodland sites. Bare ground was three times higher at rehabilitation woodland sites compared to remnant woodland sites.
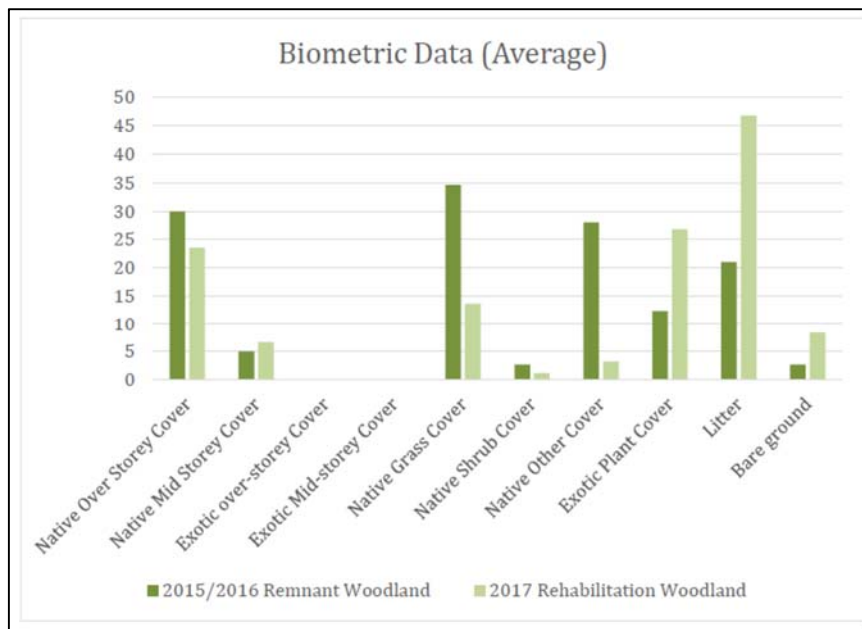
Figure 65: Biometric Data Averages

5.5.3   COMPARISON TO COMPLETION CRITERIA

In relation to the completion criteria, the results of the rehabilitation woodland sites established native species composition, projected foliage cover and for number of weeds listed as WoNS is presented in **Table 58**.

Table 58: Rehabilitation Site Completion Criteria Target – Woodland

Site	Completion criteria target (native species established)	2017 result	Target reached	Completion criteria target (projected foliage cover)	2017 result	Target reached	Completion criteria target (WoNS)	2017 result	Target exceeded
RW2	>50%	40%	No	>70%	107%	Yes	<20%	5%	No
RW3	>50%	44%	No	>70%	51%	No	<20%	6%	No
RW4	>50%	65%	Yes	>70%	71%	Yes	<20%	25%	Yes
RW5	>50%	41%	No	>70%	90%	Yes	<20%	6%	No
RW6	>50%	61%	Yes	>70%	60%	No	<20%	9%	No

5.5.4   CONCLUSIONS

The revised MOP included changes to completion criteria targets set for woodland rehabilitation sites. One of the critical changes has been the setting of target thresholds based on recommended species listed in Table 27 within the MOP (MCC 2017), species considered desired native species consistent with the Central Hunter Grey Box – Ironbark Woodland community and species utilised at the time rehabilitation sites were seeded.

The inclusion of species utilised at the time sites were seeded enables a more realistic comparison of the current composition of the rehabilitation woodland sites as opposed to previous years where rehabilitation sites were compared only to species within Table 27 of the MOP (MCC 2017), in which very few species were present. Therefore, based on this year's round of monitoring and the new completion criteria targets, two of the five rehabilitation woodland sites meet the criteria target and three fall just below the criteria target.

All rehabilitation woodland sites comprise key eucalypt species including *C. maculata*, *E. citriodora* and *Eucalyptus crebra* and currently, two of the five rehabilitation woodland sites show evidence of regrowth canopy species. Of the five rehabilitation woodland sites, three meet the criteria target for percent foliage cover, with two falling below this, however, it is considered future years will see an increase in foliage cover at these sites. Four of the five rehabilitation sites meet the criteria target for <20% WoNS weed presence. It is considered that, with weed control in that the last site will be able to meet the criteria target in the coming years.

5.6   FLORA MONITORING METHODOLOGY – PASTURE

5.6.1   PERMANENT MONITORING TRANSECTS

At each of the eight pasture sites, 20 m x 20 m full floristic plots were established using star pickets at the start and end of each a 20m transect through the centre of the plot. GPS coordinates were taken at the start and finish points and site details were recorded.

Floristic assessments for species richness were conducted within the 20 m x 20 m plot. This method provides a measure of both species presence, including cover and abundance (**Table 59**). Within each plot the attribute for native and exotic species is recorded in accordance with the *BioBanking Assessment Methodology 2014.*

Table 59: Data Gathered for Floristic Assessment of the Pasture Sites

Attribute	Survey Requirement
Stratum	Stratum and layer in which each species occurs
Growth form	Growth form for each recorded species
Species name	Scientific name and common name
Cover	A measure or estimate of the appropriate cover measure for each recorded species; recorded from 1–5% and then to the nearest 5%. If the cover of a species is less than 1% and the species is considered important, then the estimated cover should be entered (e.g. 0.4)
Abundance rating	A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000 or specify a number greater than 1000 if required

All vascular plants species were recorded and identified to the lowest taxonomic level possible, with samples of unknown species collected for further identification. Nomenclature followed the Flora of New South Wales (Harden 1992; 1993; 2000; 2002), and any subsequent recent taxonomic changes as presented on PlantNET (RBGDT 2012) and other specific botanical sources.

In addition to this, the total number of each species regenerating was assessed and recorded from across the entire vegetation zone.

5.6.2   BIOMETRIC SURVEY

Within the 20 m x 50 m plot, biometric attributes were recorded using the Biobanking Assessment Methodology (DECC 2008). Attributes included canopy cover and mid-storey cover every five metres along the 50 m transect. Shrub cover, grass cover, other (herbs, forbs, sedges) cover, exotic species cover were recorded every one metre. Length of logs, number of hollow bearing trees and whether regeneration (trees less than 5 cm DBH) was occurring were all recorded.

5.6.3   CARRYING CAPACITY

Different grazing animals have different feed needs. Feed requirements also vary with different growth phases. Hence a standard basis of comparison is required; traditionally this is a Dry Sheep Equivalent (DSE). A DSE is the amount of feed consumed in a month by a 50kg mature sheep that is not lactating or breeding (commonly known as a wether). Common DSE ratings for different cattle growth phases are shown in **Table 60** and estimated carrying capacities for pasture types in the Upper Hunter is outlined in **Table 61** (tables sourced from *Beef stocking rates and farm size – Hunter Region, Department of Primary Industries, 2006*).

Table 60: Typical DSE Equivalents

Cattle Enterprises	Typical DSE Equivalents
3 to 6 month calf, not yet wened	3.8 DSE
450kg dry stock (non-lactating, non-pregnant cow)	6.0 DSE
Average for a 450kg cow and weaner calf	13.5 DSE
350kg yearling maintaining weight	5.3 DSE
350kg yearling gaining 1kg/day	10.4 DSE
540kg (EU) bullock gaining 1kg/day	12.1 DSE

Table 61: Estimated Carrying Capacities for Pasture Types in the Upper Hunter

Pasture Types	Range (DSE/ha)	Average (DSE/ha)
Native unimproved – low fertility (e.g. dominated by Parramatta grass, barbwire grass, wiregrass, red grass)	1.0-2.5	1.8
Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	2.8
Native semi-improved - high fertility (clover + fertiliser added)	3.8-8.0	5.8
Improved pasture – moderate fertility (perennial temperate grasses, clover + fertiliser)	5.0-12.0	8.5
Improved pasture – moderate fertility (tropical grasses, clover + fertiliser)	7.0-10.0	8.5
Improved pasture – high fertility (perennial grasses, clover + regular fertiliser)	10.0-20.0	15.0
Lucerne – moderate to high fertility (extensively grazed)	7.0-12.0	9.5
Lucerne – moderate to high fertility (rotationally grazed)	10.0-15.0	12.5

5.6.4 HERBAGE MASS SAMPLING

The quadrat sampling method (Lang & McDonald, 2005) was used to rapidly assess the ground cover and herbage mass. Ten quadrats were sampled in each of the five pasture sites equating to a total of 50 herbage mass sampling plots overall.

The quadrat sampling was randomised using a handheld 1 m x 1 m quadrat frame using the following steps:
1. Walk a random path within each area to be assessed and throw the quadrat a short distance.
2. For each throw look only at the area within the quadrat and assess and record the following:
   A = the percentage of total pasture cover (living and dead);
   B = the percentage cover of live native plants;
   C = the percentage cover of live non-native plants; and
   D = estimate of herbage mass (e.g. measure height of pasture cover using Meat and Livestock
   Australia Pasture Ruler; Lodge et al. 2011).
3. Take at least 10 of these random samples for each assessment area (paddock).
4. Calculate the percentage of the assessment area covered by vegetation (living or dead):
   Sum of A / Number of samples.
5. Calculate the percentage of the living vegetation that is live native groundcover by:
   (Sum of B x 100) / (Sum of B + Sum of C).
6. Calculate average mass by:
   Sum of D / Number of samples.

5.7 FLORA MONITORING RESULTS – PASTURE

5.7.1 CARRYING CAPACITY

Carrying capacity for each of the remnant and rehabilitation pasture sites has been calculated using the example of a 450kg dry stock (non-lactating, non-pregnant cow). The results from **Table 62** show that the remnant pasture sites have the ability to stock one cow per 1.5ha. Sites RP3 and RP4 have the capacity to stock 1 cow per 2ha, RP1 could only stock one cow per 4ha and RP5 is one cow per 6ha. The 2017 results for estimated carrying capacity have not altered from results presented in 2016.

Table 62: Estimated Carrying Capacity for Remnant and Regrowth Pasture Sites

Sites	Pasture Type	Range (DSE/ha)	Estimated Value (DSE/ha)	Estimated carrying capacity (450kg dry stock)
RPastNew1	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	4	1 cow per 1.5ha
RPastNew2	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	4	1 cow per 1.5ha
RPast03	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	4	1 cow per 1.5ha
RP1	Native unimproved – low fertility (dominated by undesirable species)	1.0-2.5	1.5	1 cow per 4ha
RP3	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	2	1 cow per 2ha
RP4	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	2	1 cow per 2ha
RP5	Native unimproved – low fertility (dominated by undesirable species including *Galenia pubescens*)	1.0-2.5	1	1 cow per 6ha
RP6	Native unimproved – moderate fertility (no seed or fertiliser added)	1.5-4.0	2	1 cow per 2ha

5.7.2   HERBAGE MASS

Baseline data for estimated herbage mass was utilised from 2015 and 2016 monitoring period (**Table 63**). Data collected for rehabilitation pasture sites is presented in **Table 64**. The collection of this data will enable future comparative analysis into pasture health of the remnant and rehabilitation pasture sites. A comparison of the remnant and rehabilitation pasture sites is shown in **Figure 66**.

Table 63: Remnant Pasture Herbage Mass Sampling

Component	RPastNew1	RPastNew2	RPast03
A: Cover (%) - percentage of total pasture cover (living and dead)	96.25%	80%	94%
B: Percentage cover of live native plants	62%	45.25%	58%
C: Percentage cover of live non-native plants	33.5%	36.25%	31.5%
D: Pasture height (cm)	12.25	7.55	9.2
Estimate of herbage mass (kg DM/ha) (based on Meat and Livestock Australia Pasture Ruler)	2,800	1,900	2,150

Table 64: Rehabilitation Pasture Herbage Mass Sampling

Component	RP1	RP3	RP4	RP5	RP6
A: Cover (%) - percentage of total pasture cover (living and dead)	92.5%	79.5%	76.5%	97%	87%
B: Percentage cover of live native plants	42%	60%	32.5%	15.5%	36.5%
C: Percentage cover of live non-native plants	47.5%	17.5%	44%	80%	49.5%
D: Pasture height (cm)	4.2	2.5	2.2	3.1	4.0
Estimate of herbage mass (kg DM/ha) (based on Meat and Livestock Australia Pasture Ruler)	1,230	850	810	1,080	1,200

Herbage mass was considerably lower across the rehabilitation pasture sites for the 2017 monitoring period with RP1 being 1230, RP3 being 850, RP4 being 810, RP5 being 1080 and RP6 being 1200.
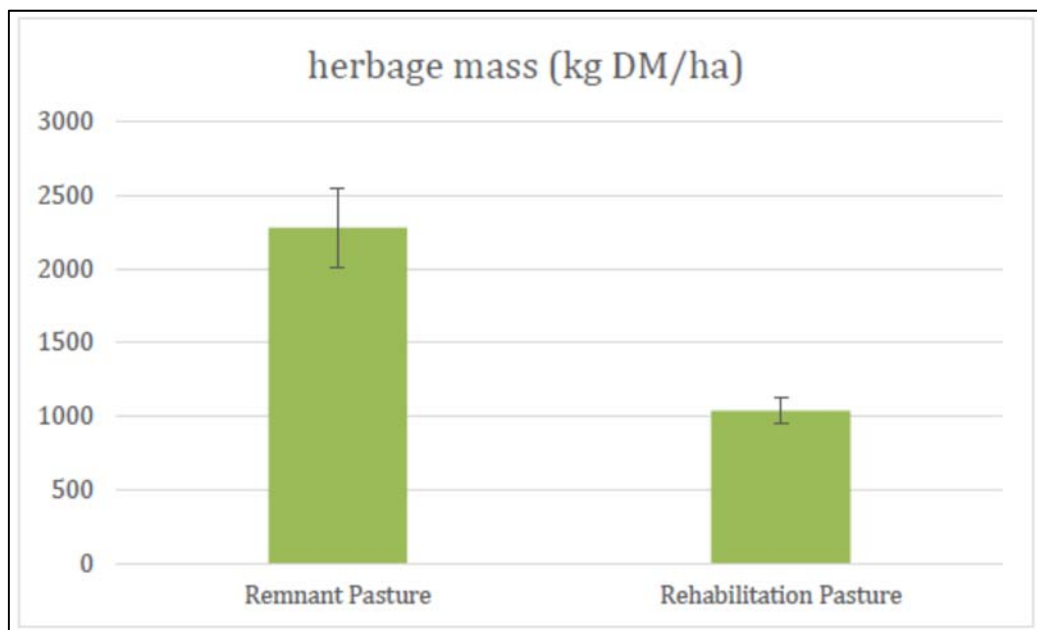
Figure 66: Average Herbage Mass (kg DM/ha) between Remnant and Rehabilitation Pasture Sites

5.7.3 PASTURE QUALITY

Pasture quality has been qualitatively assessed by estimating the digestible percentage using the graph shown in **Figure 67**. As remnant pasture sites were not surveyed during the 2017 monitoring period, data from the previous survey years have been utilised and generally, the three remnant pasture sites fall within the 'Moderate Production' range. For the time of year survey occurred for the 2017 monitoring period, RP4 also fell within the 'Moderate Production' range. All other remnant pasture sites fell within the 'Maintain Dry Stock' range. Site RP5 has considerable *Galenia pubescens* present, however other desirable species are also present.
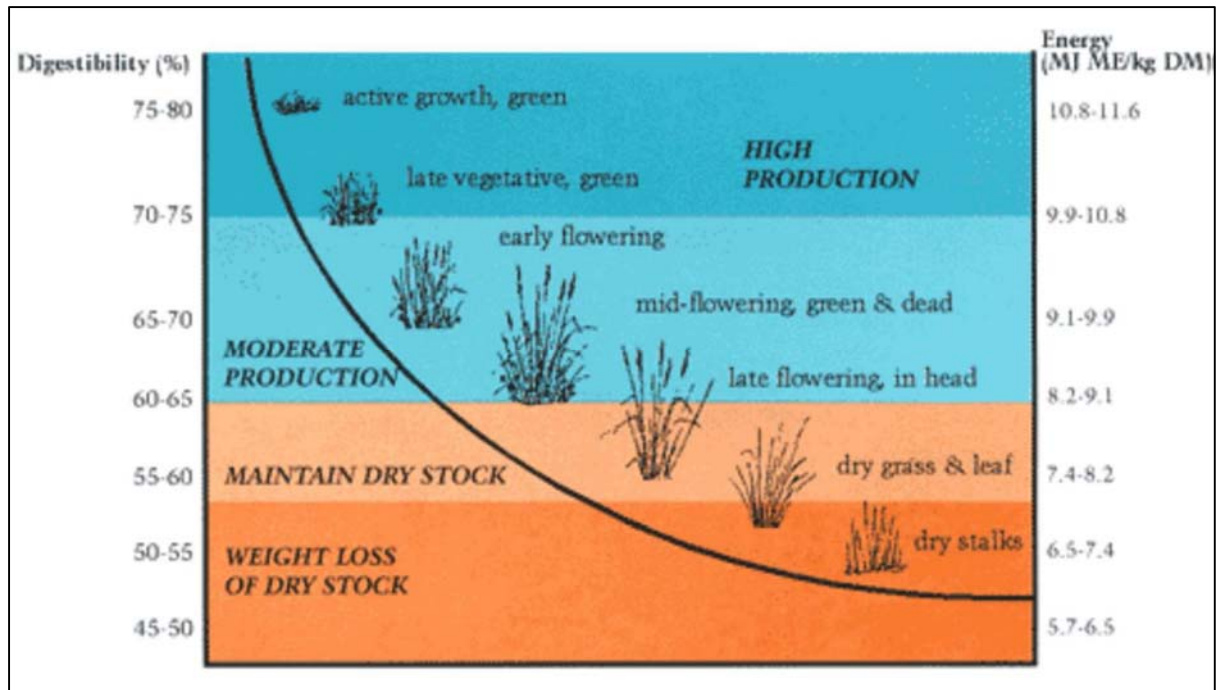
Figure 67: A Guide to Digestibility Percentage in Temperate Pasture Mixes

5.7.4 PASTURE SPECIES RICHNESS

The average number of native/desirable pasture species has been compared between remnant and rehabilitation pasture sites (**Figure 72**).

As data was not collected at the remnant pasture sites during the 2017 monitoring period, the rehabilitation pasture sites for 2017 have been compared with the average species richness for remnant pasture sites across the 2015 and 2016 monitoring periods. This relates to the recommended species list in **Table 52**, species considered desired pasture species and species utilised at the time of seeding.

The average number of native/desirable species present within the remnant pasture sites for the 2015/2016 monitoring period is more than double (17) that of native/desirable species present across the rehabilitation pasture sites (7).
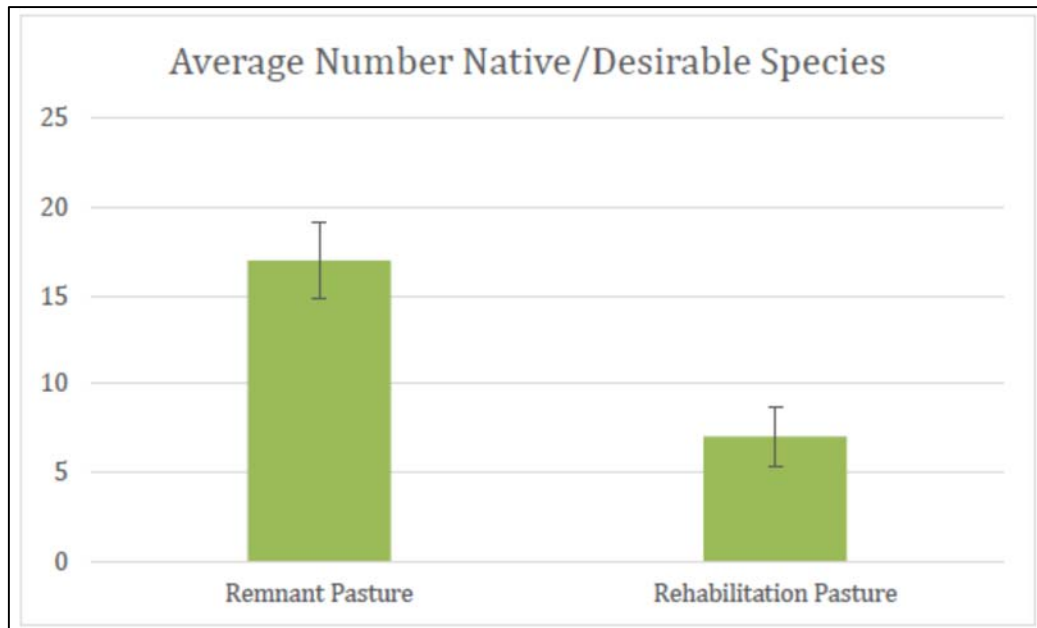
Figure 68: Comparison Between Remnant and Rehabilitation Pasture Sites for Average Native/Desirable Species

Percentage Foliage Cover (PFC) at each of the rehabilitation pasture sites has been calculated and is presented in Figure 14. RP1 had a total PFC of 89.5%, RP3 had a total PFC of 77.5%, RP4 had a total PFC of 76.5%, RP5 had a total PFC of 95.5% and RP6 had a total PFC of 86%.
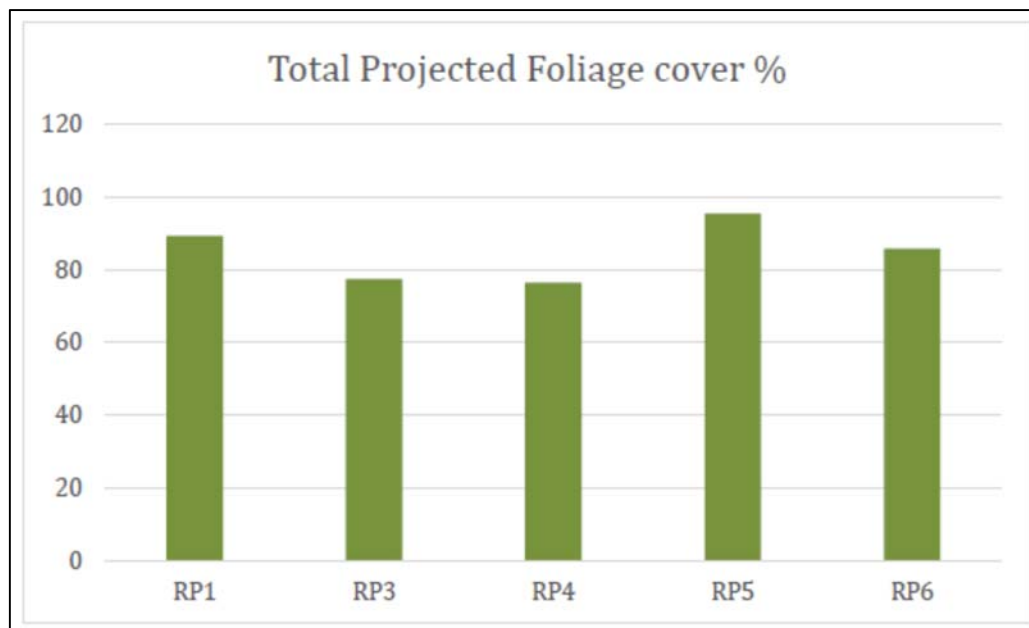
Figure 69: Total Projected Foliage Cover at Rehabilitation Pasture Sites

The average number of weed species has been compared between remnant and rehabilitation pasture sites (**Figure 70**). As data was not collected at the remnant pasture sites during the 2017 monitoring period, the rehabilitation pasture sites for 2017 have been compared with the average weed species for remnant pasture sites across the 2015 and 2016 monitoring periods.

The average weed species present at both remnant and rehabilitation pasture sites was fairly similar with remnant pasture sites comprising 18 weed species and rehabilitation pasture sites comprising 14 species.
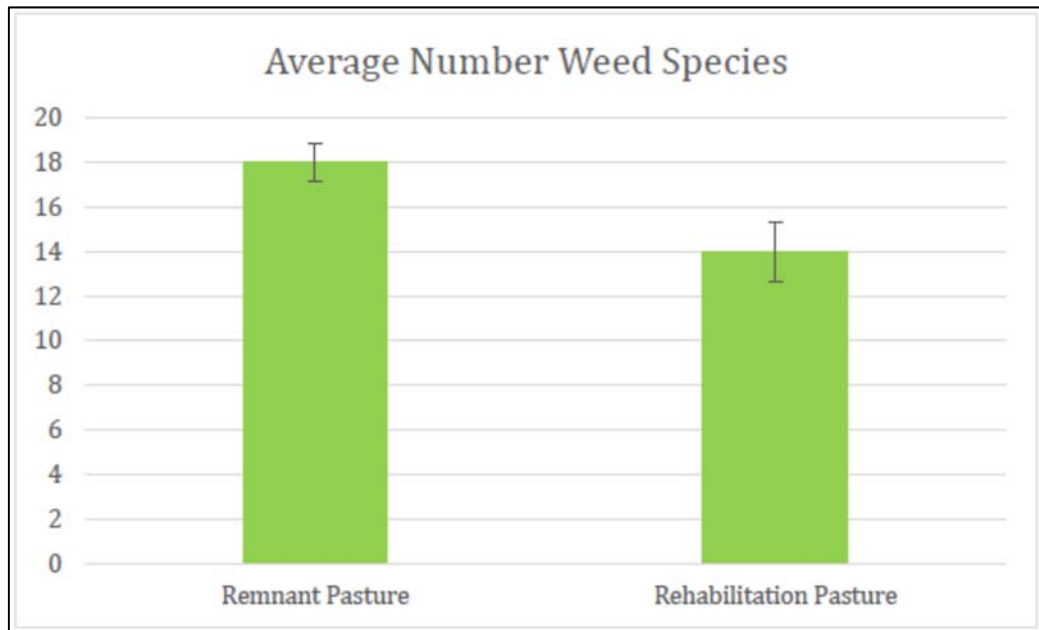
Figure 70: Comparison Between Remnant and Rehabilitation Pasture Sites for Average Weed Species Richness

Rehabilitation pasture site RP2 comprises 11 weed species and one Weed of National Significance (WoNS), RP3 comprises 17 weed species and one WoNS, RP4 comprises 12 weed species and one WoNS, RP5 comprises 12 weed species and two WoNS and RP6 comprises 17 weed species and one WoNS (**Figure 71**).
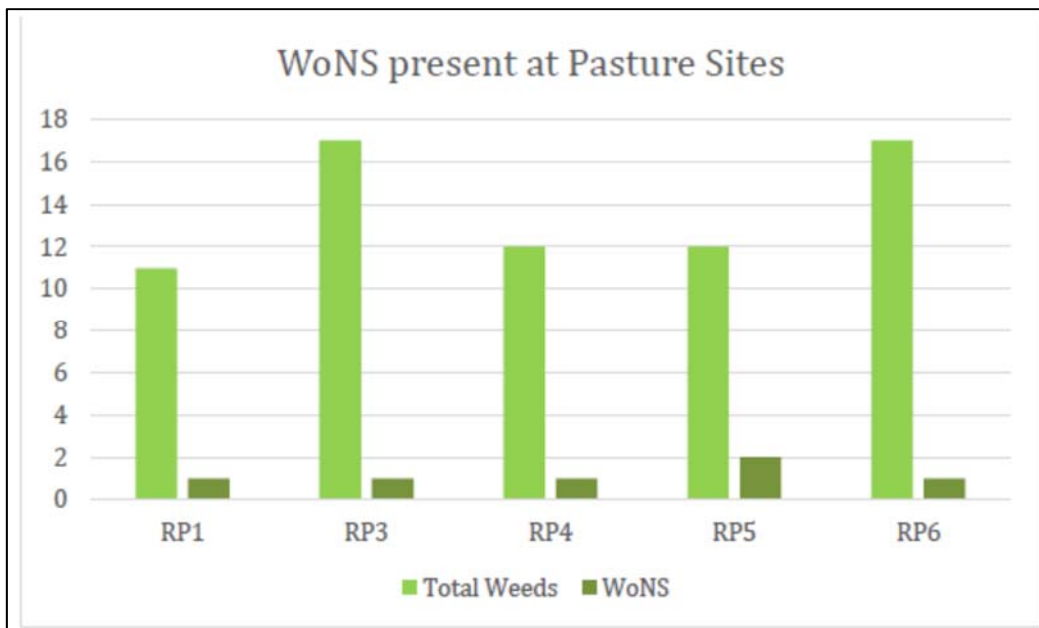
Figure 71: Total Weed Species and Number of WoNS Present at Rehabilitation Pasture Sites

5.7.5 COMPARISON TO CLOSURE CRITERIA

In relation to the completion criteria, the results of the rehabilitation pasture sites established native/desirable species composition, projected foliage cover and number of weeds listed as WoNS is presented in **Table 65**.

Table 65: Rehabilitation Site Completion Criteria Target – Pasture

Site	Completion criteria target (native/desirable species established)	2017 result	Target reached	Completion criteria target (projected foliage cover)	2017 result	Target reached	Completion criteria target (WoNS)	2017 result	Target exceeded
RW2	>50%	31%	No	>70%	89.5%	Yes	<20%	9%	No
RW3	>50%	43%	No	>70%	77.5%	Yes	<20%	6%	No
RW4	>50%	40%	No	>70%	76.5%	Yes	<20%	8%	No
RW5	>50%	29%	No	>70%	95.5%	Yes	<20%	16%	No
RW6	>50%	19%	No	>70%	86.0%	Yes	<20%	6%	No

5.7.6 CONCLUSIONS

The revised MOP included changes to completion criteria targets set for pasture rehabilitation sites. One of the critical changes has been the setting of target thresholds based on recommended species listed in **Table 52**, species considered native/desirable for pasture and species utilised at the time rehabilitation sites were seeded.

The inclusion of species utilised at the time sites were seeded enables a more realistic comparison of the current composition of the rehabilitation pasture sites as opposed to previous years where rehabilitation sites were compared only to species within **Table 52**, in which very few species were present. At this stage, based on this year's round of monitoring and the new completion criteria targets, none of the rehabilitation pasture sites meet the criteria target, however, two fall just below the target and two are above half this target.

All rehabilitation pasture sites comprise key pasture species including *C. gayana, L. rigidum, T. repens* and *M. repens* and all rehabilitation pasture sites currently show evidence of both short-lived and longlived annual/perennial species. All of the rehabilitation pasture sites meet the criteria target for percent foliage cover and for <20% WoNS weed presence.

5.8 FAUNA MONITORING METHODOLOGY

Fauna monitoring design and location was guided by the MOP and has targeted highly mobile fauna species (i.e. bird and bat species). The monitoring program is focused on key indicator fauna species as opposed to attempting to monitor all species found on site. In conjunction with the fauna monitoring, evidence of appropriate fauna structures was noted, if observed, which may assist with habitat recreation to areas adjacent to the mining operations. At this stage, fauna monitoring is focused on collecting baseline data, with more rigorous data analysis and testing to be undertaken once adequate data over subsequent monitoring years has been collected.

5.8.1 REMOTE CAMERA SURVEY

Remote cameras were placed at seven of the nine woodland sites, and comprised of a plastic bait station filled with a combination of oats, honey and peanut butter and placed at ground level. A remote camera was placed on a tree trunk facing the bait station for a total of three nights/days as in

line with the MOP. Analysis of camera images included identifying the type of animal observed at each site.

5.8.2   BIRD CENSUS

An alternative methodology was undertaken for collecting bird data across the MCC site and involved the use of songmeters. Songmeters were placed at each of the nine woodland sites for three nights and used to record bird call activity. The benefits of using this method are that recordings of bird activity were captured at exactly the same time of morning and at the same temperature across each of the woodland sites, thus providing consistency across all sites.

An ecologist experienced in identifying bird calls from recordings reviewed the data collected and has used this, in conjunction with incidental bird identification whilst conducting rehabilitation monitoring, to compile a bird list for the woodland sites across the MCC site.

5.8.3   MICROCHIROPTERAN BATS

Songmeters were placed at each of the nine woodland sites for three nights and used to record high frequency bat calls. All songmeters were directed along a potential flyway, where possible, in the woodland sites. A time delay was programmed such that the songmeters recorded calls for a four hour period from prior to dusk until midnight.

Call identifications were made using regional based guides to the echolocation calls of microbats in New South Wales (Pennay et al. 2004); and south-east Queensland and north-east New South Wales (Reinhold et al. 2001) and the accompanying reference library of over 200 calls from north-eastern NSW.

Bat calls are analysed using species-specific parameters of the call profile such as call shape, characteristic frequency, initial slope and time between calls (Rinehold et al. 2001). To obtain reliable and accurate results the following protocols (adapted from Lloyd et. al. 2006) were followed:
- Search phase calls were used in the analysis, rather than cruise phase calls or feeding buzzes (McKenzie et al. 2002)
- Recordings containing less than three pulses were not analysed and these sequences were labelled as short (Law et al. 1999)
- Four categories of confidence in species identification were used (Mills et al. 1996):
    o definite – identity not in doubt
    o probable – low probability of confusion with species of similar calls
    o possible – medium to high probability of confusion with species with similar calls
    o unidentifiable, poor or low quality– calls made by bats which cannot be identified to even a species group.
- Nyctophilus spp. are difficult to identify confidently from their calls and no attempt was made to identify this genus to species level (Pennay et al. 2004)
- Sequences not attributed to microbat echolocation calls were labelled as junk or non-bat calls and don't represent microbat activity at the site.

Data on the number of passes of each bat species per monitoring site was collated, though only definite and probable call passes were used to represent species call activity and presence at each site.

5.9 FAUNA MONITORING RESULTS

5.9.1 REMOTE CAMERA SURVEY

The results of the remote camera data is presented in **Figure 72** and **Table 66** and provides an indication of fauna species richness at each woodland site surveyed during 2015, 2016 and 2017 monitoring periods. Results show that across the remnant woodland sites, mammals have decreased slightly since 2016 monitoring, birds have fallen to zero, reptiles were present again during 2017 monitoring and pest species have dropped down to one species during 2017 monitoring. Across the rehabilitation woodland sites, the number of mammals has slightly decreased, the number of birds has stayed the same as the 2016 monitoring, reptiles are absent as they were during the 2015 and 2016 monitoring and the number of pests has increased by one.
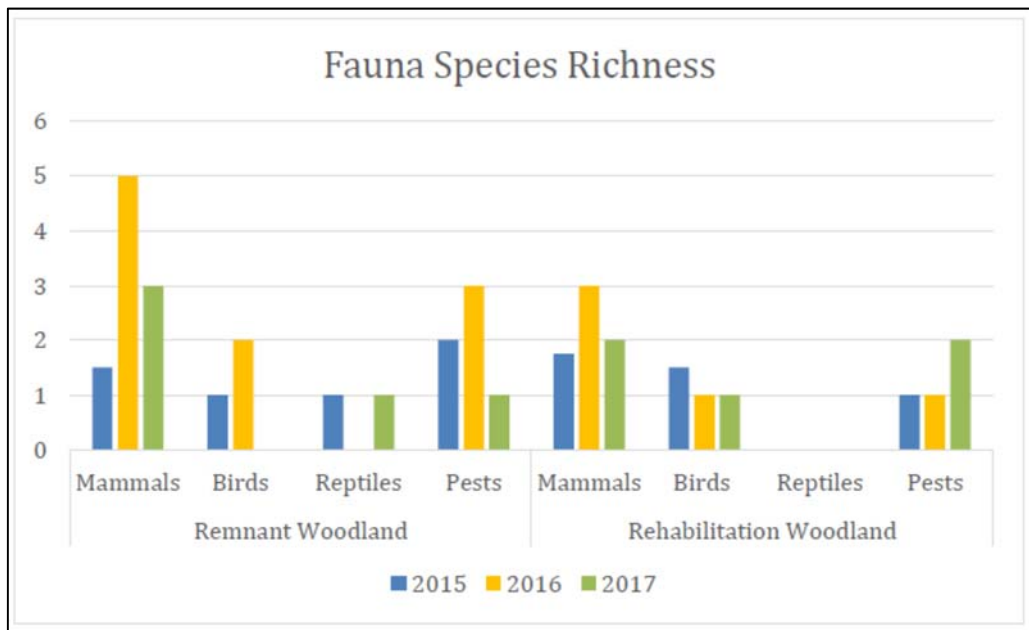
Figure 72: Comparison of Average Fauna Species Richness

Table 66: Remote Camera Results

Species	Remnant Woodland Sites			Rehabilitation Woodland Sites				
	RWoodNew1	RWoodNew2	RWoodNew3	RW2	RW3	RW4	RW5	RW6
Macropus rufogriseus (Red-neck Wallaby)	X		X	X		X	X	X
Macropus giganteus (Eastern grey kangaroo)			X		X			X
Macropus robustus (Common Wallaroo)	X							
Oryctolagus cuniculus (Rabbit)							X	
Vulpes vulpes (Fox)			X					X
Gymnorhina tibicen (Australian Magpie)				X				
Varanus varius (Lace Monitor)		X						

5.9.2 BIRD CENSUS

Bird species were identified with a comparison between remnant and rehabilitation woodland sites and across 2015, 2016 and 2017 shown in **Figure 73**. Across the remnant woodland sites, there was a slight decrease in the average bird species present from 13 recorded during 2016 monitoring to 11 recorded during 2017 monitoring, which is the same amount as during the 2015 monitoring. The rehabilitation sites showed a notable increase in bird species present with an average of eight during 2015 monitoring, 14 during 2016 monitoring and 15 during 2017 monitoring.
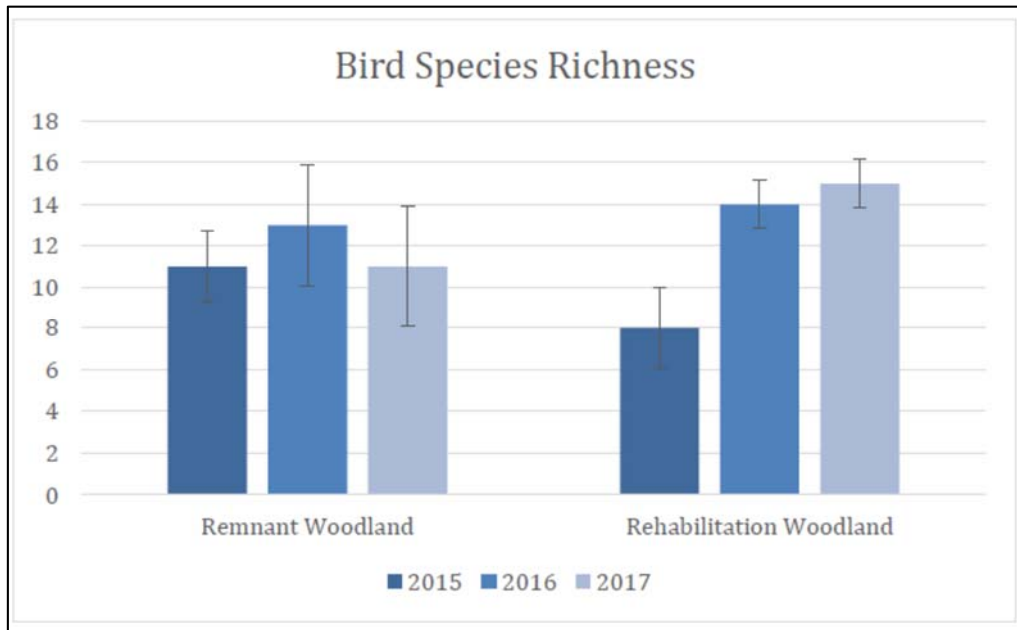
Figure 73: Bird Species Identified at Remnant and Rehabilitation Sites

5.9.3 MICROCHIROPTERAN BATS

The results of the Micro-bat census using songmeter data capture is presented in **Figure 74** and **Table 67** indicating the presence (and number of calls) of bat species utilising the woodland sites surveyed. Of the common microbat species, RW5 had the highest number of recorded being seven, RW2 and RW6 were below this at six species. Five microbat species were identified at RW3 and RW4 and RWoodNew2 had three species recorded. RWoodNew1 and RWoodNew2 had the lowest total number of common microbats recorded being two. Threatened microbat species were identified at all sites excluding RW4 and RW5. These threatened microbats included *Miniopterus australis* (Little Bentwing-bat), *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) and *Scoteanax rueppellii* (Greater Broad-nosed Bat).
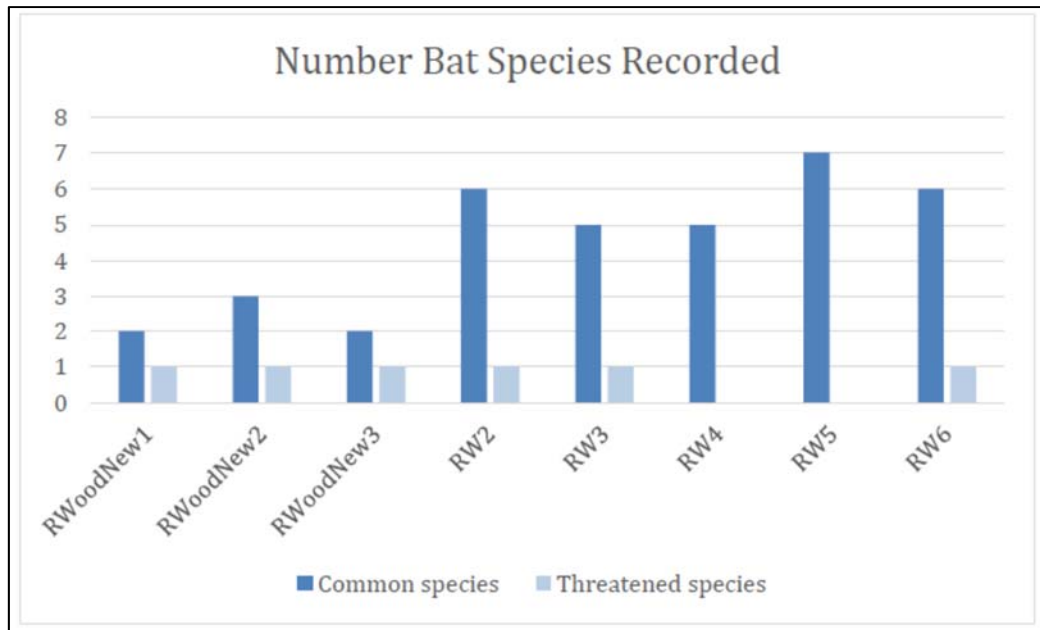
Figure 74: Number of Common and Threatened Bat Species Recorded at Woodland Sites

Microbat species have decreased across all remnant woodland sites, as well as at RW3. Rehabilitation woodland sites have increased for common microbat species across all four sites, however, the number of threatened microbat species has declined at RW2 and RW3, and have not been recorded at RW4 and RW5. As RW6 did not record data for the 2016 monitoring period, no comparison has been made (**Figure 75**).
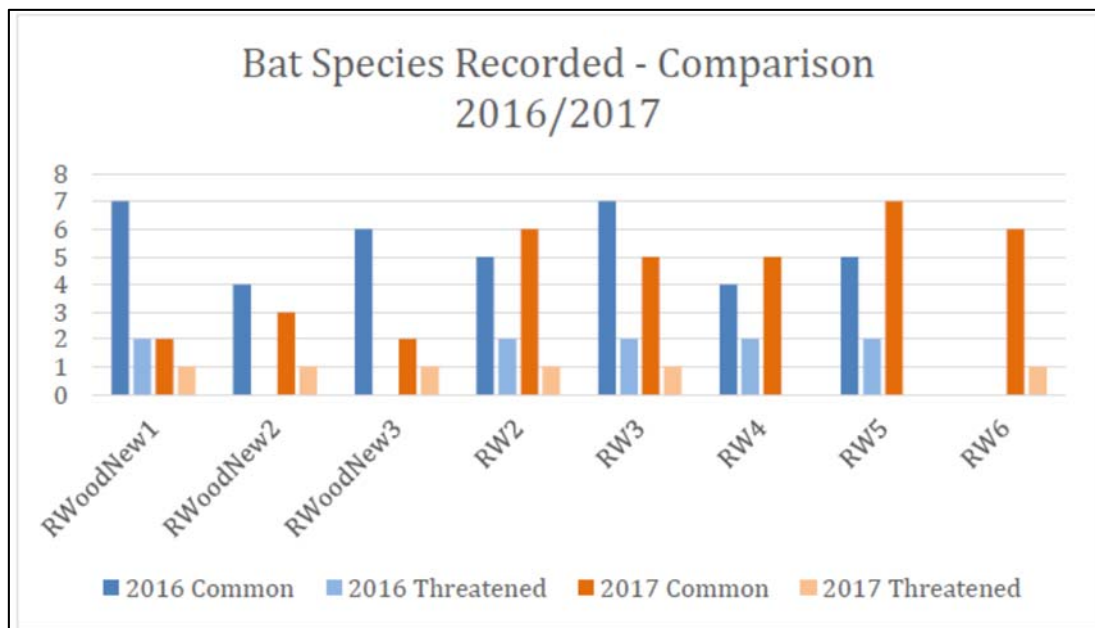
Figure 75: Comparison of Bat Species Recorded at Woodland Sites

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Table 67: Bat Calls Identified at Remnant and Rehabilitation Woodland Sites

Species	RWoodNew1 Definite	RWoodNew1 Probable	RWoodNew2 Definite	RWoodNew2 Probable	RWoodNew3 Definite	RWoodNew3 Probable	RW2 Definite	RW3 Definite	RW4 Definite	RW5 Definite	RW6 Definite
White-Striped Freetail Bat	2		34			52	28	34	56	8	2
Gould's Wattled Bat						34	3	9	33	5	
Inland Freetail-bat						1		1	2	3	
Chocolate Wattled Bat					2						
Little Bent-Winged Bat (V)					2	1	11			2	
Eastern False Pipistrelle (V)		1									
Greater Broad-nosed Bat (V)				1							
South-Eastern Freetail Bat					2	74	71	37	76	26	
Eastern Freetail Bat							1				
Inland Broad-nosed Bat	1		1						1	1	1
Eastern Horseshoe Bat						1			1		
Southern Forest Bat			3			5		1	5	1	
Eastern Forest Bat							1				

(V) Listed as vulnerable under both State and Federal legislation

5.9.4   CONCLUSIONS

Based on the data collected during 2017, generally it is considered that the rehabilitation woodland sites are functioning as wildlife corridors for those highly mobile fauna groups. There has been a considerable increase in the number and variety of microbat and bird species across both the remnant and rehabilitation sites. The identification of three threatened microbats is a positive result for the MCC site. For mammals, birds and microbats all are exceeding the target threshold as compared to the analogue woodland sites. One faunal group, being reptiles are yet to be identified as occurring within rehabilitation woodland sites, however, future years of survey will determine whether a trend is occurring as to presence/absence.

5.10 SOIL MONITORING METHODOLOGY

In accordance with amendments to the MOP 2017-2023, soil sampling will now be undertaken on a three-yearly cycle, as such, no soil sampling, or analysis/discussion has occurred as part of the 2017 monitoring program.

5.11 EROSION AND LANDFORM STABILITY

In conjunction with the rehabilitation monitoring, observations were made in the areas surrounding each of the rehabilitation monitoring sites for any signs of soil erosion or obvious landform instability. The following list provides some of the features that were to be recorded if found present within and surrounding each rehabilitation monitoring site:

- Rills, gullies and tunnel inlet and outlets.
- Fine soil accumulation or the presence of lag material at the bottom of slopes or in depressions.
- Holes through drainage structures.
- Loss in depth of topsoil/growth medium
- Loss of topsoil due to wind and sheet flow
- Hummocking and pedestalling.
- Root exposure.
- Bare patches where groundcover vegetation has been denuded.

In order to determine the severity of erosion, a scoring system from 1 to 10 (with 10 being severe erosion and 1 being minimal) has been used with management options recommended depending on the level of erosion identified.

The results from the erosion survey undertaken at each of the five rehabilitation and pasture monitoring sites are presented in **Table 68**. The survey found that there is limited erosion occurring at all 10 sites. However, gully erosion was identified along the northern boundary of Block C on the left side of the road heading towards RW6(**Figure 76**). The erosion gully seems to extend downslope for approximately 50 m.

Table 68: Evidence of Erosion at Rehabilitation Woodland and Pasture Sites

Rehabilitation Site	Erosion Occurrence/ Type	Comments
RW2	Limited (1)	No evidence of erosion was observed at this site, or within the vicinity of the site. There is limited topsoil present, however, this is likely due to a number of factors including limited topsoil initially being applied, potentially some loss of topsoil due to wind and/or sheet flow during establishment and natural degeneration. There is a fair amount of vegetative cover present which is likely to assist in the prevention of erosive features from occurring.
RW3	Limited (1)	No evidence of erosion was observed at this site, or within the vicinity of the site. There is limited topsoil present, however, this is likely due to a number of factors including limited topsoil initially being applied, potentially some loss of topsoil due to wind and/or sheet flow during establishment and natural degeneration. There are patches of bare ground in which ground layer cover is not present, however the majority of the site has both ground and canopy vegetative cover present which is likely to assist in the prevention of erosive features from occurring.

Rehabilitation Site	Erosion Occurrence/ Type	Comments
RW4	Limited (1)	No evidence of erosion was observed at this site, or within the vicinity of the site. There is limited topsoil present and a significant amount of bare ground and rock present, however, this is likely due to limited topsoil initially being applied, the use of rock during landform establishment, potentially some loss of topsoil due to wind and/or sheet flow during establishment and natural degeneration. There are large areas of bare ground in which ground layer cover is not present, however the site has a sparse ground cover and moderate canopy cover present which is likely to assist in the prevention of erosive features from occurring.
RW5	Limited (1)	No evidence of erosion was observed at this site. There is a low-moderate level of topsoil present and ground layer and canopy cover is fairly high.
RW6	Limited at site (1) Gully erosion forming at northern boundary of Block C on left hand side of road heading towards RW6 (5)	No evidence of erosion was observed at this site. There is limited topsoil present, however, this is likely due to a number of factors including limited topsoil initially being applied, potentially some loss of topsoil due to wind and/or sheet flow during establishment and natural degeneration. Gully erosion was identified along the northern boundary of Block C on the left side of the road heading towards RW6. The erosion gully seems to extend downslope for approximately 50m.
RP1	Limited	No evidence of erosion was observed at this site. There is a low-moderate level of topsoil present and ground layer cover is fairly high.
RP3	Limited	No evidence of erosion was observed at this site. There is a low-moderate level of topsoil present and ground layer cover is fairly high.
RP4	Limited	No evidence of erosion was observed at this site. There is limited topsoil present and moderate patches of bare ground. Ground layer cover is moderately high.
RP5	Limited	No evidence of erosion was observed at this site. There is limited topsoil present, however groundcover has increased since last year's monitoring and comprises of a fairly high ground layer cover.
RP6	Limited	No evidence of erosion was observed at this site. There is limited topsoil present, however groundcover has increased since last year's monitoring and comprises of a fairly high ground layer cover.

Generally, across the rehabilitation sites limited erosion was encountered. The majority of sites had good vegetative cover and maintaining this cover will limit further erosion from occurring. No major settlement or subsidence areas were identified; however, one fairly advanced erosion gully was identified.

Figure 76: Erosion Sites

5.12 BIODIVERSITY OFFSET AREA

In accordance with amendments to the MOP 2017-2023, monitoring of the biodiversity offset area will now be undertaken on a three-yearly cycle, as such, no monitoring has occurred this reporting period.

5.13 FIRE AFFECTED REHABILITATION SITE

An unplanned fire occurred on the 14 December 2015 within the western and south-western section of Block C. Two monitoring points have been set up to monitor the area in order to document the resilience of rehabilitation to impacts of fire. These points were recorded using GPS and at these locations photos were taken from north, east, south and west directions (**Figure 77**). The condition of the area was recorded, including noting species regenerating and any weed species becoming established. In subsequent years these monitoring points can be revisited with photos taken over time showing the recovery of species. It is noted that no photos of the site were taken prior to the burn occurring so no data is available for the location pre-burn.

At monitoring point 1, no canopy species are present in the locality. Shrub species consisted of *Acacia paradoxa* (Kangaroo thorn). Groundlayer species consisted of a majority of exotic species such as *S. madagascariensis, Chloris gayana* (Chloris grass), *Hypochaeris radicata* (Flatweed), *Sida rhombifolia* (Paddy's Lucerne). A few native species such as *Wahlenbergia communis* (Tufted bluebell) were also present.

At monitoring point 2, no canopy species are present in the locality. Shrub species consisted of *A. saligna*. Groundlayer species consisted of a majority of exotic species such as *S. madagascariensis, C. gayana, H. radicata, Sonchus sp., V. bonariensis, S. rhombifolia, Setaria sp.*, and *Cirsium. vulgare* (Scotch thistle). A few native species such as *W. communis* were also present.

No action needs to be undertaken at this location. Monitoring in subsequent years will indicate whether the fire has had a significant impact. Initial observations indicate the site is recovering well. Groundlayer species have fully recovered and the shrub layer, including *Acacia saligna* and *Acacia paradoxa* are showing signs of new growth.

5.14 REHABILITATION TRIALS AND RESEARCH

MCC are not currently undertaking any trials within the rehabilitation areas.

5.15 FURTHER DEVELOPMENT OF THE FINAL REHABILITATION PLAN

As part of the modification to the development consent the final landform was reviewed with improvements made to the final landform. The revised final landform has been modified such that all slopes, including final void batters, would be equal to or less than 14 degrees. One high wall will remain, in Open Cut 2, which will be appropriately treated with the installation of a safety fence and/or berms, as well as capping of exposed coal seams. There are no proposed changes to this final rehabilitation plan.

Figure 77: Fire Affected Monitoring Sites

6.0   ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

During the next reporting period, the following activities are planned:

- Continuing to implement the commitments in the Environmental Management Plans and the Mining Operations Plan.
- Place a caveat on the title for the Biodiversity Offset Area regarding restrictions on the use of this land.
- Maintenance activities on the rehabilitation areas will continue. This will include weed control, pest animal control, removing sediment from dams, repairing erosion on rehabilitated areas and re-seeding if required.
- Coordination of an independent environmental audit as per the requirements of the development consent.
- Coordination of an independent review of spontaneous combustion management as per the requirements of the environmental protection licence.
- Commence a spontaneous combustion emissions study as per the requirements of the environmental protection licence. This will be completed in 2019.

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Appendix 1: Air Quality Monitoring Results

DEPOSITIONAL DUST RESULTS

DATE	DM7	DM17	DM18	*DM19	DM22	*DM24	DM26	*DM29
Jan-17	1.5	3.0	1.8	c5.2	2.5	2.9	1.7	1.5
Feb-17	1.9	4.8	2.7	1.2	2.8	3.2	2.2	1.5
Mar-17	1.0	2.8	1.5	1.3	2.0	1.2	c4.1	0.9
Apr-17	0.9	2.5	1.2	c6.4	2.4	2.1	2.3	1.2
May-17	0.8	1.9	0.7	c3.7	0.6	1.8	1.5	0.8
Jun-17	1.3	3.8	1.4	4.4	1.3	1.4	1.5	1.2
12-month Rolling Average	1.1	2.4	1.9	2.3	1.8	2.0	1.9	1.2
Background Average (2005-2009)	1.1	1.7	1.1	2.5	1.9	1.8	1.8	1.5

c = Contaminated result due to the presence of bird droppings, insects, or vegetation in sample. Contaminated results excluded from averages.

NR = No result. Includes broken or missing bottles.

Depositional Dust Gauge Monitoring - DM7
January - June 2017

Gaps in graph indicate the result was contaminated and not valid

Legend: Insoluble Solids | Ash | Annual Criteria

Depositional Dust Gauge Monitoring - DM17

January - June 2017

Gaps in graph indicate the result was contaminated and not valid

Depositional Dust Gauge Monitoring - DM18

January - June 2017

Gaps in graph indicate the result
was contaminated and not valid

Legend: Insoluble Solids, Ash, Annual Criteria

Depositional Dust Gauge Monitoring - DM22
January - December 2017

Depositional Dust Gauge Monitoring - DM24

January - December 2017

Depositional Dust Gauge Monitoring - DM26

January - June 2017

Gaps in graph indicate the result was contaminated and not valid

Legend: Insoluble Solids | Ash | Annual Criteria

Depositional Dust Gauge Monitoring - DM29

January - June 2017

Gaps in graph indicate the result was contaminated and not valid

HVAS MONITORING RESULTS

Date	Nisbet PM10	Site 1 TSP	Site 2 TSP	Site 3 TSP
06-Jan-17	18	26	23	37
12-Jan-17	41	55	59	57
18-Jan-17	30	43	50	57
24-Jan-17	26	37	38	40
30-Jan-17	26	35	36	40
05-Feb-17	17	44	35	33
11-Feb-17	54	58	69	65
17-Feb-17	51	55	70	76
23-Feb-17	55	71	76	105
01-Mar-17	9	18	16	16
07-Mar-17	20	32	31	34
13-Mar-17	33	49	49	62
19-Mar-17	11	19	16	15
25-Mar-17	14	26	19	22
31-Mar-17	15	30	28	36
06-Apr-17	5	13	13	18
12-Apr-17	14	36	32	37
18-Apr-17	18	22	18	33
24-Apr-17	22	28	28	42
30-Apr-17	11	18	17	22
06-May-17	8	19	18	17
12-May-17	32	53	53	52
18-May-17	26	36	34	45
24-May-17	8	23	21	18
30-May-17	7	8	8	8
05-Jun-17	8	25	22	22
11-Jun-17	6	16	14	22
17-Jun-17	22	45	41	41
23-Jun-17	9	24	21	20
29-Jun-17	Decommissioned	14	Decommissioned	9

REAL-TIME PM₁₀ MONITORING RESULTS

January 2017				February 2017				March 2017				April 2017			
SAMPLE DATE	SITE 1	SITE 2	SITE 3	SAMPLE DATE	SITE 1	SITE 2	SITE 3	SAMPLE DATE	SITE 1	SITE 2	SITE 3	SAMPLE DATE	SITE 1	SITE 2	SITE 3
01-Jan-17	23.4	23.9	24.0	01-Feb-17	24.8	24.0	23.8	01-Mar-17	8.2	8.6	7.7	01-Apr-17	15.5	15.8	13.7
02-Jan-17	14.3	15.8	18.8	02-Feb-17	28.7	27.5	22.9	02-Mar-17	13.8	13.3	10.1	02-Apr-17	14.9	15.0	14.1
03-Jan-17	14.4	15.0	18.2	03-Feb-17	31.2	30.2	28.2	03-Mar-17	14.1	13.4	11.0	03-Apr-17	11.5	11.5	9.4
04-Jan-17	9.9	10.0	17.2	04-Feb-17	23.3	22.7	22.5	04-Mar-17	9.4	9.8	8.7	04-Apr-17	11.1	11.0	8.6
05-Jan-17	10.8	11.0	8.6	05-Feb-17	22.8	15.9	12.4	05-Mar-17	6.0	6.9	5.0	05-Apr-17	9.6	9.2	8.6
06-Jan-17	10.4	10.5	11.4	06-Feb-17	19.9	19.4	15.0	06-Mar-17	11.8	11.8	10.3	06-Apr-17	8.4	10.5	6.8
07-Jan-17	9.7	9.7	7.3	07-Feb-17	28.8	28.1	28.5	07-Mar-17	18.2	17.2	15.9	07-Apr-17	8.8	8.1	10.5
08-Jan-17	14.9	20.0	19.5	08-Feb-17	11.8	11.0	12.3	08-Mar-17	14.9	13.6	11.6	08-Apr-17	9.9	9.5	7.4
09-Jan-17	23.8	26.6	24.1	09-Feb-17	17.0	20.8	17.6	09-Mar-17	16.5	15.2	11.6	09-Apr-17	11.3	10.6	8.3
10-Jan-17	31.2	33.6	29.8	10-Feb-17	24.1	26.3	16.6	10-Mar-17	23.4	21.4	24.5	10-Apr-17	44.9	43.5	35.3
11-Jan-17	22.1	26.7	20.2	11-Feb-17	32.0	33.5	24.0	11-Mar-17	18.9	17.0	18.6	11-Apr-17	20.8	18.8	20.4
12-Jan-17	31.3	33.2	30.5	12-Feb-17	43.3	51.3	39.9	12-Mar-17	21.7	19.9	12.9	12-Apr-17	14.6	13.9	15.1
13-Jan-17	22.6	24.2	24.0	13-Feb-17	24.9	23.3	60.2	13-Mar-17	27.2	25.7	10.3	13-Apr-17	13.6	12.2	9.4
14-Jan-17	22.4	25.3	20.6	14-Feb-17	21.2	20.4	9.6	14-Mar-17	15.0	16.7	4.6	14-Apr-17	19.9	16.4	15.3
15-Jan-17	17.6	17.3	19.0	15-Feb-17	16.4	15.2	33.4	15-Mar-17	10.0	9.8	5.5	15-Apr-17	20.1	17.2	15.1
16-Jan-17	24.4	25.8	26.2	16-Feb-17	29.7	38.5	25.2	16-Mar-17	6.8	8.0	4.6	16-Apr-17	24.8	22.4	21.7
17-Jan-17	19.3	23.0	24.6	17-Feb-17	29.3	39.7	53.5	17-Mar-17	14.5	14.8	6.7	17-Apr-17	24.7	21.4	22.2
18-Jan-17	23.2	24.2	21.6	18-Feb-17	20.7	24.2	22.1	18-Mar-17	13.2	14.8	no data	18-Apr-17	17.4	14.9	16.7
19-Jan-17	17.7	18.4	19.2	19-Feb-17	22.9	22.1	37.2	19-Mar-17	9.7	9.7	no data	19-Apr-17	18.2	15.0	18.1
20-Jan-17	24.3	35.0	21.3	20-Feb-17	14.8	16.1	21.8	20-Mar-17	17.6	18.8	no data	20-Apr-17	12.9	11.5	14.9
21-Jan-17	15.5	18.7	17.3	21-Feb-17	30.6	29.6	70.5	21-Mar-17	13.1	14.1	no data	21-Apr-17	20.1	20.1	17.0
22-Jan-17	21.6	22.1	19.1	22-Feb-17	32.2	39.3	33.0	22-Mar-17	12.6	13.1	no data	22-Apr-17	18.3	16.6	16.9
23-Jan-17	18.4	19.3	40.3	23-Feb-17	29.7	31.5	26.0	23-Mar-17	12.7	13.1	no data	23-Apr-17	10.5	11.0	8.8
24-Jan-17	22.1	24.3	28.3	24-Feb-17	38.8	38.5	28.7	24-Mar-17	7.7	8.9	no data	24-Apr-17	18.0	18.7	16.3
25-Jan-17	12.4	12.5	17.0	25-Feb-17	21.3	19.6	18.7	25-Mar-17	14.5	14.6	no data	25-Apr-17	17.7	17.2	15.2
26-Jan-17	13.3	13.3	10.2	26-Feb-17	16.7	18.2	16.8	26-Mar-17	19.4	20.0	no data	26-Apr-17	6.2	6.4	3.6
27-Jan-17	16.6	16.7	17.5	27-Feb-17	14.5	14.3	14.1	27-Mar-17	15.3	15.4	no data	27-Apr-17	9.9	7.8	5.4
28-Jan-17	17.0	18.8	29.7	28-Feb-17	11.1	11.8	9.9	28-Mar-17	21.7	21.9	14.0	28-Apr-17	15.4	14.2	20.3
29-Jan-17	15.4	17.4	39.9					29-Mar-17	19.0	19.0	18.8	29-Apr-17	12.2	9.7	9.2
30-Jan-17	18.0	19.0	25.5					30-Mar-17	7.7	8.3	9.6	30-Apr-17	14.3	14.0	12.9
31-Jan-17	19.3	21.3	39.3					31-Mar-17	14.0	13.6	12.1				

May 2017				June 2017				July 2017				August 2017			
SAMPLE DATE	SITE 1	SITE 2	SITE 3	SAMPLE DATE	SITE 1	SITE 2	SITE 3	SAMPLE DATE	SITE 7	SITE 8	SITE 3	SAMPLE DATE	SITE 7	SITE 8	SITE 3
01-May-17	12.6	12.4	10.0	01-Jun-17	16.8	15.4	12.7	01-Jul-17	9.3	24.6	7.9	01-Aug-17	8.7	40.1	17.7
02-May-17	19.9	17.9	10.6	02-Jun-17	16.4	13.6	22.3	02-Jul-17	6.5	44.5	12.3	02-Aug-17	11.7	23.4	8.6
03-May-17	24.8	22.2	15.7	03-Jun-17	21.8	21.6	no data	03-Jul-17	9.6	40.9	9.0	03-Aug-17	15.1	34.0	20.4
04-May-17	16.3	14.2	17.1	04-Jun-17	15.1	12.5	no data	04-Jul-17	8.0	66.4	6.6	04-Aug-17	4.3	32.0	21.7
05-May-17	16.0	14.1	11.2	05-Jun-17	10.2	9.7	12.2	05-Jul-17	6.1	47.9	no data	05-Aug-17	6.6	26.5	6.2
06-May-17	12.8	12.6	12.0	06-Jun-17	13.3	12.3	8.8	06-Jul-17	7.2	38.6	no data	06-Aug-17	7.2	38.6	4.6
07-May-17	12.8	13.1	11.4	07-Jun-17	9.2	9.5	11.5	07-Jul-17	9.2	147.0	no data	07-Aug-17	7.7	49.9	5.2
08-May-17	20.7	19.1	11.6	08-Jun-17	10.5	9.6	8.3	08-Jul-17	9.3	109.3	no data	08-Aug-17	7.6	67.4	6.0
09-May-17	19.8	21.2	15.7	09-Jun-17	9.9	9.3	8.7	09-Jul-17	8.7	44.7	no data	09-Aug-17	7.1	70.4	6.2
10-May-17	16.7	16.6	14.9	10-Jun-17	8.5	8.0	5.3	10-Jul-17	7.4	50.8	no data	10-Aug-17	7.7	99.9	5.8
11-May-17	21.2	24.4	14.2	11-Jun-17	9.7	9.0	10.6	11-Jul-17	14.7	29.7	11.1	11-Aug-17	14.5	146.4	7.1
12-May-17	29.7	28.0	22.0	12-Jun-17	13.7	14.4	18.6	12-Jul-17	15.7	34.9	15.7	12-Aug-17	9.3	51.7	9.4
13-May-17	16.9	19.3	25.2	13-Jun-17	16.6	15.4	16.9	13-Jul-17	7.8	44.4	10.9	13-Aug-17	17.7	24.6	9.1
14-May-17	18.0	18.0	21.1	14-Jun-17	14.2	13.9	12.2	14-Jul-17	9.8	98.2	9.0	14-Aug-17	13.2	92.4	8.3
15-May-17	13.1	13.0	15.9	15-Jun-17	6.9	6.9	6.8	15-Jul-17	6.9	29.7	7.8	15-Aug-17	16.2	127.7	10.8
16-May-17	12.7	12.5	12.1	16-Jun-17	15.8	14.4	16.5	16-Jul-17	10.8	23.7	8.7	16-Aug-17	16.6	278.0	18.7
17-May-17	19.2	20.6	13.9	17-Jun-17	19.7	19.2	18.9	17-Jul-17	8.6	46.5	8.9	17-Aug-17	10.4	113.4	17.4
18-May-17	20.8	20.8	16.2	18-Jun-17	19.1	17.4	17.0	18-Jul-17	9.1	98.2	7.7	18-Aug-17	16.2	57.2	9.2
19-May-17	14.3	14.1	17.5	19-Jun-17	21.1	21.4	19.1	19-Jul-17	8.2	81.2	7.0	19-Aug-17	10.8	19.3	9.8
20-May-17	8.4	7.7	9.9	20-Jun-17	13.9	12.0	11.2	20-Jul-17	8.6	no data	7.4	20-Aug-17	17.5	17.1	10.1
21-May-17	10.2	10.7	no data	21-Jun-17	11.8	12.7	10.9	21-Jul-17	15.3	33.3	12.1	21-Aug-17	14.8	32.6	12.3
22-May-17	16.7	15.2	no data	22-Jun-17	no data	12.4	13.4	22-Jul-17	9.5	50.4	11.4	22-Aug-17	22.2	48.7	15.9
23-May-17	10.1	10.7	no data	23-Jun-17	9.1	13.2	10.0	23-Jul-17	8.8	76.8	8.1	23-Aug-17	20.1	79.2	21.3
24-May-17	11.1	11.3	no data	24-Jun-17	10.7	10.9	10.4	24-Jul-17	11.7	194.2	8.2	24-Aug-17	18.6	59.5	20.0
25-May-17	12.0	10.4	no data	25-Jun-17	10.9	11.6	9.2	25-Jul-17	10.9	96.5	8.8	25-Aug-17	20.6	26.5	16.9
26-May-17	15.1	14.5	no data	26-Jun-17			7.1	26-Jul-17	13.3	181.2	11.9	26-Aug-17	11.9	40.5	
27-May-17	14.8	13.7	no data	27-Jun-17	No further data	No further data	16.0	27-Jul-17	13.3	41.1	11.9	27-Aug-17	10.7	66.4	
28-May-17	13.7	13.2	no data	28-Jun-17			15.1	28-Jul-17	12.4	56.0	17.7	28-Aug-17	14.3	14.7	No further data
29-May-17	7.0	7.1	no data	29-Jun-17			8.1	29-Jul-17	9.3	43.1	9.7	29-Aug-17	15.0	21.5	
30-May-17	7.6	7.8	4.0	30-Jun-17			6.2	30-Jul-17	12.5	84.9	13.0	30-Aug-17	17.0	39.1	
31-May-17	11.2	10.5	7.9					31-Jul-17	22.4	43.0	24.7	31-Aug-17	21.8	23.0	

September 2017				October 2017				November 2017				December 2017			
SAMPLE DATE	SITE 7	SITE 8	SITE 9	SAMPLE DATE	SITE 7	SITE 8	SITE 9	SAMPLE DATE	SITE 7	SITE 8	SITE 9	SAMPLE DATE	SITE 7	SITE 8	SITE 9
01-Sep-17	17.0	35.6	26.8	01-Oct-17	18.2	32.6	23.9	01-Nov-17	20.8	26.9	17.1	01-Dec-17	11.9	83.4	11.9
02-Sep-17	16.3	43.9	28.9	02-Oct-17	31.2	46.9	22.5	02-Nov-17	24.6	38.3	20.9	02-Dec-17	9.2	81.1	11.8
03-Sep-17	19.7	109.5	23.8	03-Oct-17	27.1	39.4	20.6	03-Nov-17	22.0	33.1	15.7	03-Dec-17	3.6	14.4	6.8
04-Sep-17	14.1	32.6	16.9	04-Oct-17	20.6	44.0	18.5	04-Nov-17	22.6	20.4	15.8	04-Dec-17	16.8	28.1	16.4
05-Sep-17	12.7	64.0	12.5	05-Oct-17	13.8	16.0	14.0	05-Nov-17	6.9	6.1	4.5	05-Dec-17	16.5	14.0	11.2
06-Sep-17	11.3	80.1	11.9	06-Oct-17	20.0	29.8	27.8	06-Nov-17	14.4	40.6	11.2	06-Dec-17	7.3	62.8	9.6
07-Sep-17	10.1	65.9	13.7	07-Oct-17	17.3	16.0	18.7	07-Nov-17	15.3	14.4	10.9	07-Dec-17	7.4	121.0	13.1
08-Sep-17	10.4	43.6	16.2	08-Oct-17	18.4	33.7	18.5	08-Nov-17	10.8	10.1	9.8	08-Dec-17	27.3	205.1	24.4
09-Sep-17	14.5	26.9	17.7	09-Oct-17	12.1	86.5	14.3	09-Nov-17	9.7	16.3	9.8	09-Dec-17	16.7	16.8	15.7
10-Sep-17	18.5	28.0	20.9	10-Oct-17	26.9	31.2	28.4	10-Nov-17	16.1	16.8	14.1	10-Dec-17	16.7	14.2	11.3
11-Sep-17	14.0	70.2	17.7	11-Oct-17	19.0	74.3	16.5	11-Nov-17	13.3	13.9	11.2	11-Dec-17	23.9	21.5	16.0
12-Sep-17	14.1	163.6	18.6	12-Oct-17	11.7	76.4	13.2	12-Nov-17	14.1	13.6	13.4	12-Dec-17	25.9	22.9	16.0
13-Sep-17	21.4	189.1	27.2	13-Oct-17	27.1	46.6	24.5	13-Nov-17	15.5	15.9	15.0	13-Dec-17	24.0	83.8	20.6
14-Sep-17	9.3	72.3	12.0	14-Oct-17	15.8	15.4	17.0	14-Nov-17	12.8	15.4	12.9	14-Dec-17	17.6	127.7	18.9
15-Sep-17	11.3	100.6	7.2	15-Oct-17	10.1	9.9	7.6	15-Nov-17	22.3	27.8	13.5	15-Dec-17	45.0	114.7	29.5
16-Sep-17	12.9	83.9	11.8	16-Oct-17	25.1	16.5	13.0	16-Nov-17	26.1	28.6	15.1	16-Dec-17	37.1	57.5	23.0
17-Sep-17	19.3	15.4	21.7	17-Oct-17	17.1	26.1	12.9	17-Nov-17	16.1	14.0	11.8	17-Dec-17	37.4	35.2	29.2
18-Sep-17	17.7	78.9	20.7	18-Oct-17	18.2	21.5	13.5	18-Nov-17	17.7	24.5	13.3	18-Dec-17	30.6	45.4	22.4
19-Sep-17	19.1	113.1	22.3	19-Oct-17	16.6	77.1	19.5	19-Nov-17	11.7	12.1	13.1	19-Dec-17	14.3	221.6	26.7
20-Sep-17	25.6	30.9	22.3	20-Oct-17	9.7	72.9	27.1	20-Nov-17	12.6	14.0	12.0	20-Dec-17	25.7	249.4	29.3
21-Sep-17	15.2	107.5	10.1	21-Oct-17	16.9	15.2	15.1	21-Nov-17	13.2	16.9	13.8	21-Dec-17	16.8	15.4	14.0
22-Sep-17	16.8	142.0	no data	22-Oct-17	11.0	16.0	9.8	22-Nov-17	11.1	13.9	13.6	22-Dec-17	10.6	12.0	10.9
23-Sep-17	24.6	91.2	21.4	23-Oct-17	9.8	8.8	8.2	23-Nov-17	13.3	43.7	11.9	23-Dec-17	17.0	55.0	17.1
24-Sep-17	34.9	72.9	33.0	24-Oct-17	10.2	27.1	9.5	24-Nov-17	15.9	38.7	12.1	24-Dec-17	24.6	67.2	17.6
25-Sep-17	24.1	87.2	27.3	25-Oct-17	10.7	145.0	13.1	25-Nov-17	26.7	29.3	20.2	25-Dec-17	17.5	13.0	13.3
26-Sep-17	22.4	54.9	27.3	26-Oct-17	18.8	64.0	18.2	26-Nov-17	19.3	15.4	12.5	26-Dec-17	11.4	11.1	8.8
27-Sep-17	40.2	37.6	30.5	27-Oct-17	13.4	27.5	12.9	27-Nov-17	15.4	22.7	14.9	27-Dec-17	11.1	10.5	10.2
28-Sep-17	28.4	108.6	28.8	28-Oct-17	14.5	24.0	9.3	28-Nov-17	17.5	17.8	17.7	28-Dec-17	14.7	17.9	11.0
29-Sep-17	10.0	66.3	17.5	29-Oct-17	11.2	51.2	9.3	29-Nov-17	9.7	15.3	11.1	29-Dec-17	19.0	80.8	16.3
30-Sep-17	11.8	77.4	22.6	30-Oct-17	15.2	154.3	19.0	30-Nov-17	11.6	22.4	10.5	30-Dec-17	12.0	57.2	20.7
				31-Oct-17	13.7	33.1	15.8					31-Dec-17	28.6	12.3	16.5

GAS MONITORING RESULTS – 1 HOUR SUMMARY

Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)
26/07/17	0	7.5	50	28/07/17	0	26.7	50	30/07/17	0	5.0	50	01/08/17	0	5.0	50	03/08/17	0	5.4	50	05/08/17	0	5.0	50	07/08/17	0	5.0	50
26/07/17	1	5.0	50	28/07/17	1	32.5	50	30/07/17	1	8.8	50	01/08/17	1	5.0	50	03/08/17	1	5.0	50	05/08/17	1	5.0	50	07/08/17	1	5.0	50
26/07/17	2	5.0	50	28/07/17	2	35.0	50	30/07/17	2	13.3	50	01/08/17	2	10.8	50	03/08/17	2	5.0	50	05/08/17	2	5.0	50	07/08/17	2	5.0	50
26/07/17	3	5.0	50	28/07/17	3	41.7	50	30/07/17	3	16.7	50	01/08/17	3	11.3	50	03/08/17	3	5.4	50	05/08/17	3	5.0	50	07/08/17	3	5.0	50
26/07/17	4	6.3	50	28/07/17	4	47.5	50	30/07/17	4	15.4	50	01/08/17	4	21.7	50	03/08/17	4	5.0	50	05/08/17	4	5.0	50	07/08/17	4	5.0	50
26/07/17	5	5.0	50	28/07/17	5	32.5	50	30/07/17	5	8.8	50	01/08/17	5	22.5	50	03/08/17	5	5.0	50	05/08/17	5	5.0	50	07/08/17	5	5.0	50
26/07/17	6	5.0	50	28/07/17	6	5.0	50	30/07/17	6	7.1	50	01/08/17	6	24.2	50	03/08/17	6	5.4	50	05/08/17	6	5.0	50	07/08/17	6	5.0	50
26/07/17	7	5.0	50	28/07/17	7	5.0	50	30/07/17	7	13.8	50	01/08/17	7	30.8	50	03/08/17	7	5.4	50	05/08/17	7	5.0	50	07/08/17	7	5.0	50
26/07/17	8	5.0	50	28/07/17	8	6.3	50	30/07/17	8	8.8	50	01/08/17	8	20.4	50	03/08/17	8	8.3	50	05/08/17	8	5.0	50	07/08/17	8	5.0	50
26/07/17	9	5.0	50	28/07/17	9	5.0	50	30/07/17	9	5.0	50	01/08/17	9	5.0	50	03/08/17	9	7.1	50	05/08/17	9	5.0	50	07/08/17	9	5.0	50
26/07/17	10	5.0	50	28/07/17	10	5.0	50	30/07/17	10	5.0	50	01/08/17	10	5.0	50	03/08/17	10	5.0	50	05/08/17	10	5.0	50	07/08/17	10	5.0	50
26/07/17	11	5.0	50	28/07/17	11	5.0	50	30/07/17	11	5.0	50	01/08/17	11	5.0	50	03/08/17	11	5.0	50	05/08/17	11	5.0	50	07/08/17	11	5.0	50
26/07/17	12	5.0	50	28/07/17	12	5.0	50	30/07/17	12	5.0	50	01/08/17	12	11.7	50	03/08/17	12	5.0	50	05/08/17	12	5.0	50	07/08/17	12	5.0	50
26/07/17	13	5.0	50	28/07/17	13	5.0	50	30/07/17	13	5.0	50	01/08/17	13	5.0	50	03/08/17	13	5.0	50	05/08/17	13	5.0	50	07/08/17	13	5.0	50
26/07/17	14	5.0	50	28/07/17	14	5.0	50	30/07/17	14	5.0	50	01/08/17	14	5.0	50	03/08/17	14	5.0	50	05/08/17	14	5.0	50	07/08/17	14	5.0	50
26/07/17	15	5.0	50	28/07/17	15	5.0	50	30/07/17	15	5.0	50	01/08/17	15	5.0	50	03/08/17	15	5.0	50	05/08/17	15	5.0	50	07/08/17	15	5.0	50
26/07/17	16	5.0	50	28/07/17	16	5.0	50	30/07/17	16	5.0	50	01/08/17	16	5.0	50	03/08/17	16	5.0	50	05/08/17	16	5.0	50	07/08/17	16	5.0	50
26/07/17	17	5.0	50	28/07/17	17	5.0	50	30/07/17	17	5.0	50	01/08/17	17	6.3	50	03/08/17	17	5.0	50	05/08/17	17	5.0	50	07/08/17	17	5.0	50
26/07/17	18	5.0	50	28/07/17	18	16.3	50	30/07/17	18	5.0	50	01/08/17	18	11.3	50	03/08/17	18	5.0	50	05/08/17	18	5.0	50	07/08/17	18	5.0	50
26/07/17	19	5.0	50	28/07/17	19	12.1	50	30/07/17	19	5.0	50	01/08/17	19	20.0	50	03/08/17	19	5.0	50	05/08/17	19	5.0	50	07/08/17	19	5.0	50
26/07/17	20	5.0	50	28/07/17	20	26.7	50	30/07/17	20	5.0	50	01/08/17	20	16.3	50	03/08/17	20	5.0	50	05/08/17	20	5.0	50	07/08/17	20	5.0	50
26/07/17	21	15.4	50	28/07/17	21	30.8	50	30/07/17	21	5.0	50	01/08/17	21	25.0	50	03/08/17	21	5.0	50	05/08/17	21	5.0	50	07/08/17	21	5.0	50
26/07/17	22	13.3	50	28/07/17	22	37.5	50	30/07/17	22	5.0	50	01/08/17	22	23.6	50	03/08/17	22	5.0	50	05/08/17	22	5.0	50	07/08/17	22	5.0	50
26/07/17	23	16.7	50	28/07/17	23	37.5	50	30/07/17	23	5.0	50	01/08/17	23	No Data	No Data	03/08/17	23	5.0	50	05/08/17	23	5.0	50	07/08/17	23	5.0	50
27/07/17	0	20.8	50	29/07/17	0	36.7	50	31/07/17	0	5.0	50	02/08/17	0	No Data	No Data	04/08/17	0	5.0	50	06/08/17	0	5.0	50	08/08/17	0	5.0	50
27/07/17	1	25.8	50	29/07/17	1	40.0	50	31/07/17	1	5.0	50	02/08/17	1	No Data	No Data	04/08/17	1	5.0	50	06/08/17	1	5.0	50	08/08/17	1	5.0	50
27/07/17	2	27.5	50	29/07/17	2	39.2	50	31/07/17	2	6.7	50	02/08/17	2	No Data	No Data	04/08/17	2	5.0	50	06/08/17	2	5.0	50	08/08/17	2	5.0	50
27/07/17	3	32.5	50	29/07/17	3	40.8	50	31/07/17	3	8.3	50	02/08/17	3	No Data	No Data	04/08/17	3	5.0	50	06/08/17	3	5.0	50	08/08/17	3	5.0	50
27/07/17	4	32.5	50	29/07/17	4	45.8	50	31/07/17	4	6.3	50	02/08/17	4	No Data	No Data	04/08/17	4	5.0	50	06/08/17	4	5.0	50	08/08/17	4	5.0	50
27/07/17	5	33.3	50	29/07/17	5	58.3	50	31/07/17	5	5.0	50	02/08/17	5	No Data	No Data	04/08/17	5	5.0	50	06/08/17	5	5.0	50	08/08/17	5	5.0	50
27/07/17	6	37.5	50	29/07/17	6	68.3	50	31/07/17	6	5.4	50	02/08/17	6	No Data	No Data	04/08/17	6	5.0	50	06/08/17	6	5.0	50	08/08/17	6	5.0	50
27/07/17	7	42.5	50	29/07/17	7	75.8	50	31/07/17	7	5.4	50	02/08/17	7	No Data	No Data	04/08/17	7	5.0	50	06/08/17	7	5.0	50	08/08/17	7	5.0	50
27/07/17	8	25.0	50	29/07/17	8	50.8	50	31/07/17	8	5.0	50	02/08/17	8	No Data	No Data	04/08/17	8	5.0	50	06/08/17	8	5.0	50	08/08/17	8	5.0	50
27/07/17	9	5.0	50	29/07/17	9	7.1	50	31/07/17	9	7.5	50	02/08/17	9	No Data	No Data	04/08/17	9	5.0	50	06/08/17	9	5.0	50	08/08/17	9	5.0	50
27/07/17	10	5.0	50	29/07/17	10	5.0	50	31/07/17	10	5.4	50	02/08/17	10	No Data	No Data	04/08/17	10	5.0	50	06/08/17	10	5.0	50	08/08/17	10	5.0	50
27/07/17	11	5.0	50	29/07/17	11	5.0	50	31/07/17	11	5.0	50	02/08/17	11	No Data	No Data	04/08/17	11	5.0	50	06/08/17	11	5.0	50	08/08/17	11	8.8	50
27/07/17	12	5.0	50	29/07/17	12	5.0	50	31/07/17	12	5.0	50	02/08/17	12	5.0	50	04/08/17	12	5.0	50	06/08/17	12	5.0	50	08/08/17	12	5.0	50
27/07/17	13	5.0	50	29/07/17	13	5.0	50	31/07/17	13	5.0	50	02/08/17	13	5.0	50	04/08/17	13	5.0	50	06/08/17	13	5.0	50	08/08/17	13	5.0	50
27/07/17	14	5.0	50	29/07/17	14	5.0	50	31/07/17	14	5.0	50	02/08/17	14	5.0	50	04/08/17	14	5.0	50	06/08/17	14	5.0	50	08/08/17	14	5.0	50
27/07/17	15	5.0	50	29/07/17	15	5.0	50	31/07/17	15	5.4	50	02/08/17	15	5.0	50	04/08/17	15	5.4	50	06/08/17	15	5.0	50	08/08/17	15	5.0	50
27/07/17	16	5.0	50	29/07/17	16	5.0	50	31/07/17	16	5.0	50	02/08/17	16	5.0	50	04/08/17	16	5.0	50	06/08/17	16	5.0	50	08/08/17	16	5.0	50
27/07/17	17	5.0	50	29/07/17	17	5.0	50	31/07/17	17	5.0	50	02/08/17	17	5.0	50	04/08/17	17	5.0	50	06/08/17	17	5.0	50	08/08/17	17	5.0	50
27/07/17	18	8.8	50	29/07/17	18	6.3	50	31/07/17	18	5.0	50	02/08/17	18	5.0	50	04/08/17	18	5.0	50	06/08/17	18	5.0	50	08/08/17	18	15.4	50
27/07/17	19	12.5	50	29/07/17	19	12.1	50	31/07/17	19	5.0	50	02/08/17	19	5.0	50	04/08/17	19	5.0	50	06/08/17	19	5.0	50	08/08/17	19	5.4	50
27/07/17	20	15.8	50	29/07/17	20	7.1	50	31/07/17	20	5.0	50	02/08/17	20	5.0	50	04/08/17	20	5.0	50	06/08/17	20	5.0	50	08/08/17	20	5.0	50
27/07/17	21	16.7	50	29/07/17	21	5.0	50	31/07/17	21	5.0	50	02/08/17	21	5.0	50	04/08/17	21	5.0	50	06/08/17	21	5.0	50	08/08/17	21	5.0	50
27/07/17	22	20.8	50	29/07/17	22	5.0	50	31/07/17	22	5.0	50	02/08/17	22	5.0	50	04/08/17	22	5.0	50	06/08/17	22	5.0	50	08/08/17	22	5.0	50
27/07/17	23	22.5	50	29/07/17	23	5.0	50	31/07/17	23	5.0	50	02/08/17	23	5.0	50	04/08/17	23	5.0	50	06/08/17	23	5.0	50	08/08/17	23	5.0	50

MUSWELLBROOK COAL COMPANY LIMITED

Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)	Date	Hour	H₂S 1hr Average (ppb)	SO₂ 1hr Average (ppb)
09/08/17	0	5.0	50	11/08/17	0	5.0	50	13/08/17	0	5.0	50	15/08/17	0	5.0	50	17/08/17	0	5.0	50	19/08/17	0	5.0	50	21/08/17	0	5.0	50
09/08/17	1	5.0	50	11/08/17	1	5.0	50	13/08/17	1	5.0	50	15/08/17	1	5.0	50	17/08/17	1	5.0	50	19/08/17	1	5.0	50	21/08/17	1	5.4	50
09/08/17	2	5.0	50	11/08/17	2	5.0	50	13/08/17	2	5.0	50	15/08/17	2	5.0	50	17/08/17	2	5.0	50	19/08/17	2	5.0	50	21/08/17	2	5.0	50
09/08/17	3	5.4	50	11/08/17	3	5.0	50	13/08/17	3	5.0	50	15/08/17	3	5.0	50	17/08/17	3	5.0	50	19/08/17	3	5.0	50	21/08/17	3	5.0	50
09/08/17	4	5.0	50	11/08/17	4	5.0	50	13/08/17	4	5.0	50	15/08/17	4	5.0	50	17/08/17	4	5.0	50	19/08/17	4	5.0	50	21/08/17	4	5.0	50
09/08/17	5	5.0	50	11/08/17	5	5.0	50	13/08/17	5	5.0	50	15/08/17	5	5.0	50	17/08/17	5	5.0	50	19/08/17	5	5.0	50	21/08/17	5	5.0	50
09/08/17	6	5.0	50	11/08/17	6	5.0	50	13/08/17	6	5.4	50	15/08/17	6	5.0	50	17/08/17	6	5.0	50	19/08/17	6	5.0	50	21/08/17	6	5.0	50
09/08/17	7	5.0	50	11/08/17	7	5.0	50	13/08/17	7	5.8	50	15/08/17	7	5.0	50	17/08/17	7	7.5	50	19/08/17	7	5.8	50	21/08/17	7	5.0	50
09/08/17	8	5.0	50	11/08/17	8	5.0	50	13/08/17	8	5.4	50	15/08/17	8	5.0	50	17/08/17	8	5.0	50	19/08/17	8	5.0	50	21/08/17	8	5.0	50
09/08/17	9	5.0	50	11/08/17	9	5.0	50	13/08/17	9	5.0	50	15/08/17	9	5.0	50	17/08/17	9	5.0	50	19/08/17	9	5.0	50	21/08/17	9	5.4	50
09/08/17	10	5.0	50	11/08/17	10	5.0	50	13/08/17	10	5.0	50	15/08/17	10	5.0	50	17/08/17	10	5.0	50	19/08/17	10	5.0	50	21/08/17	10	5.0	50
09/08/17	11	5.0	50	11/08/17	11	5.0	50	13/08/17	11	5.0	50	15/08/17	11	5.0	50	17/08/17	11	5.0	50	19/08/17	11	5.0	50	21/08/17	11	5.0	50
09/08/17	12	5.0	50	11/08/17	12	5.0	50	13/08/17	12	5.0	50	15/08/17	12	5.0	50	17/08/17	12	5.0	50	19/08/17	12	5.0	50	21/08/17	12	5.0	50
09/08/17	13	5.0	50	11/08/17	13	5.0	50	13/08/17	13	5.0	50	15/08/17	13	5.0	50	17/08/17	13	5.0	50	19/08/17	13	5.0	50	21/08/17	13	5.0	50
09/08/17	14	5.0	50	11/08/17	14	5.0	50	13/08/17	14	5.0	50	15/08/17	14	5.0	50	17/08/17	14	5.0	50	19/08/17	14	5.0	50	21/08/17	14	5.0	50
09/08/17	15	5.0	50	11/08/17	15	5.0	50	13/08/17	15	5.0	50	15/08/17	15	5.0	50	17/08/17	15	5.0	50	19/08/17	15	5.0	50	21/08/17	15	5.0	50
09/08/17	16	5.0	50	11/08/17	16	5.0	50	13/08/17	16	5.0	50	15/08/17	16	5.0	50	17/08/17	16	5.0	50	19/08/17	16	5.0	50	21/08/17	16	5.0	50
09/08/17	17	5.0	50	11/08/17	17	5.0	50	13/08/17	17	5.0	50	15/08/17	17	5.0	50	17/08/17	17	5.0	50	19/08/17	17	5.0	50	21/08/17	17	5.0	50
09/08/17	18	5.0	50	11/08/17	18	5.0	50	13/08/17	18	5.0	50	15/08/17	18	5.0	50	17/08/17	18	5.0	50	19/08/17	18	5.0	50	21/08/17	18	5.0	50
09/08/17	19	5.0	50	11/08/17	19	5.0	50	13/08/17	19	5.0	50	15/08/17	19	5.0	50	17/08/17	19	6.3	50	19/08/17	19	5.0	50	21/08/17	19	5.0	50
09/08/17	20	7.1	50	11/08/17	20	5.0	50	13/08/17	20	5.0	50	15/08/17	20	5.0	50	17/08/17	20	5.0	50	19/08/17	20	5.0	50	21/08/17	20	5.0	50
09/08/17	21	5.0	50	11/08/17	21	5.0	50	13/08/17	21	5.0	50	15/08/17	21	5.0	50	17/08/17	21	5.0	50	19/08/17	21	5.0	50	21/08/17	21	5.0	50
09/08/17	22	5.0	50	11/08/17	22	5.0	50	13/08/17	22	5.0	50	15/08/17	22	5.0	50	17/08/17	22	5.0	50	19/08/17	22	5.0	50	21/08/17	22	5.0	50
09/08/17	23	5.0	50	11/08/17	23	5.0	50	13/08/17	23	5.0	50	15/08/17	23	5.0	50	17/08/17	23	5.0	50	19/08/17	23	5.0	50	21/08/17	23	5.0	50
10/08/17	0	5.0	50	12/08/17	0	5.0	50	14/08/17	0	5.0	50	16/08/17	0	5.0	50	18/08/17	0	5.0	50	20/08/17	0	5.0	50	22/08/17	0	5.0	50
10/08/17	1	5.0	50	12/08/17	1	5.0	50	14/08/17	1	5.4	50	16/08/17	1	5.0	50	18/08/17	1	5.0	50	20/08/17	1	5.4	50	22/08/17	1	5.0	50
10/08/17	2	6.3	50	12/08/17	2	5.0	50	14/08/17	2	6.7	50	16/08/17	2	5.0	50	18/08/17	2	5.0	50	20/08/17	2	5.8	50	22/08/17	2	5.0	50
10/08/17	3	6.3	50	12/08/17	3	5.0	50	14/08/17	3	6.3	50	16/08/17	3	5.0	50	18/08/17	3	5.0	50	20/08/17	3	5.4	50	22/08/17	3	5.0	50
10/08/17	4	5.4	50	12/08/17	4	5.0	50	14/08/17	4	5.4	50	16/08/17	4	5.0	50	18/08/17	4	5.0	50	20/08/17	4	5.4	50	22/08/17	4	5.0	50
10/08/17	5	6.3	50	12/08/17	5	7.9	50	14/08/17	5	6.7	50	16/08/17	5	5.0	50	18/08/17	5	5.0	50	20/08/17	5	6.7	50	22/08/17	5	5.0	50
10/08/17	6	7.5	50	12/08/17	6	5.0	50	14/08/17	6	6.7	50	16/08/17	6	5.0	50	18/08/17	6	5.0	50	20/08/17	6	7.5	50	22/08/17	6	5.0	50
10/08/17	7	9.2	50	12/08/17	7	5.0	50	14/08/17	7	10.8	50	16/08/17	7	5.0	50	18/08/17	7	5.0	50	20/08/17	7	11.7	50	22/08/17	7	5.4	50
10/08/17	8	10.0	50	12/08/17	8	5.0	50	14/08/17	8	12.9	50	16/08/17	8	5.0	50	18/08/17	8	5.0	50	20/08/17	8	5.8	50	22/08/17	8	5.0	50
10/08/17	9	5.0	50	12/08/17	9	5.0	50	14/08/17	9	5.0	50	16/08/17	9	5.0	50	18/08/17	9	5.4	50	20/08/17	9	5.0	50	22/08/17	9	5.0	50
10/08/17	10	5.0	50	12/08/17	10	5.0	50	14/08/17	10	5.0	50	16/08/17	10	5.0	50	18/08/17	10	5.0	50	20/08/17	10	5.0	50	22/08/17	10	5.0	50
10/08/17	11	5.0	50	12/08/17	11	5.0	50	14/08/17	11	5.0	50	16/08/17	11	5.0	50	18/08/17	11	5.0	50	20/08/17	11	5.0	50	22/08/17	11	5.0	50
10/08/17	12	5.0	50	12/08/17	12	5.0	50	14/08/17	12	5.0	50	16/08/17	12	5.0	50	18/08/17	12	5.0	50	20/08/17	12	5.0	50	22/08/17	12	5.0	50
10/08/17	13	5.0	50	12/08/17	13	5.0	50	14/08/17	13	5.0	50	16/08/17	13	5.0	50	18/08/17	13	5.0	50	20/08/17	13	5.0	50	22/08/17	13	5.0	50
10/08/17	14	5.0	50	12/08/17	14	5.0	50	14/08/17	14	5.0	50	16/08/17	14	5.0	50	18/08/17	14	5.0	50	20/08/17	14	5.0	50	22/08/17	14	5.0	50
10/08/17	15	5.0	50	12/08/17	15	5.0	50	14/08/17	15	5.0	50	16/08/17	15	5.0	50	18/08/17	15	5.0	50	20/08/17	15	5.4	50	22/08/17	15	5.0	50
10/08/17	16	5.0	50	12/08/17	16	5.0	50	14/08/17	16	5.0	50	16/08/17	16	5.0	50	18/08/17	16	5.0	50	20/08/17	16	5.0	50	22/08/17	16	5.0	50
10/08/17	17	5.0	50	12/08/17	17	5.0	50	14/08/17	17	5.0	50	16/08/17	17	5.0	50	18/08/17	17	5.4	50	20/08/17	17	5.0	50	22/08/17	17	5.0	50
10/08/17	18	5.0	50	12/08/17	18	5.0	50	14/08/17	18	5.0	50	16/08/17	18	5.0	50	18/08/17	18	5.4	50	20/08/17	18	5.4	50	22/08/17	18	5.0	50
10/08/17	19	5.0	50	12/08/17	19	5.0	50	14/08/17	19	5.0	50	16/08/17	19	5.0	50	18/08/17	19	5.0	50	20/08/17	19	5.0	50	22/08/17	19	5.8	50
10/08/17	20	5.0	50	12/08/17	20	5.0	50	14/08/17	20	5.0	50	16/08/17	20	5.0	50	18/08/17	20	5.0	50	20/08/17	20	5.0	50	22/08/17	20	5.8	50
10/08/17	21	5.0	50	12/08/17	21	5.0	50	14/08/17	21	5.0	50	16/08/17	21	5.0	50	18/08/17	21	5.0	50	20/08/17	21	5.4	50	22/08/17	21	5.0	50
10/08/17	22	5.0	50	12/08/17	22	5.0	50	14/08/17	22	5.0	50	16/08/17	22	5.0	50	18/08/17	22	5.0	50	20/08/17	22	5.4	50	22/08/17	22	5.0	50
10/08/17	23	5.0	50	12/08/17	23	5.0	50	14/08/17	23	5.0	50	16/08/17	23	5.0	50	18/08/17	23	5.0	50	20/08/17	23	5.4	50	22/08/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
23/08/17	0	5.0	50	25/08/17	0	5.0	50	27/08/17	0	5.0	50	29/08/17	0	5.0	50	31/08/17	0	5.0	50	02/09/17	0	56.7	50	04/09/17	0	5.0	50
23/08/17	1	5.0	50	25/08/17	1	5.0	50	27/08/17	1	5.0	50	29/08/17	1	5.0	50	31/08/17	1	5.0	50	02/09/17	1	60.8	50	04/09/17	1	5.0	50
23/08/17	2	5.0	50	25/08/17	2	5.0	50	27/08/17	2	5.0	50	29/08/17	2	5.0	50	31/08/17	2	5.0	50	02/09/17	2	64.2	50	04/09/17	2	5.0	50
23/08/17	3	5.0	50	25/08/17	3	5.0	50	27/08/17	3	5.0	50	29/08/17	3	5.0	50	31/08/17	3	5.0	50	02/09/17	3	68.3	50	04/09/17	3	5.0	50
23/08/17	4	5.0	50	25/08/17	4	5.0	50	27/08/17	4	5.0	50	29/08/17	4	5.0	50	31/08/17	4	5.0	50	02/09/17	4	65.8	50	04/09/17	4	5.0	50
23/08/17	5	5.0	50	25/08/17	5	5.0	50	27/08/17	5	5.0	50	29/08/17	5	5.8	50	31/08/17	5	5.0	50	02/09/17	5	76.7	50	04/09/17	5	5.0	50
23/08/17	6	5.0	50	25/08/17	6	5.0	50	27/08/17	6	5.0	50	29/08/17	6	14.2	50	31/08/17	6	No Data	No Data	02/09/17	6	95.8	50	04/09/17	6	5.0	50
23/08/17	7	5.8	50	25/08/17	7	5.0	50	27/08/17	7	5.4	50	29/08/17	7	22.5	50	31/08/17	7	No Data	No Data	02/09/17	7	59.2	50	04/09/17	7	5.0	50
23/08/17	8	15.8	50	25/08/17	8	5.0	50	27/08/17	8	5.0	50	29/08/17	8	5.0	50	31/08/17	8	No Data	No Data	02/09/17	8	20.4	50	04/09/17	8	5.0	50
23/08/17	9	5.0	50	25/08/17	9	5.0	50	27/08/17	9	5.0	50	29/08/17	9	5.0	50	31/08/17	9	No Data	No Data	02/09/17	9	5.0	50	04/09/17	9	5.0	50
23/08/17	10	5.0	50	25/08/17	10	6.3	50	27/08/17	10	5.0	50	29/08/17	10	5.0	50	31/08/17	10	No Data	No Data	02/09/17	10	5.0	50	04/09/17	10	5.0	50
23/08/17	11	5.0	50	25/08/17	11	5.0	50	27/08/17	11	5.0	50	29/08/17	11	5.0	50	31/08/17	11	No Data	No Data	02/09/17	11	5.0	50	04/09/17	11	5.0	50
23/08/17	12	5.4	50	25/08/17	12	5.0	50	27/08/17	12	5.0	50	29/08/17	12	5.0	50	31/08/17	12	5.0	50	02/09/17	12	5.0	50	04/09/17	12	5.0	50
23/08/17	13	5.0	50	25/08/17	13	5.0	50	27/08/17	13	5.0	50	29/08/17	13	5.0	50	31/08/17	13	5.0	50	02/09/17	13	5.0	50	04/09/17	13	5.0	50
23/08/17	14	5.0	50	25/08/17	14	5.0	50	27/08/17	14	5.0	50	29/08/17	14	5.0	50	31/08/17	14	5.0	50	02/09/17	14	5.0	50	04/09/17	14	5.0	50
23/08/17	15	5.0	50	25/08/17	15	5.0	50	27/08/17	15	5.0	50	29/08/17	15	5.0	50	31/08/17	15	5.0	50	02/09/17	15	5.0	50	04/09/17	15	5.0	50
23/08/17	16	5.0	50	25/08/17	16	5.0	50	27/08/17	16	5.0	50	29/08/17	16	5.0	50	31/08/17	16	5.0	50	02/09/17	16	5.0	50	04/09/17	16	5.0	50
23/08/17	17	5.0	50	25/08/17	17	5.0	50	27/08/17	17	5.0	50	29/08/17	17	5.0	50	31/08/17	17	5.0	50	02/09/17	17	6.7	50	04/09/17	17	5.0	50
23/08/17	18	5.0	50	25/08/17	18	5.0	50	27/08/17	18	5.0	50	29/08/17	18	5.0	50	31/08/17	18	5.0	50	02/09/17	18	5.8	50	04/09/17	18	5.0	50
23/08/17	19	5.0	50	25/08/17	19	5.0	50	27/08/17	19	5.0	50	29/08/17	19	5.0	50	31/08/17	19	5.0	50	02/09/17	19	8.3	50	04/09/17	19	5.0	50
23/08/17	20	5.0	50	25/08/17	20	5.0	50	27/08/17	20	5.0	50	29/08/17	20	5.0	50	31/08/17	20	5.0	50	02/09/17	20	7.5	50	04/09/17	20	5.0	50
23/08/17	21	5.0	50	25/08/17	21	5.4	50	27/08/17	21	5.0	50	29/08/17	21	5.0	50	31/08/17	21	5.0	50	02/09/17	21	11.7	50	04/09/17	21	5.0	50
23/08/17	22	5.0	50	25/08/17	22	5.0	50	27/08/17	22	5.0	50	29/08/17	22	5.0	50	31/08/17	22	5.4	50	02/09/17	22	16.7	50	04/09/17	22	5.0	50
23/08/17	23	5.0	50	25/08/17	23	5.0	50	27/08/17	23	5.0	50	29/08/17	23	5.0	50	31/08/17	23	8.3	50	02/09/17	23	21.7	50	04/09/17	23	5.0	50
24/08/17	0	5.0	50	26/08/17	0	5.0	50	28/08/17	0	5.0	50	30/08/17	0	5.0	50	01/09/17	0	5.0	50	03/09/17	0	30.8	50	05/09/17	0	5.0	50
24/08/17	1	5.0	50	26/08/17	1	5.0	50	28/08/17	1	5.0	50	30/08/17	1	5.0	50	01/09/17	1	5.4	50	03/09/17	1	42.5	50	05/09/17	1	5.0	50
24/08/17	2	5.0	50	26/08/17	2	5.0	50	28/08/17	2	5.0	50	30/08/17	2	5.0	50	01/09/17	2	5.0	50	03/09/17	2	50.0	50	05/09/17	2	5.0	50
24/08/17	3	5.0	50	26/08/17	3	5.0	50	28/08/17	3	5.0	50	30/08/17	3	5.0	50	01/09/17	3	5.5	50	03/09/17	3	49.2	50	05/09/17	3	5.0	50
24/08/17	4	5.0	50	26/08/17	4	5.0	50	28/08/17	4	5.0	50	30/08/17	4	5.0	50	01/09/17	4	No Data	No Data	03/09/17	4	45.0	50	05/09/17	4	5.0	50
24/08/17	5	5.0	50	26/08/17	5	5.8	50	28/08/17	5	5.8	50	30/08/17	5	5.0	50	01/09/17	5	No Data	No Data	03/09/17	5	47.5	50	05/09/17	5	5.0	50
24/08/17	6	6.3	50	26/08/17	6	5.4	50	28/08/17	6	7.1	50	30/08/17	6	5.8	50	01/09/17	6	No Data	No Data	03/09/17	6	52.5	50	05/09/17	6	5.0	50
24/08/17	7	8.8	50	26/08/17	7	12.1	50	28/08/17	7	5.0	50	30/08/17	7	5.8	50	01/09/17	7	No Data	No Data	03/09/17	7	17.5	50	05/09/17	7	5.0	50
24/08/17	8	5.0	50	26/08/17	8	27.1	50	28/08/17	8	5.0	50	30/08/17	8	5.8	50	01/09/17	8	No Data	No Data	03/09/17	8	7.5	50	05/09/17	8	5.0	50
24/08/17	9	5.0	50	26/08/17	9	5.0	50	28/08/17	9	5.0	50	30/08/17	9	5.0	50	01/09/17	9	No Data	No Data	03/09/17	9	5.0	50	05/09/17	9	5.0	50
24/08/17	10	5.0	50	26/08/17	10	5.0	50	28/08/17	10	5.0	50	30/08/17	10	5.0	50	01/09/17	10	No Data	No Data	03/09/17	10	5.0	50	05/09/17	10	5.4	50
24/08/17	11	5.0	50	26/08/17	11	5.0	50	28/08/17	11	5.4	50	30/08/17	11	5.0	50	01/09/17	11	No Data	No Data	03/09/17	11	5.0	50	05/09/17	11	5.0	50
24/08/17	12	5.0	50	26/08/17	12	5.0	50	28/08/17	12	5.0	50	30/08/17	12	5.0	50	01/09/17	12	15.6	50	03/09/17	12	5.0	50	05/09/17	12	5.0	50
24/08/17	13	5.0	50	26/08/17	13	5.0	50	28/08/17	13	5.0	50	30/08/17	13	5.0	50	01/09/17	13	5.0	50	03/09/17	13	5.0	50	05/09/17	13	5.0	50
24/08/17	14	5.0	50	26/08/17	14	5.0	50	28/08/17	14	5.0	50	30/08/17	14	5.0	50	01/09/17	14	5.6	50	03/09/17	14	5.0	50	05/09/17	14	5.0	50
24/08/17	15	5.0	50	26/08/17	15	5.0	50	28/08/17	15	5.0	50	30/08/17	15	5.0	50	01/09/17	15	5.0	50	03/09/17	15	5.0	50	05/09/17	15	5.0	50
24/08/17	16	5.0	50	26/08/17	16	5.0	50	28/08/17	16	5.0	50	30/08/17	16	5.0	50	01/09/17	16	5.0	50	03/09/17	16	5.0	50	05/09/17	16	5.0	50
24/08/17	17	5.0	50	26/08/17	17	5.0	50	28/08/17	17	5.0	50	30/08/17	17	5.0	50	01/09/17	17	5.0	50	03/09/17	17	5.0	50	05/09/17	17	5.0	50
24/08/17	18	5.0	50	26/08/17	18	5.0	50	28/08/17	18	5.0	50	30/08/17	18	5.0	50	01/09/17	18	19.2	50	03/09/17	18	5.0	50	05/09/17	18	5.0	50
24/08/17	19	5.0	50	26/08/17	19	5.0	50	28/08/17	19	5.4	50	30/08/17	19	5.0	50	01/09/17	19	27.5	50	03/09/17	19	34.6	50	05/09/17	19	5.0	50
24/08/17	20	5.0	50	26/08/17	20	5.0	50	28/08/17	20	5.0	50	30/08/17	20	5.0	50	01/09/17	20	30.0	50	03/09/17	20	5.0	50	05/09/17	20	5.0	50
24/08/17	21	5.0	50	26/08/17	21	5.0	50	28/08/17	21	5.0	50	30/08/17	21	5.0	50	01/09/17	21	30.8	50	03/09/17	21	5.0	50	05/09/17	21	5.0	50
24/08/17	22	5.0	50	26/08/17	22	5.0	50	28/08/17	22	5.0	50	30/08/17	22	5.0	50	01/09/17	22	45.8	50	03/09/17	22	5.0	50	05/09/17	22	5.0	50
24/08/17	23	5.0	50	26/08/17	23	5.0	50	28/08/17	23	5.0	50	30/08/17	23	5.0	50	01/09/17	23	50.0	50	03/09/17	23	5.0	50	05/09/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
06/09/17	0	5.0	50	08/09/17	0	5.0	50	10/09/17	0	6.7	50	12/09/17	0	5.0	50	14/09/17	0	5.0	50	16/09/17	0	5.0	50	18/09/17	0	5.4	50
06/09/17	1	5.0	50	08/09/17	1	5.0	50	10/09/17	1	5.0	50	12/09/17	1	5.0	50	14/09/17	1	5.0	50	16/09/17	1	5.0	50	18/09/17	1	5.0	50
06/09/17	2	5.0	50	08/09/17	2	5.4	50	10/09/17	2	5.4	50	12/09/17	2	5.0	50	14/09/17	2	9.2	50	16/09/17	2	5.0	50	18/09/17	2	5.0	50
06/09/17	3	5.0	50	08/09/17	3	5.0	50	10/09/17	3	5.0	50	12/09/17	3	5.0	50	14/09/17	3	5.4	50	16/09/17	3	5.0	50	18/09/17	3	5.0	50
06/09/17	4	5.0	50	08/09/17	4	5.0	50	10/09/17	4	5.0	50	12/09/17	4	5.0	50	14/09/17	4	5.0	50	16/09/17	4	5.0	50	18/09/17	4	5.4	50
06/09/17	5	5.0	50	08/09/17	5	5.0	50	10/09/17	5	5.4	50	12/09/17	5	5.0	50	14/09/17	5	5.0	50	16/09/17	5	5.0	50	18/09/17	5	5.0	50
06/09/17	6	5.0	50	08/09/17	6	5.0	50	10/09/17	6	5.0	50	12/09/17	6	6.7	50	14/09/17	6	5.0	50	16/09/17	6	5.0	50	18/09/17	6	8.3	50
06/09/17	7	5.0	50	08/09/17	7	5.0	50	10/09/17	7	5.0	50	12/09/17	7	5.0	50	14/09/17	7	5.0	50	16/09/17	7	5.0	50	18/09/17	7	5.4	50
06/09/17	8	5.0	50	08/09/17	8	5.0	50	10/09/17	8	6.7	50	12/09/17	8	5.0	50	14/09/17	8	5.0	50	16/09/17	8	5.0	50	18/09/17	8	5.4	50
06/09/17	9	5.0	50	08/09/17	9	5.0	50	10/09/17	9	5.4	50	12/09/17	9	5.0	50	14/09/17	9	5.0	50	16/09/17	9	5.0	50	18/09/17	9	5.0	50
06/09/17	10	5.0	50	08/09/17	10	5.0	50	10/09/17	10	5.0	50	12/09/17	10	5.0	50	14/09/17	10	5.4	50	16/09/17	10	5.4	50	18/09/17	10	5.0	50
06/09/17	11	5.0	50	08/09/17	11	5.0	50	10/09/17	11	5.0	50	12/09/17	11	5.0	50	14/09/17	11	5.4	50	16/09/17	11	5.0	50	18/09/17	11	5.0	50
06/09/17	12	5.0	50	08/09/17	12	5.0	50	10/09/17	12	5.0	50	12/09/17	12	5.0	50	14/09/17	12	5.4	50	16/09/17	12	5.0	50	18/09/17	12	5.0	50
06/09/17	13	5.0	50	08/09/17	13	5.0	50	10/09/17	13	5.0	50	12/09/17	13	5.0	50	14/09/17	13	5.0	50	16/09/17	13	5.0	50	18/09/17	13	5.0	50
06/09/17	14	5.0	50	08/09/17	14	5.0	50	10/09/17	14	5.0	50	12/09/17	14	5.0	50	14/09/17	14	5.0	50	16/09/17	14	5.0	50	18/09/17	14	5.0	50
06/09/17	15	5.0	50	08/09/17	15	5.0	50	10/09/17	15	5.0	50	12/09/17	15	5.0	50	14/09/17	15	5.0	50	16/09/17	15	5.0	50	18/09/17	15	5.0	50
06/09/17	16	5.0	50	08/09/17	16	5.0	50	10/09/17	16	5.0	50	12/09/17	16	5.0	50	14/09/17	16	5.0	50	16/09/17	16	5.0	50	18/09/17	16	5.0	50
06/09/17	17	5.0	50	08/09/17	17	5.0	50	10/09/17	17	5.0	50	12/09/17	17	5.0	50	14/09/17	17	5.0	50	16/09/17	17	5.0	50	18/09/17	17	5.0	50
06/09/17	18	5.0	50	08/09/17	18	5.0	50	10/09/17	18	5.0	50	12/09/17	18	5.0	50	14/09/17	18	5.0	50	16/09/17	18	5.0	50	18/09/17	18	5.0	50
06/09/17	19	6.3	50	08/09/17	19	5.0	50	10/09/17	19	5.0	50	12/09/17	19	5.0	50	14/09/17	19	5.0	50	16/09/17	19	5.0	50	18/09/17	19	5.0	50
06/09/17	20	5.0	50	08/09/17	20	5.0	50	10/09/17	20	5.0	50	12/09/17	20	5.0	50	14/09/17	20	5.0	50	16/09/17	20	5.8	50	18/09/17	20	5.0	50
06/09/17	21	5.8	50	08/09/17	21	5.0	50	10/09/17	21	5.0	50	12/09/17	21	5.0	50	14/09/17	21	5.0	50	16/09/17	21	5.4	50	18/09/17	21	5.0	50
06/09/17	22	5.0	50	08/09/17	22	5.0	50	10/09/17	22	5.0	50	12/09/17	22	5.0	50	14/09/17	22	5.0	50	16/09/17	22	5.0	50	18/09/17	22	5.0	50
06/09/17	23	5.0	50	08/09/17	23	5.0	50	10/09/17	23	5.0	50	12/09/17	23	5.0	50	14/09/17	23	5.0	50	16/09/17	23	5.0	50	18/09/17	23	5.0	50
07/09/17	0	5.0	50	09/09/17	0	5.4	50	11/09/17	0	5.4	50	13/09/17	0	5.0	50	15/09/17	0	5.0	50	17/09/17	0	5.0	50	19/09/17	0	5.0	50
07/09/17	1	5.0	50	09/09/17	1	5.0	50	11/09/17	1	5.8	50	13/09/17	1	5.0	50	15/09/17	1	5.0	50	17/09/17	1	5.4	50	19/09/17	1	5.0	50
07/09/17	2	5.0	50	09/09/17	2	5.0	50	11/09/17	2	5.0	50	13/09/17	2	5.0	50	15/09/17	2	5.0	50	17/09/17	2	5.4	50	19/09/17	2	5.0	50
07/09/17	3	29.2	50	09/09/17	3	5.8	50	11/09/17	3	5.0	50	13/09/17	3	5.0	50	15/09/17	3	5.0	50	17/09/17	3	5.0	50	19/09/17	3	5.0	50
07/09/17	4	12.9	50	09/09/17	4	5.0	50	11/09/17	4	5.4	50	13/09/17	4	5.0	50	15/09/17	4	5.0	50	17/09/17	4	5.0	50	19/09/17	4	5.0	50
07/09/17	5	10.8	50	09/09/17	5	5.0	50	11/09/17	5	5.0	50	13/09/17	5	5.0	50	15/09/17	5	5.0	50	17/09/17	5	5.4	50	19/09/17	5	5.0	50
07/09/17	6	5.0	50	09/09/17	6	6.7	50	11/09/17	6	8.3	50	13/09/17	6	5.0	50	15/09/17	6	5.0	50	17/09/17	6	5.8	50	19/09/17	6	5.0	50
07/09/17	7	5.0	50	09/09/17	7	5.4	50	11/09/17	7	6.7	50	13/09/17	7	5.0	50	15/09/17	7	5.0	50	17/09/17	7	6.7	50	19/09/17	7	5.0	50
07/09/17	8	5.0	50	09/09/17	8	5.0	50	11/09/17	8	5.0	50	13/09/17	8	5.0	50	15/09/17	8	5.0	50	17/09/17	8	5.0	50	19/09/17	8	5.0	50
07/09/17	9	5.0	50	09/09/17	9	5.0	50	11/09/17	9	5.0	50	13/09/17	9	5.0	50	15/09/17	9	5.0	50	17/09/17	9	5.0	50	19/09/17	9	5.0	50
07/09/17	10	5.4	50	09/09/17	10	5.0	50	11/09/17	10	5.0	50	13/09/17	10	5.0	50	15/09/17	10	5.0	50	17/09/17	10	5.0	50	19/09/17	10	5.0	50
07/09/17	11	5.0	50	09/09/17	11	5.0	50	11/09/17	11	5.0	50	13/09/17	11	5.0	50	15/09/17	11	5.0	50	17/09/17	11	5.0	50	19/09/17	11	5.0	50
07/09/17	12	5.0	50	09/09/17	12	5.0	50	11/09/17	12	5.0	50	13/09/17	12	5.0	50	15/09/17	12	5.0	50	17/09/17	12	5.0	50	19/09/17	12	5.0	50
07/09/17	13	5.0	50	09/09/17	13	5.0	50	11/09/17	13	5.0	50	13/09/17	13	5.0	50	15/09/17	13	5.0	50	17/09/17	13	5.0	50	19/09/17	13	5.0	50
07/09/17	14	5.0	50	09/09/17	14	5.0	50	11/09/17	14	5.0	50	13/09/17	14	5.0	50	15/09/17	14	5.0	50	17/09/17	14	5.0	50	19/09/17	14	5.0	50
07/09/17	15	5.0	50	09/09/17	15	5.0	50	11/09/17	15	5.0	50	13/09/17	15	5.0	50	15/09/17	15	5.0	50	17/09/17	15	5.0	50	19/09/17	15	5.0	50
07/09/17	16	5.0	50	09/09/17	16	5.0	50	11/09/17	16	5.0	50	13/09/17	16	5.0	50	15/09/17	16	5.0	50	17/09/17	16	5.0	50	19/09/17	16	5.0	50
07/09/17	17	5.0	50	09/09/17	17	5.0	50	11/09/17	17	5.0	50	13/09/17	17	5.0	50	15/09/17	17	5.0	50	17/09/17	17	5.0	50	19/09/17	17	5.0	50
07/09/17	18	5.0	50	09/09/17	18	5.0	50	11/09/17	18	5.0	50	13/09/17	18	5.0	50	15/09/17	18	5.0	50	17/09/17	18	5.0	50	19/09/17	18	5.0	50
07/09/17	19	7.1	50	09/09/17	19	5.0	50	11/09/17	19	5.0	50	13/09/17	19	5.0	50	15/09/17	19	5.0	50	17/09/17	19	5.0	50	19/09/17	19	13.3	50
07/09/17	20	51.7	50	09/09/17	20	5.0	50	11/09/17	20	5.0	50	13/09/17	20	5.0	50	15/09/17	20	5.0	50	17/09/17	20	5.0	50	19/09/17	20	5.0	50
07/09/17	21	30.0	50	09/09/17	21	5.0	50	11/09/17	21	5.0	50	13/09/17	21	5.0	50	15/09/17	21	5.0	50	17/09/17	21	5.4	50	19/09/17	21	5.0	50
07/09/17	22	29.2	50	09/09/17	22	6.3	50	11/09/17	22	5.0	50	13/09/17	22	5.0	50	15/09/17	22	5.0	50	17/09/17	22	5.0	50	19/09/17	22	5.0	50
07/09/17	23	25.0	50	09/09/17	23	6.3	50	11/09/17	23	5.0	50	13/09/17	23	5.0	50	15/09/17	23	5.0	50	17/09/17	23	5.0	50	19/09/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
20/09/17	0	5.0	50	22/09/17	0	5.0	50	24/09/17	0	5.0	50	26/09/17	0	8.3	50	28/09/17	0	5.0	50	30/09/17	0	5.0	50	02/10/17	0	No Data	No Data
20/09/17	1	5.0	50	22/09/17	1	5.0	50	24/09/17	1	5.0	50	26/09/17	1	5.8	50	28/09/17	1	5.0	50	30/09/17	1	5.0	50	02/10/17	1	No Data	No Data
20/09/17	2	5.0	50	22/09/17	2	5.0	50	24/09/17	2	5.0	50	26/09/17	2	5.4	50	28/09/17	2	5.0	50	30/09/17	2	5.0	50	02/10/17	2	No Data	No Data
20/09/17	3	5.0	50	22/09/17	3	5.0	50	24/09/17	3	5.0	50	26/09/17	3	5.0	50	28/09/17	3	5.0	50	30/09/17	3	No Data	No Data	02/10/17	3	No Data	No Data
20/09/17	4	5.0	50	22/09/17	4	5.0	50	24/09/17	4	5.0	50	26/09/17	4	5.0	50	28/09/17	4	5.8	50	30/09/17	4	No Data	No Data	02/10/17	4	No Data	No Data
20/09/17	5	5.4	50	22/09/17	5	5.0	50	24/09/17	5	5.0	50	26/09/17	5	5.0	50	28/09/17	5	5.0	50	30/09/17	5	No Data	No Data	02/10/17	5	No Data	No Data
20/09/17	6	9.6	50	22/09/17	6	5.8	50	24/09/17	6	5.0	50	26/09/17	6	5.0	50	28/09/17	6	5.0	50	30/09/17	6	No Data	No Data	02/10/17	6	No Data	No Data
20/09/17	7	5.4	50	22/09/17	7	5.0	50	24/09/17	7	5.0	50	26/09/17	7	5.0	50	28/09/17	7	5.0	50	30/09/17	7	No Data	No Data	02/10/17	7	No Data	No Data
20/09/17	8	5.0	50	22/09/17	8	5.0	50	24/09/17	8	5.0	50	26/09/17	8	5.0	50	28/09/17	8	5.0	50	30/09/17	8	No Data	No Data	02/10/17	8	No Data	No Data
20/09/17	9	5.0	50	22/09/17	9	5.0	50	24/09/17	9	5.0	50	26/09/17	9	5.4	50	28/09/17	9	5.0	50	30/09/17	9	No Data	No Data	02/10/17	9	No Data	No Data
20/09/17	10	5.0	50	22/09/17	10	5.0	50	24/09/17	10	5.0	50	26/09/17	10	5.0	50	28/09/17	10	5.0	50	30/09/17	10	No Data	No Data	02/10/17	10	No Data	No Data
20/09/17	11	5.0	50	22/09/17	11	5.0	50	24/09/17	11	5.0	50	26/09/17	11	5.0	50	28/09/17	11	5.0	50	30/09/17	11	No Data	No Data	02/10/17	11	No Data	No Data
20/09/17	12	5.0	50	22/09/17	12	5.0	50	24/09/17	12	5.0	50	26/09/17	12	5.0	50	28/09/17	12	5.0	50	30/09/17	12	No Data	No Data	02/10/17	12	No Data	No Data
20/09/17	13	5.0	50	22/09/17	13	5.0	50	24/09/17	13	5.4	50	26/09/17	13	5.0	50	28/09/17	13	5.0	50	30/09/17	13	No Data	No Data	02/10/17	13	No Data	No Data
20/09/17	14	5.0	50	22/09/17	14	5.0	50	24/09/17	14	5.0	50	26/09/17	14	5.0	50	28/09/17	14	5.0	50	30/09/17	14	No Data	No Data	02/10/17	14	No Data	No Data
20/09/17	15	5.0	50	22/09/17	15	5.0	50	24/09/17	15	5.0	50	26/09/17	15	5.0	50	28/09/17	15	5.0	50	30/09/17	15	No Data	No Data	02/10/17	15	No Data	No Data
20/09/17	16	5.0	50	22/09/17	16	5.0	50	24/09/17	16	5.0	50	26/09/17	16	5.0	50	28/09/17	16	5.0	50	30/09/17	16	No Data	No Data	02/10/17	16	No Data	No Data
20/09/17	17	5.4	50	22/09/17	17	5.0	50	24/09/17	17	5.0	50	26/09/17	17	5.4	50	28/09/17	17	5.0	50	30/09/17	17	No Data	No Data	02/10/17	17	No Data	No Data
20/09/17	18	5.8	50	22/09/17	18	5.8	50	24/09/17	18	5.0	50	26/09/17	18	12.5	50	28/09/17	18	5.0	50	30/09/17	18	No Data	No Data	02/10/17	18	No Data	No Data
20/09/17	19	5.0	50	22/09/17	19	5.0	50	24/09/17	19	5.0	50	26/09/17	19	5.0	50	28/09/17	19	5.0	50	30/09/17	19	No Data	No Data	02/10/17	19	No Data	No Data
20/09/17	20	5.0	50	22/09/17	20	5.0	50	24/09/17	20	5.0	50	26/09/17	20	5.0	50	28/09/17	20	5.0	50	30/09/17	20	No Data	No Data	02/10/17	20	No Data	No Data
20/09/17	21	5.0	50	22/09/17	21	5.0	50	24/09/17	21	5.0	50	26/09/17	21	5.0	50	28/09/17	21	5.0	50	30/09/17	21	No Data	No Data	02/10/17	21	No Data	No Data
20/09/17	22	5.8	50	22/09/17	22	5.0	50	24/09/17	22	5.4	50	26/09/17	22	5.0	50	28/09/17	22	5.0	50	30/09/17	22	No Data	No Data	02/10/17	22	No Data	No Data
20/09/17	23	5.0	50	22/09/17	23	5.0	50	24/09/17	23	7.9	50	26/09/17	23	5.0	50	28/09/17	23	5.0	50	30/09/17	23	No Data	No Data	02/10/17	23	No Data	No Data
21/09/17	0	6.7	50	23/09/17	0	5.0	50	25/09/17	0	5.4	50	27/09/17	0	5.0	50	29/09/17	0	5.0	50	01/10/17	0	No Data	No Data	03/10/17	0	No Data	No Data
21/09/17	1	5.0	50	23/09/17	1	5.0	50	25/09/17	1	5.0	50	27/09/17	1	5.0	50	29/09/17	1	5.0	50	01/10/17	1	No Data	No Data	03/10/17	1	No Data	No Data
21/09/17	2	5.0	50	23/09/17	2	5.0	50	25/09/17	2	5.0	50	27/09/17	2	5.0	50	29/09/17	2	5.0	50	01/10/17	2	No Data	No Data	03/10/17	2	No Data	No Data
21/09/17	3	5.0	50	23/09/17	3	5.0	50	25/09/17	3	5.0	50	27/09/17	3	5.0	50	29/09/17	3	5.4	50	01/10/17	3	No Data	No Data	03/10/17	3	No Data	No Data
21/09/17	4	5.0	50	23/09/17	4	5.0	50	25/09/17	4	5.0	50	27/09/17	4	5.0	50	29/09/17	4	5.0	50	01/10/17	4	No Data	No Data	03/10/17	4	No Data	No Data
21/09/17	5	6.3	50	23/09/17	5	5.0	50	25/09/17	5	5.0	50	27/09/17	5	5.0	50	29/09/17	5	5.0	50	01/10/17	5	No Data	No Data	03/10/17	5	No Data	No Data
21/09/17	6	5.8	50	23/09/17	6	5.0	50	25/09/17	6	5.4	50	27/09/17	6	5.0	50	29/09/17	6	5.4	50	01/10/17	6	No Data	No Data	03/10/17	6	No Data	No Data
21/09/17	7	5.4	50	23/09/17	7	5.0	50	25/09/17	7	5.0	50	27/09/17	7	5.0	50	29/09/17	7	5.0	50	01/10/17	7	No Data	No Data	03/10/17	7	No Data	No Data
21/09/17	8	5.0	50	23/09/17	8	5.0	50	25/09/17	8	5.0	50	27/09/17	8	5.0	50	29/09/17	8	5.0	50	01/10/17	8	No Data	No Data	03/10/17	8	No Data	No Data
21/09/17	9	5.0	50	23/09/17	9	5.0	50	25/09/17	9	5.0	50	27/09/17	9	5.0	50	29/09/17	9	5.0	50	01/10/17	9	No Data	No Data	03/10/17	9	No Data	No Data
21/09/17	10	5.0	50	23/09/17	10	5.0	50	25/09/17	10	5.0	50	27/09/17	10	5.0	50	29/09/17	10	5.0	50	01/10/17	10	No Data	No Data	03/10/17	10	No Data	No Data
21/09/17	11	5.0	50	23/09/17	11	5.0	50	25/09/17	11	5.0	50	27/09/17	11	5.0	50	29/09/17	11	5.0	50	01/10/17	11	No Data	No Data	03/10/17	11	No Data	No Data
21/09/17	12	5.0	50	23/09/17	12	5.0	50	25/09/17	12	5.0	50	27/09/17	12	5.0	50	29/09/17	12	5.0	50	01/10/17	12	No Data	No Data	03/10/17	12	No Data	No Data
21/09/17	13	5.0	50	23/09/17	13	5.0	50	25/09/17	13	5.0	50	27/09/17	13	5.0	50	29/09/17	13	5.0	50	01/10/17	13	No Data	No Data	03/10/17	13	6.3	50
21/09/17	14	5.0	50	23/09/17	14	5.0	50	25/09/17	14	5.0	50	27/09/17	14	5.0	50	29/09/17	14	5.0	50	01/10/17	14	No Data	No Data	03/10/17	14	5.0	50
21/09/17	15	5.0	50	23/09/17	15	5.0	50	25/09/17	15	5.0	50	27/09/17	15	5.0	50	29/09/17	15	5.0	50	01/10/17	15	No Data	No Data	03/10/17	15	5.0	50
21/09/17	16	5.0	50	23/09/17	16	5.0	50	25/09/17	16	5.0	50	27/09/17	16	5.0	50	29/09/17	16	5.0	50	01/10/17	16	No Data	No Data	03/10/17	16	5.0	50
21/09/17	17	5.0	50	23/09/17	17	5.0	50	25/09/17	17	5.0	50	27/09/17	17	5.0	50	29/09/17	17	5.0	50	01/10/17	17	No Data	No Data	03/10/17	17	5.0	50
21/09/17	18	5.0	50	23/09/17	18	5.0	50	25/09/17	18	5.0	50	27/09/17	18	5.0	50	29/09/17	18	5.0	50	01/10/17	18	No Data	No Data	03/10/17	18	5.0	50
21/09/17	19	5.0	50	23/09/17	19	5.0	50	25/09/17	19	5.0	50	27/09/17	19	5.0	50	29/09/17	19	5.0	50	01/10/17	19	No Data	No Data	03/10/17	19	5.0	50
21/09/17	20	5.0	50	23/09/17	20	5.0	50	25/09/17	20	5.0	50	27/09/17	20	5.0	50	29/09/17	20	5.0	50	01/10/17	20	No Data	No Data	03/10/17	20	5.0	50
21/09/17	21	5.0	50	23/09/17	21	5.0	50	25/09/17	21	5.0	50	27/09/17	21	5.0	50	29/09/17	21	5.0	50	01/10/17	21	No Data	No Data	03/10/17	21	5.4	50
21/09/17	22	5.0	50	23/09/17	22	5.0	50	25/09/17	22	5.0	50	27/09/17	22	5.0	50	29/09/17	22	5.0	50	01/10/17	22	No Data	No Data	03/10/17	22	5.0	50
21/09/17	23	5.4	50	23/09/17	23	5.0	50	25/09/17	23	5.0	50	27/09/17	23	5.0	50	29/09/17	23	5.0	50	01/10/17	23	No Data	No Data	03/10/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
04/10/17	0	5.0	50	06/10/17	0	5.0	50	08/10/17	0	5.0	50	10/10/17	0	5.0	50	12/10/17	0	5.0	50	14/10/17	0	5.0	50	16/10/17	0	5.0	50
04/10/17	1	5.0	50	06/10/17	1	5.0	50	08/10/17	1	5.4	50	10/10/17	1	5.0	50	12/10/17	1	5.0	50	14/10/17	1	5.0	50	16/10/17	1	5.0	50
04/10/17	2	5.0	50	06/10/17	2	5.0	50	08/10/17	2	5.0	50	10/10/17	2	5.0	50	12/10/17	2	5.0	50	14/10/17	2	5.0	50	16/10/17	2	5.0	50
04/10/17	3	5.0	50	06/10/17	3	5.0	50	08/10/17	3	5.0	50	10/10/17	3	5.0	50	12/10/17	3	5.0	50	14/10/17	3	5.0	50	16/10/17	3	5.4	50
04/10/17	4	5.0	50	06/10/17	4	5.0	50	08/10/17	4	5.0	50	10/10/17	4	5.0	50	12/10/17	4	5.0	50	14/10/17	4	5.0	50	16/10/17	4	5.0	50
04/10/17	5	5.0	50	06/10/17	5	5.0	50	08/10/17	5	5.0	50	10/10/17	5	5.0	50	12/10/17	5	5.0	50	14/10/17	5	5.0	50	16/10/17	5	5.0	50
04/10/17	6	5.0	50	06/10/17	6	5.0	50	08/10/17	6	5.0	50	10/10/17	6	5.0	50	12/10/17	6	5.0	50	14/10/17	6	5.0	50	16/10/17	6	5.4	50
04/10/17	7	5.0	50	06/10/17	7	5.0	50	08/10/17	7	5.4	50	10/10/17	7	5.0	50	12/10/17	7	5.0	50	14/10/17	7	5.0	50	16/10/17	7	5.0	50
04/10/17	8	5.8	50	06/10/17	8	5.0	50	08/10/17	8	5.0	50	10/10/17	8	5.0	50	12/10/17	8	5.0	50	14/10/17	8	5.0	50	16/10/17	8	5.0	50
04/10/17	9	5.0	50	06/10/17	9	5.0	50	08/10/17	9	5.0	50	10/10/17	9	5.0	50	12/10/17	9	5.0	50	14/10/17	9	5.0	50	16/10/17	9	5.0	50
04/10/17	10	5.0	50	06/10/17	10	5.0	50	08/10/17	10	5.0	50	10/10/17	10	5.0	50	12/10/17	10	5.0	50	14/10/17	10	5.0	50	16/10/17	10	5.0	50
04/10/17	11	5.0	50	06/10/17	11	5.0	50	08/10/17	11	5.0	50	10/10/17	11	5.0	50	12/10/17	11	5.0	50	14/10/17	11	5.0	50	16/10/17	11	5.0	50
04/10/17	12	No Data	No Data	06/10/17	12	5.0	50	08/10/17	12	5.0	50	10/10/17	12	5.0	50	12/10/17	12	5.0	50	14/10/17	12	5.0	50	16/10/17	12	5.0	50
04/10/17	13	No Data	No Data	06/10/17	13	5.0	50	08/10/17	13	5.0	50	10/10/17	13	5.0	50	12/10/17	13	5.0	50	14/10/17	13	5.0	50	16/10/17	13	5.0	50
04/10/17	14	No Data	No Data	06/10/17	14	5.0	50	08/10/17	14	5.0	50	10/10/17	14	5.0	50	12/10/17	14	5.0	50	14/10/17	14	5.0	50	16/10/17	14	5.0	50
04/10/17	15	No Data	No Data	06/10/17	15	5.0	50	08/10/17	15	5.0	50	10/10/17	15	5.0	50	12/10/17	15	5.0	50	14/10/17	15	5.0	50	16/10/17	15	5.0	50
04/10/17	16	No Data	No Data	06/10/17	16	5.0	50	08/10/17	16	5.0	50	10/10/17	16	5.0	50	12/10/17	16	5.0	50	14/10/17	16	5.0	50	16/10/17	16	5.0	50
04/10/17	17	No Data	No Data	06/10/17	17	5.8	50	08/10/17	17	5.0	50	10/10/17	17	5.0	50	12/10/17	17	5.0	50	14/10/17	17	5.0	50	16/10/17	17	5.0	50
04/10/17	18	No Data	No Data	06/10/17	18	5.0	50	08/10/17	18	5.0	50	10/10/17	18	5.0	50	12/10/17	18	5.0	50	14/10/17	18	5.0	50	16/10/17	18	5.0	50
04/10/17	19	No Data	No Data	06/10/17	19	5.0	50	08/10/17	19	5.0	50	10/10/17	19	5.0	50	12/10/17	19	5.4	50	14/10/17	19	5.0	50	16/10/17	19	5.0	50
04/10/17	20	No Data	No Data	06/10/17	20	5.0	50	08/10/17	20	5.0	50	10/10/17	20	5.0	50	12/10/17	20	6.7	50	14/10/17	20	5.0	50	16/10/17	20	5.0	50
04/10/17	21	No Data	No Data	06/10/17	21	5.0	50	08/10/17	21	5.0	50	10/10/17	21	5.0	50	12/10/17	21	5.0	50	14/10/17	21	5.0	50	16/10/17	21	5.0	50
04/10/17	22	No Data	No Data	06/10/17	22	5.0	50	08/10/17	22	5.0	50	10/10/17	22	5.0	50	12/10/17	22	5.0	50	14/10/17	22	5.0	50	16/10/17	22	5.0	50
04/10/17	23	No Data	No Data	06/10/17	23	5.0	50	08/10/17	23	5.0	50	10/10/17	23	5.0	50	12/10/17	23	5.0	50	14/10/17	23	5.0	50	16/10/17	23	5.0	50
05/10/17	0	No Data	No Data	07/10/17	0	5.0	50	09/10/17	0	5.0	50	11/10/17	0	5.0	50	13/10/17	0	5.0	50	15/10/17	0	5.0	50	17/10/17	0	5.0	50
05/10/17	1	No Data	No Data	07/10/17	1	5.0	50	09/10/17	1	5.0	50	11/10/17	1	5.0	50	13/10/17	1	5.0	50	15/10/17	1	5.0	50	17/10/17	1	5.0	50
05/10/17	2	No Data	No Data	07/10/17	2	5.0	50	09/10/17	2	5.0	50	11/10/17	2	5.0	50	13/10/17	2	5.0	50	15/10/17	2	5.0	50	17/10/17	2	5.0	50
05/10/17	3	No Data	No Data	07/10/17	3	5.0	50	09/10/17	3	5.0	50	11/10/17	3	5.0	50	13/10/17	3	5.0	50	15/10/17	3	5.0	50	17/10/17	3	5.0	50
05/10/17	4	No Data	No Data	07/10/17	4	5.0	50	09/10/17	4	5.0	50	11/10/17	4	5.0	50	13/10/17	4	5.0	50	15/10/17	4	5.0	50	17/10/17	4	5.0	50
05/10/17	5	No Data	No Data	07/10/17	5	5.0	50	09/10/17	5	5.0	50	11/10/17	5	5.0	50	13/10/17	5	5.0	50	15/10/17	5	5.0	50	17/10/17	5	5.0	50
05/10/17	6	No Data	No Data	07/10/17	6	5.0	50	09/10/17	6	5.0	50	11/10/17	6	5.0	50	13/10/17	6	5.0	50	15/10/17	6	5.0	50	17/10/17	6	5.0	50
05/10/17	7	No Data	No Data	07/10/17	7	5.0	50	09/10/17	7	5.0	50	11/10/17	7	5.0	50	13/10/17	7	5.0	50	15/10/17	7	5.0	50	17/10/17	7	5.0	50
05/10/17	8	No Data	No Data	07/10/17	8	5.0	50	09/10/17	8	5.0	50	11/10/17	8	5.0	50	13/10/17	8	5.0	50	15/10/17	8	5.0	50	17/10/17	8	5.0	50
05/10/17	9	No Data	No Data	07/10/17	9	5.0	50	09/10/17	9	5.0	50	11/10/17	9	5.0	50	13/10/17	9	5.0	50	15/10/17	9	5.0	50	17/10/17	9	5.0	50
05/10/17	10	No Data	No Data	07/10/17	10	5.0	50	09/10/17	10	5.0	50	11/10/17	10	5.0	50	13/10/17	10	5.0	50	15/10/17	10	5.0	50	17/10/17	10	5.0	50
05/10/17	11	No Data	No Data	07/10/17	11	5.0	50	09/10/17	11	5.0	50	11/10/17	11	5.0	50	13/10/17	11	No Data	No Data	15/10/17	11	5.0	50	17/10/17	11	5.0	50
05/10/17	12	5.0	50	07/10/17	12	5.0	50	09/10/17	12	5.0	50	11/10/17	12	5.0	50	13/10/17	12	5.0	50	15/10/17	12	5.0	50	17/10/17	12	5.0	50
05/10/17	13	5.0	50	07/10/17	13	5.0	50	09/10/17	13	5.0	50	11/10/17	13	5.0	50	13/10/17	13	5.0	50	15/10/17	13	5.0	50	17/10/17	13	5.0	50
05/10/17	14	5.0	50	07/10/17	14	5.0	50	09/10/17	14	5.0	50	11/10/17	14	5.0	50	13/10/17	14	5.0	50	15/10/17	14	5.0	50	17/10/17	14	5.0	50
05/10/17	15	5.0	50	07/10/17	15	5.0	50	09/10/17	15	5.0	50	11/10/17	15	5.0	50	13/10/17	15	5.0	50	15/10/17	15	5.0	50	17/10/17	15	5.0	50
05/10/17	16	5.0	50	07/10/17	16	5.0	50	09/10/17	16	5.0	50	11/10/17	16	5.0	50	13/10/17	16	5.0	50	15/10/17	16	5.0	50	17/10/17	16	5.0	50
05/10/17	17	5.0	50	07/10/17	17	5.0	50	09/10/17	17	5.0	50	11/10/17	17	5.0	50	13/10/17	17	5.0	50	15/10/17	17	5.0	50	17/10/17	17	5.0	50
05/10/17	18	5.0	50	07/10/17	18	5.0	50	09/10/17	18	5.0	50	11/10/17	18	5.0	50	13/10/17	18	5.0	50	15/10/17	18	5.0	50	17/10/17	18	5.0	50
05/10/17	19	5.0	50	07/10/17	19	5.0	50	09/10/17	19	5.0	50	11/10/17	19	5.0	50	13/10/17	19	5.0	50	15/10/17	19	15.0	50	17/10/17	19	5.0	50
05/10/17	20	5.0	50	07/10/17	20	5.0	50	09/10/17	20	5.0	50	11/10/17	20	5.0	50	13/10/17	20	5.0	50	15/10/17	20	5.0	50	17/10/17	20	5.0	50
05/10/17	21	5.0	50	07/10/17	21	5.0	50	09/10/17	21	5.0	50	11/10/17	21	5.0	50	13/10/17	21	5.0	50	15/10/17	21	5.0	50	17/10/17	21	5.0	50
05/10/17	22	5.0	50	07/10/17	22	5.0	50	09/10/17	22	5.0	50	11/10/17	22	5.0	50	13/10/17	22	5.4	50	15/10/17	22	5.0	50	17/10/17	22	5.0	50
05/10/17	23	5.0	50	07/10/17	23	5.0	50	09/10/17	23	5.0	50	11/10/17	23	5.0	50	13/10/17	23	5.0	50	15/10/17	23	5.0	50	17/10/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
18/10/17	0	5.0	50	20/10/17	0	5.0	50	22/10/17	0	5.0	50	24/10/17	0	5.0	50	26/10/17	0	5.0	50	28/10/17	0	5.0	50	30/10/17	0	5.0	50
18/10/17	1	5.0	50	20/10/17	1	5.0	50	22/10/17	1	5.0	50	24/10/17	1	5.0	50	26/10/17	1	5.0	50	28/10/17	1	5.0	50	30/10/17	1	5.0	50
18/10/17	2	5.0	50	20/10/17	2	5.0	50	22/10/17	2	5.0	50	24/10/17	2	5.0	50	26/10/17	2	5.0	50	28/10/17	2	5.0	50	30/10/17	2	5.0	50
18/10/17	3	5.0	50	20/10/17	3	5.0	50	22/10/17	3	5.0	50	24/10/17	3	5.0	50	26/10/17	3	5.0	50	28/10/17	3	5.0	50	30/10/17	3	5.0	50
18/10/17	4	5.0	50	20/10/17	4	5.0	50	22/10/17	4	5.0	50	24/10/17	4	5.0	50	26/10/17	4	5.0	50	28/10/17	4	5.0	50	30/10/17	4	5.0	50
18/10/17	5	5.0	50	20/10/17	5	5.4	50	22/10/17	5	5.0	50	24/10/17	5	5.0	50	26/10/17	5	5.0	50	28/10/17	5	5.0	50	30/10/17	5	5.0	50
18/10/17	6	5.0	50	20/10/17	6	5.0	50	22/10/17	6	5.0	50	24/10/17	6	6.7	50	26/10/17	6	5.0	50	28/10/17	6	5.0	50	30/10/17	6	No Data	No Data
18/10/17	7	5.0	50	20/10/17	7	5.0	50	22/10/17	7	5.8	50	24/10/17	7	5.0	50	26/10/17	7	5.0	50	28/10/17	7	5.0	50	30/10/17	7	No Data	No Data
18/10/17	8	5.0	50	20/10/17	8	5.0	50	22/10/17	8	5.0	50	24/10/17	8	5.0	50	26/10/17	8	5.0	50	28/10/17	8	5.0	50	30/10/17	8	No Data	No Data
18/10/17	9	5.0	50	20/10/17	9	5.0	50	22/10/17	9	5.0	50	24/10/17	9	5.0	50	26/10/17	9	5.0	50	28/10/17	9	5.0	50	30/10/17	9	No Data	No Data
18/10/17	10	5.0	50	20/10/17	10	5.0	50	22/10/17	10	5.0	50	24/10/17	10	5.0	50	26/10/17	10	5.0	50	28/10/17	10	5.0	50	30/10/17	10	No Data	No Data
18/10/17	11	5.0	50	20/10/17	11	5.0	50	22/10/17	11	5.0	50	24/10/17	11	5.0	50	26/10/17	11	5.0	50	28/10/17	11	5.0	50	30/10/17	11	No Data	No Data
18/10/17	12	5.0	50	20/10/17	12	5.0	50	22/10/17	12	5.0	50	24/10/17	12	5.0	50	26/10/17	12	5.0	50	28/10/17	12	5.0	50	30/10/17	12	No Data	No Data
18/10/17	13	5.0	50	20/10/17	13	5.0	50	22/10/17	13	5.0	50	24/10/17	13	5.0	50	26/10/17	13	5.0	50	28/10/17	13	5.0	50	30/10/17	13	No Data	No Data
18/10/17	14	5.0	50	20/10/17	14	5.0	50	22/10/17	14	5.0	50	24/10/17	14	5.0	50	26/10/17	14	11.3	50	28/10/17	14	5.0	50	30/10/17	14	No Data	No Data
18/10/17	15	5.0	50	20/10/17	15	5.0	50	22/10/17	15	5.0	50	24/10/17	15	5.0	50	26/10/17	15	5.0	50	28/10/17	15	5.0	50	30/10/17	15	No Data	No Data
18/10/17	16	5.0	50	20/10/17	16	5.0	50	22/10/17	16	5.0	50	24/10/17	16	5.0	50	26/10/17	16	12.1	50	28/10/17	16	5.0	50	30/10/17	16	No Data	No Data
18/10/17	17	5.0	50	20/10/17	17	5.0	50	22/10/17	17	5.0	50	24/10/17	17	5.0	50	26/10/17	17	9.2	50	28/10/17	17	5.0	50	30/10/17	17	No Data	No Data
18/10/17	18	5.0	50	20/10/17	18	5.0	50	22/10/17	18	5.0	50	24/10/17	18	5.0	50	26/10/17	18	6.3	50	28/10/17	18	5.0	50	30/10/17	18	No Data	No Data
18/10/17	19	5.0	50	20/10/17	19	5.0	50	22/10/17	19	5.0	50	24/10/17	19	5.0	50	26/10/17	19	5.0	50	28/10/17	19	5.0	50	30/10/17	19	No Data	No Data
18/10/17	20	5.0	50	20/10/17	20	5.0	50	22/10/17	20	5.0	50	24/10/17	20	5.0	50	26/10/17	20	5.0	50	28/10/17	20	5.0	50	30/10/17	20	No Data	No Data
18/10/17	21	5.0	50	20/10/17	21	5.0	50	22/10/17	21	5.0	50	24/10/17	21	5.0	50	26/10/17	21	5.0	50	28/10/17	21	5.0	50	30/10/17	21	No Data	No Data
18/10/17	22	5.0	50	20/10/17	22	5.0	50	22/10/17	22	5.0	50	24/10/17	22	5.0	50	26/10/17	22	5.0	50	28/10/17	22	5.0	50	30/10/17	22	No Data	No Data
18/10/17	23	5.0	50	20/10/17	23	5.0	50	22/10/17	23	5.0	50	24/10/17	23	5.0	50	26/10/17	23	5.0	50	28/10/17	23	5.0	50	30/10/17	23	No Data	No Data
19/10/17	0	5.0	50	21/10/17	0	5.0	50	23/10/17	0	5.0	50	25/10/17	0	5.0	50	27/10/17	0	5.0	50	29/10/17	0	5.0	50	31/10/17	0	No Data	No Data
19/10/17	1	5.0	50	21/10/17	1	5.0	50	23/10/17	1	5.0	50	25/10/17	1	5.0	50	27/10/17	1	5.0	50	29/10/17	1	5.0	50	31/10/17	1	No Data	No Data
19/10/17	2	5.0	50	21/10/17	2	5.0	50	23/10/17	2	5.0	50	25/10/17	2	5.0	50	27/10/17	2	5.0	50	29/10/17	2	5.0	50	31/10/17	2	No Data	No Data
19/10/17	3	5.0	50	21/10/17	3	5.0	50	23/10/17	3	5.0	50	25/10/17	3	5.0	50	27/10/17	3	5.0	50	29/10/17	3	5.0	50	31/10/17	3	No Data	No Data
19/10/17	4	5.0	50	21/10/17	4	5.0	50	23/10/17	4	5.0	50	25/10/17	4	5.0	50	27/10/17	4	5.0	50	29/10/17	4	5.0	50	31/10/17	4	No Data	No Data
19/10/17	5	5.0	50	21/10/17	5	5.0	50	23/10/17	5	5.0	50	25/10/17	5	5.0	50	27/10/17	5	5.0	50	29/10/17	5	5.0	50	31/10/17	5	No Data	No Data
19/10/17	6	5.0	50	21/10/17	6	5.0	50	23/10/17	6	5.0	50	25/10/17	6	5.0	50	27/10/17	6	5.0	50	29/10/17	6	5.0	50	31/10/17	6	No Data	No Data
19/10/17	7	5.0	50	21/10/17	7	5.0	50	23/10/17	7	5.0	50	25/10/17	7	5.0	50	27/10/17	7	5.0	50	29/10/17	7	5.0	50	31/10/17	7	No Data	No Data
19/10/17	8	5.0	50	21/10/17	8	5.0	50	23/10/17	8	5.0	50	25/10/17	8	5.0	50	27/10/17	8	5.0	50	29/10/17	8	5.0	50	31/10/17	8	No Data	No Data
19/10/17	9	5.0	50	21/10/17	9	5.0	50	23/10/17	9	5.0	50	25/10/17	9	5.0	50	27/10/17	9	5.0	50	29/10/17	9	5.0	50	31/10/17	9	No Data	No Data
19/10/17	10	5.0	50	21/10/17	10	5.0	50	23/10/17	10	5.0	50	25/10/17	10	5.0	50	27/10/17	10	5.0	50	29/10/17	10	5.0	50	31/10/17	10	No Data	No Data
19/10/17	11	5.0	50	21/10/17	11	5.0	50	23/10/17	11	5.0	50	25/10/17	11	5.0	50	27/10/17	11	5.0	50	29/10/17	11	5.0	50	31/10/17	11	5.7	50
19/10/17	12	5.0	50	21/10/17	12	5.0	50	23/10/17	12	5.0	50	25/10/17	12	5.0	50	27/10/17	12	5.0	50	29/10/17	12	5.0	50	31/10/17	12	5.4	50
19/10/17	13	5.0	50	21/10/17	13	5.0	50	23/10/17	13	5.0	50	25/10/17	13	5.0	50	27/10/17	13	5.0	50	29/10/17	13	5.0	50	31/10/17	13	5.0	50
19/10/17	14	5.0	50	21/10/17	14	5.0	50	23/10/17	14	5.0	50	25/10/17	14	5.0	50	27/10/17	14	5.0	50	29/10/17	14	5.0	50	31/10/17	14	5.0	50
19/10/17	15	5.0	50	21/10/17	15	5.0	50	23/10/17	15	5.0	50	25/10/17	15	5.0	50	27/10/17	15	5.0	50	29/10/17	15	5.0	50	31/10/17	15	5.0	50
19/10/17	16	5.0	50	21/10/17	16	5.0	50	23/10/17	16	5.0	50	25/10/17	16	10.0	50	27/10/17	16	5.0	50	29/10/17	16	5.0	50	31/10/17	16	5.0	50
19/10/17	17	5.0	50	21/10/17	17	5.0	50	23/10/17	17	5.0	50	25/10/17	17	5.0	50	27/10/17	17	5.0	50	29/10/17	17	5.0	50	31/10/17	17	5.0	50
19/10/17	18	5.0	50	21/10/17	18	5.0	50	23/10/17	18	5.0	50	25/10/17	18	5.0	50	27/10/17	18	5.0	50	29/10/17	18	5.0	50	31/10/17	18	5.0	50
19/10/17	19	5.0	50	21/10/17	19	5.0	50	23/10/17	19	5.0	50	25/10/17	19	5.0	50	27/10/17	19	5.0	50	29/10/17	19	5.4	50	31/10/17	19	5.4	50
19/10/17	20	5.0	50	21/10/17	20	5.0	50	23/10/17	20	5.0	50	25/10/17	20	5.0	50	27/10/17	20	5.0	50	29/10/17	20	6.3	50	31/10/17	20	5.0	50
19/10/17	21	5.0	50	21/10/17	21	5.0	50	23/10/17	21	5.0	50	25/10/17	21	5.0	50	27/10/17	21	5.0	50	29/10/17	21	5.0	50	31/10/17	21	5.0	50
19/10/17	22	5.0	50	21/10/17	22	5.0	50	23/10/17	22	5.0	50	25/10/17	22	5.0	50	27/10/17	22	5.0	50	29/10/17	22	5.0	50	31/10/17	22	5.0	50
19/10/17	23	5.0	50	21/10/17	23	5.0	50	23/10/17	23	5.0	50	25/10/17	23	5.0	50	27/10/17	23	5.0	50	29/10/17	23	5.0	50	31/10/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
01/11/17	0	5.0	50	03/11/17	0	5.0	50	05/11/17	0	5.0	50	07/11/17	0	5.0	50	09/11/17	0	5.0	50	11/11/17	0	5.0	50	13/11/17	0	No Data	No Data
01/11/17	1	5.0	50	03/11/17	1	5.0	50	05/11/17	1	5.0	50	07/11/17	1	5.0	50	09/11/17	1	5.0	50	11/11/17	1	5.0	50	13/11/17	1	No Data	No Data
01/11/17	2	5.0	50	03/11/17	2	5.0	50	05/11/17	2	5.0	50	07/11/17	2	5.0	50	09/11/17	2	5.0	50	11/11/17	2	5.0	50	13/11/17	2	No Data	No Data
01/11/17	3	5.4	50	03/11/17	3	5.0	50	05/11/17	3	5.0	50	07/11/17	3	5.0	50	09/11/17	3	5.0	50	11/11/17	3	5.0	50	13/11/17	3	No Data	No Data
01/11/17	4	5.0	50	03/11/17	4	5.0	50	05/11/17	4	5.0	50	07/11/17	4	5.0	50	09/11/17	4	5.0	50	11/11/17	4	5.0	50	13/11/17	4	No Data	No Data
01/11/17	5	5.0	50	03/11/17	5	5.0	50	05/11/17	5	5.0	50	07/11/17	5	5.0	50	09/11/17	5	5.0	50	11/11/17	5	5.0	50	13/11/17	5	No Data	No Data
01/11/17	6	5.0	50	03/11/17	6	5.0	50	05/11/17	6	5.0	50	07/11/17	6	5.0	50	09/11/17	6	5.0	50	11/11/17	6	5.0	50	13/11/17	6	No Data	No Data
01/11/17	7	5.0	50	03/11/17	7	5.0	50	05/11/17	7	5.0	50	07/11/17	7	5.0	50	09/11/17	7	5.0	50	11/11/17	7	5.0	50	13/11/17	7	No Data	No Data
01/11/17	8	5.0	50	03/11/17	8	5.0	50	05/11/17	8	5.0	50	07/11/17	8	5.0	50	09/11/17	8	5.0	50	11/11/17	8	5.0	50	13/11/17	8	No Data	No Data
01/11/17	9	5.0	50	03/11/17	9	5.0	50	05/11/17	9	5.0	50	07/11/17	9	5.0	50	09/11/17	9	5.0	50	11/11/17	9	5.0	50	13/11/17	9	No Data	No Data
01/11/17	10	5.0	50	03/11/17	10	5.0	50	05/11/17	10	5.0	50	07/11/17	10	5.0	50	09/11/17	10	5.0	50	11/11/17	10	5.0	50	13/11/17	10	No Data	No Data
01/11/17	11	5.0	50	03/11/17	11	5.0	50	05/11/17	11	5.0	50	07/11/17	11	5.0	50	09/11/17	11	5.0	50	11/11/17	11	5.0	50	13/11/17	11	No Data	No Data
01/11/17	12	5.0	50	03/11/17	12	5.0	50	05/11/17	12	5.0	50	07/11/17	12	5.0	50	09/11/17	12	5.0	50	11/11/17	12	5.0	50	13/11/17	12	No Data	No Data
01/11/17	13	5.0	50	03/11/17	13	5.0	50	05/11/17	13	5.0	50	07/11/17	13	5.0	50	09/11/17	13	5.0	50	11/11/17	13	5.0	50	13/11/17	13	No Data	No Data
01/11/17	14	5.0	50	03/11/17	14	5.0	50	05/11/17	14	5.0	50	07/11/17	14	5.0	50	09/11/17	14	5.0	50	11/11/17	14	5.0	50	13/11/17	14	No Data	No Data
01/11/17	15	5.0	50	03/11/17	15	5.0	50	05/11/17	15	5.0	50	07/11/17	15	5.0	50	09/11/17	15	5.0	50	11/11/17	15	5.0	50	13/11/17	15	No Data	No Data
01/11/17	16	5.0	50	03/11/17	16	5.0	50	05/11/17	16	5.0	50	07/11/17	16	5.0	50	09/11/17	16	5.0	50	11/11/17	16	5.0	50	13/11/17	16	5.0	50
01/11/17	17	5.0	50	03/11/17	17	5.0	50	05/11/17	17	5.0	50	07/11/17	17	5.0	50	09/11/17	17	5.0	50	11/11/17	17	5.0	50	13/11/17	17	5.0	50
01/11/17	18	5.0	50	03/11/17	18	5.0	50	05/11/17	18	5.0	50	07/11/17	18	5.0	50	09/11/17	18	5.0	50	11/11/17	18	5.0	50	13/11/17	18	5.0	50
01/11/17	19	5.0	50	03/11/17	19	5.8	50	05/11/17	19	5.0	50	07/11/17	19	5.0	50	09/11/17	19	5.0	50	11/11/17	19	5.0	50	13/11/17	19	5.0	50
01/11/17	20	5.0	50	03/11/17	20	5.0	50	05/11/17	20	5.0	50	07/11/17	20	5.0	50	09/11/17	20	5.0	50	11/11/17	20	5.0	50	13/11/17	20	5.0	50
01/11/17	21	5.0	50	03/11/17	21	5.0	50	05/11/17	21	5.0	50	07/11/17	21	5.0	50	09/11/17	21	5.0	50	11/11/17	21	5.0	50	13/11/17	21	5.0	50
01/11/17	22	5.0	50	03/11/17	22	5.0	50	05/11/17	22	5.0	50	07/11/17	22	5.0	50	09/11/17	22	5.0	50	11/11/17	22	5.0	50	13/11/17	22	5.0	50
01/11/17	23	5.0	50	03/11/17	23	5.0	50	05/11/17	23	5.0	50	07/11/17	23	5.0	50	09/11/17	23	5.0	50	11/11/17	23	5.0	50	13/11/17	23	5.0	50
02/11/17	0	6.3	50	04/11/17	0	5.0	50	06/11/17	0	5.0	50	08/11/17	0	5.0	50	10/11/17	0	5.0	50	12/11/17	0	5.0	50	14/11/17	0	5.0	50
02/11/17	1	5.8	50	04/11/17	1	5.0	50	06/11/17	1	5.0	50	08/11/17	1	5.0	50	10/11/17	1	5.0	50	12/11/17	1	5.0	50	14/11/17	1	5.0	50
02/11/17	2	5.0	50	04/11/17	2	5.0	50	06/11/17	2	5.0	50	08/11/17	2	5.0	50	10/11/17	2	5.0	50	12/11/17	2	5.0	50	14/11/17	2	5.0	50
02/11/17	3	5.0	50	04/11/17	3	5.0	50	06/11/17	3	5.0	50	08/11/17	3	5.0	50	10/11/17	3	5.0	50	12/11/17	3	5.0	50	14/11/17	3	5.0	50
02/11/17	4	5.0	50	04/11/17	4	5.0	50	06/11/17	4	5.0	50	08/11/17	4	5.0	50	10/11/17	4	5.0	50	12/11/17	4	5.0	50	14/11/17	4	5.0	50
02/11/17	5	5.0	50	04/11/17	5	5.0	50	06/11/17	5	5.0	50	08/11/17	5	5.0	50	10/11/17	5	5.0	50	12/11/17	5	5.0	50	14/11/17	5	5.0	50
02/11/17	6	5.0	50	04/11/17	6	5.0	50	06/11/17	6	5.0	50	08/11/17	6	5.0	50	10/11/17	6	5.8	50	12/11/17	6	5.0	50	14/11/17	6	5.0	50
02/11/17	7	5.0	50	04/11/17	7	5.0	50	06/11/17	7	5.0	50	08/11/17	7	5.0	50	10/11/17	7	5.0	50	12/11/17	7	5.0	50	14/11/17	7	5.0	50
02/11/17	8	5.0	50	04/11/17	8	5.0	50	06/11/17	8	5.0	50	08/11/17	8	5.0	50	10/11/17	8	5.0	50	12/11/17	8	5.0	50	14/11/17	8	5.0	50
02/11/17	9	5.0	50	04/11/17	9	5.0	50	06/11/17	9	5.0	50	08/11/17	9	5.0	50	10/11/17	9	5.0	50	12/11/17	9	5.0	50	14/11/17	9	5.0	50
02/11/17	10	5.0	50	04/11/17	10	5.0	50	06/11/17	10	5.0	50	08/11/17	10	5.0	50	10/11/17	10	5.0	50	12/11/17	10	5.0	50	14/11/17	10	5.0	50
02/11/17	11	5.0	50	04/11/17	11	5.0	50	06/11/17	11	5.0	50	08/11/17	11	5.0	50	10/11/17	11	5.0	50	12/11/17	11	5.0	50	14/11/17	11	5.0	50
02/11/17	12	5.0	50	04/11/17	12	5.0	50	06/11/17	12	5.0	50	08/11/17	12	5.0	50	10/11/17	12	5.0	50	12/11/17	12	5.0	50	14/11/17	12	5.0	50
02/11/17	13	5.0	50	04/11/17	13	5.0	50	06/11/17	13	5.0	50	08/11/17	13	5.0	50	10/11/17	13	5.0	50	12/11/17	13	5.0	50	14/11/17	13	5.0	50
02/11/17	14	5.0	50	04/11/17	14	5.0	50	06/11/17	14	11.3	50	08/11/17	14	5.0	50	10/11/17	14	5.0	50	12/11/17	14	5.0	50	14/11/17	14	5.0	50
02/11/17	15	5.0	50	04/11/17	15	5.0	50	06/11/17	15	9.2	50	08/11/17	15	5.0	50	10/11/17	15	5.0	50	12/11/17	15	5.0	50	14/11/17	15	5.0	50
02/11/17	16	5.0	50	04/11/17	16	5.0	50	06/11/17	16	5.0	50	08/11/17	16	5.0	50	10/11/17	16	5.0	50	12/11/17	16	5.0	50	14/11/17	16	5.0	50
02/11/17	17	5.0	50	04/11/17	17	5.0	50	06/11/17	17	5.0	50	08/11/17	17	5.0	50	10/11/17	17	5.0	50	12/11/17	17	5.0	50	14/11/17	17	5.0	50
02/11/17	18	5.0	50	04/11/17	18	5.0	50	06/11/17	18	5.0	50	08/11/17	18	5.0	50	10/11/17	18	5.0	50	12/11/17	18	5.0	50	14/11/17	18	5.0	50
02/11/17	19	5.0	50	04/11/17	19	5.0	50	06/11/17	19	5.0	50	08/11/17	19	5.0	50	10/11/17	19	5.0	50	12/11/17	19	5.0	50	14/11/17	19	5.0	50
02/11/17	20	5.0	50	04/11/17	20	5.0	50	06/11/17	20	5.0	50	08/11/17	20	5.0	50	10/11/17	20	5.0	50	12/11/17	20	5.0	50	14/11/17	20	5.0	50
02/11/17	21	5.0	50	04/11/17	21	5.0	50	06/11/17	21	5.0	50	08/11/17	21	5.0	50	10/11/17	21	5.0	50	12/11/17	21	No Data	No Data	14/11/17	21	5.0	50
02/11/17	22	5.0	50	04/11/17	22	5.0	50	06/11/17	22	5.0	50	08/11/17	22	5.0	50	10/11/17	22	5.0	50	12/11/17	22	No Data	No Data	14/11/17	22	5.0	50
02/11/17	23	5.0	50	04/11/17	23	5.0	50	06/11/17	23	5.0	50	08/11/17	23	5.0	50	10/11/17	23	5.0	50	12/11/17	23	No Data	No Data	14/11/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
15/11/17	0	5.0	50	17/11/17	0	5.0	50	19/11/17	0	5.0	50	21/11/17	0	5.0	50	23/11/17	0	5.0	50	25/11/17	0	5.0	50	27/11/17	0	5.0	50
15/11/17	1	5.0	50	17/11/17	1	5.0	50	19/11/17	1	5.0	50	21/11/17	1	5.0	50	23/11/17	1	5.0	50	25/11/17	1	5.0	50	27/11/17	1	5.0	50
15/11/17	2	5.0	50	17/11/17	2	5.0	50	19/11/17	2	5.0	50	21/11/17	2	5.0	50	23/11/17	2	5.0	50	25/11/17	2	5.0	50	27/11/17	2	5.0	50
15/11/17	3	5.0	50	17/11/17	3	5.0	50	19/11/17	3	5.0	50	21/11/17	3	5.0	50	23/11/17	3	5.0	50	25/11/17	3	5.0	50	27/11/17	3	5.0	50
15/11/17	4	5.0	50	17/11/17	4	5.0	50	19/11/17	4	5.0	50	21/11/17	4	5.0	50	23/11/17	4	5.0	50	25/11/17	4	5.0	50	27/11/17	4	5.0	50
15/11/17	5	5.0	50	17/11/17	5	5.0	50	19/11/17	5	5.0	50	21/11/17	5	5.0	50	23/11/17	5	5.0	50	25/11/17	5	5.0	50	27/11/17	5	5.0	50
15/11/17	6	5.0	50	17/11/17	6	5.0	50	19/11/17	6	5.0	50	21/11/17	6	5.0	50	23/11/17	6	5.0	50	25/11/17	6	5.0	50	27/11/17	6	5.0	50
15/11/17	7	5.0	50	17/11/17	7	5.0	50	19/11/17	7	5.0	50	21/11/17	7	5.0	50	23/11/17	7	5.0	50	25/11/17	7	5.0	50	27/11/17	7	5.0	50
15/11/17	8	5.0	50	17/11/17	8	5.0	50	19/11/17	8	5.0	50	21/11/17	8	5.0	50	23/11/17	8	5.0	50	25/11/17	8	5.0	50	27/11/17	8	5.0	50
15/11/17	9	5.0	50	17/11/17	9	5.0	50	19/11/17	9	5.0	50	21/11/17	9	5.0	50	23/11/17	9	5.0	50	25/11/17	9	5.0	50	27/11/17	9	5.0	50
15/11/17	10	5.0	50	17/11/17	10	5.4	50	19/11/17	10	5.0	50	21/11/17	10	5.0	50	23/11/17	10	5.0	50	25/11/17	10	5.0	50	27/11/17	10	5.0	50
15/11/17	11	5.0	50	17/11/17	11	5.4	50	19/11/17	11	5.0	50	21/11/17	11	5.0	50	23/11/17	11	5.0	50	25/11/17	11	5.0	50	27/11/17	11	5.0	50
15/11/17	12	5.0	50	17/11/17	12	5.0	50	19/11/17	12	5.0	50	21/11/17	12	5.0	50	23/11/17	12	5.0	50	25/11/17	12	5.0	50	27/11/17	12	5.0	50
15/11/17	13	5.0	50	17/11/17	13	5.0	50	19/11/17	13	5.0	50	21/11/17	13	5.0	50	23/11/17	13	5.0	50	25/11/17	13	5.0	50	27/11/17	13	5.0	50
15/11/17	14	5.0	50	17/11/17	14	5.0	50	19/11/17	14	5.0	50	21/11/17	14	5.0	50	23/11/17	14	5.0	50	25/11/17	14	5.0	50	27/11/17	14	5.0	50
15/11/17	15	5.0	50	17/11/17	15	5.0	50	19/11/17	15	5.0	50	21/11/17	15	5.0	50	23/11/17	15	5.0	50	25/11/17	15	5.0	50	27/11/17	15	5.0	50
15/11/17	16	5.0	50	17/11/17	16	5.0	50	19/11/17	16	5.0	50	21/11/17	16	5.0	50	23/11/17	16	5.0	50	25/11/17	16	5.4	50	27/11/17	16	5.0	50
15/11/17	17	5.0	50	17/11/17	17	5.0	50	19/11/17	17	5.0	50	21/11/17	17	5.0	50	23/11/17	17	5.0	50	25/11/17	17	5.0	50	27/11/17	17	5.0	50
15/11/17	18	5.0	50	17/11/17	18	5.0	50	19/11/17	18	5.0	50	21/11/17	18	5.0	50	23/11/17	18	5.0	50	25/11/17	18	5.0	50	27/11/17	18	5.0	50
15/11/17	19	5.0	50	17/11/17	19	5.0	50	19/11/17	19	5.0	50	21/11/17	19	5.0	50	23/11/17	19	5.0	50	25/11/17	19	5.0	50	27/11/17	19	5.0	50
15/11/17	20	5.0	50	17/11/17	20	5.0	50	19/11/17	20	5.0	50	21/11/17	20	5.0	50	23/11/17	20	5.0	50	25/11/17	20	5.0	50	27/11/17	20	5.0	50
15/11/17	21	5.0	50	17/11/17	21	5.0	50	19/11/17	21	5.0	50	21/11/17	21	5.0	50	23/11/17	21	5.0	50	25/11/17	21	5.0	50	27/11/17	21	5.0	50
15/11/17	22	5.0	50	17/11/17	22	5.0	50	19/11/17	22	5.0	50	21/11/17	22	5.0	50	23/11/17	22	5.0	50	25/11/17	22	5.0	50	27/11/17	22	5.0	50
15/11/17	23	5.0	50	17/11/17	23	5.0	50	19/11/17	23	5.0	50	21/11/17	23	5.0	50	23/11/17	23	5.0	50	25/11/17	23	5.0	50	27/11/17	23	5.0	50
16/11/17	0	5.0	50	18/11/17	0	5.0	50	20/11/17	0	5.0	50	22/11/17	0	5.0	50	24/11/17	0	5.0	50	26/11/17	0	5.0	50	28/11/17	0	5.0	50
16/11/17	1	5.0	50	18/11/17	1	5.0	50	20/11/17	1	5.0	50	22/11/17	1	5.0	50	24/11/17	1	5.0	50	26/11/17	1	5.0	50	28/11/17	1	5.0	50
16/11/17	2	5.0	50	18/11/17	2	5.0	50	20/11/17	2	5.0	50	22/11/17	2	5.0	50	24/11/17	2	5.0	50	26/11/17	2	5.0	50	28/11/17	2	5.0	50
16/11/17	3	5.0	50	18/11/17	3	5.0	50	20/11/17	3	5.0	50	22/11/17	3	5.0	50	24/11/17	3	5.0	50	26/11/17	3	5.0	50	28/11/17	3	5.0	50
16/11/17	4	5.0	50	18/11/17	4	5.0	50	20/11/17	4	5.0	50	22/11/17	4	5.0	50	24/11/17	4	5.0	50	26/11/17	4	5.0	50	28/11/17	4	5.0	50
16/11/17	5	5.0	50	18/11/17	5	5.0	50	20/11/17	5	5.0	50	22/11/17	5	5.0	50	24/11/17	5	5.0	50	26/11/17	5	5.0	50	28/11/17	5	5.0	50
16/11/17	6	5.0	50	18/11/17	6	5.0	50	20/11/17	6	5.0	50	22/11/17	6	5.0	50	24/11/17	6	5.0	50	26/11/17	6	5.0	50	28/11/17	6	5.0	50
16/11/17	7	5.0	50	18/11/17	7	5.0	50	20/11/17	7	5.0	50	22/11/17	7	5.0	50	24/11/17	7	5.0	50	26/11/17	7	5.0	50	28/11/17	7	5.0	50
16/11/17	8	5.0	50	18/11/17	8	5.0	50	20/11/17	8	5.0	50	22/11/17	8	5.0	50	24/11/17	8	5.0	50	26/11/17	8	5.0	50	28/11/17	8	5.0	50
16/11/17	9	5.0	50	18/11/17	9	5.0	50	20/11/17	9	5.0	50	22/11/17	9	5.0	50	24/11/17	9	5.0	50	26/11/17	9	5.0	50	28/11/17	9	5.0	50
16/11/17	10	5.0	50	18/11/17	10	5.0	50	20/11/17	10	5.0	50	22/11/17	10	5.0	50	24/11/17	10	5.0	50	26/11/17	10	5.0	50	28/11/17	10	5.0	50
16/11/17	11	5.0	50	18/11/17	11	5.0	50	20/11/17	11	5.0	50	22/11/17	11	5.0	50	24/11/17	11	5.0	50	26/11/17	11	5.4	50	28/11/17	11	5.0	50
16/11/17	12	5.0	50	18/11/17	12	5.0	50	20/11/17	12	5.0	50	22/11/17	12	5.0	50	24/11/17	12	5.0	50	26/11/17	12	5.0	50	28/11/17	12	5.0	50
16/11/17	13	5.0	50	18/11/17	13	5.0	50	20/11/17	13	5.0	50	22/11/17	13	5.0	50	24/11/17	13	5.0	50	26/11/17	13	5.0	50	28/11/17	13	5.0	50
16/11/17	14	5.0	50	18/11/17	14	5.0	50	20/11/17	14	5.0	50	22/11/17	14	5.0	50	24/11/17	14	5.0	50	26/11/17	14	5.0	50	28/11/17	14	5.0	50
16/11/17	15	5.0	50	18/11/17	15	5.0	50	20/11/17	15	5.0	50	22/11/17	15	5.0	50	24/11/17	15	5.0	50	26/11/17	15	5.0	50	28/11/17	15	5.0	50
16/11/17	16	5.0	50	18/11/17	16	5.0	50	20/11/17	16	5.0	50	22/11/17	16	5.0	50	24/11/17	16	5.0	50	26/11/17	16	5.0	50	28/11/17	16	5.0	50
16/11/17	17	5.0	50	18/11/17	17	5.0	50	20/11/17	17	5.0	50	22/11/17	17	5.0	50	24/11/17	17	5.0	50	26/11/17	17	5.4	50	28/11/17	17	5.0	50
16/11/17	18	5.0	50	18/11/17	18	5.0	50	20/11/17	18	5.0	50	22/11/17	18	5.0	50	24/11/17	18	7.1	50	26/11/17	18	5.0	50	28/11/17	18	5.0	50
16/11/17	19	5.0	50	18/11/17	19	5.0	50	20/11/17	19	5.0	50	22/11/17	19	5.0	50	24/11/17	19	5.0	50	26/11/17	19	5.0	50	28/11/17	19	5.0	50
16/11/17	20	5.0	50	18/11/17	20	5.0	50	20/11/17	20	5.0	50	22/11/17	20	5.0	50	24/11/17	20	5.0	50	26/11/17	20	5.0	50	28/11/17	20	5.0	50
16/11/17	21	5.0	50	18/11/17	21	5.0	50	20/11/17	21	5.0	50	22/11/17	21	5.0	50	24/11/17	21	5.0	50	26/11/17	21	5.0	50	28/11/17	21	5.0	50
16/11/17	22	5.0	50	18/11/17	22	5.0	50	20/11/17	22	5.0	50	22/11/17	22	5.0	50	24/11/17	22	5.0	50	26/11/17	22	5.0	50	28/11/17	22	5.0	50
16/11/17	23	5.0	50	18/11/17	23	5.0	50	20/11/17	23	5.0	50	22/11/17	23	5.0	50	24/11/17	23	5.0	50	26/11/17	23	5.0	50	28/11/17	23	5.0	50

Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)	Date	Hour	H2S 1hr Average (ppb)	SO2 1hr Average (ppb)
29/11/17	0	5.0	50	01/12/17	0	No Data	No Data	03/12/17	0	5.0	50	05/12/17	0	5.0	50	07/12/17	0	5.0	50	09/12/17	0	5.0	50	11/12/17	0	5.0	50
29/11/17	1	5.0	50	01/12/17	1	No Data	No Data	03/12/17	1	5.0	50	05/12/17	1	5.0	50	07/12/17	1	5.0	50	09/12/17	1	5.0	50	11/12/17	1	5.0	50
29/11/17	2	5.0	50	01/12/17	2	No Data	No Data	03/12/17	2	5.0	50	05/12/17	2	5.0	50	07/12/17	2	5.0	50	09/12/17	2	5.0	50	11/12/17	2	5.0	50
29/11/17	3	5.0	50	01/12/17	3	No Data	No Data	03/12/17	3	5.0	50	05/12/17	3	5.0	50	07/12/17	3	5.0	50	09/12/17	3	5.0	50	11/12/17	3	5.0	50
29/11/17	4	5.0	50	01/12/17	4	No Data	No Data	03/12/17	4	5.0	50	05/12/17	4	5.0	50	07/12/17	4	5.0	50	09/12/17	4	5.0	50	11/12/17	4	5.0	50
29/11/17	5	No Data	No Data	01/12/17	5	No Data	No Data	03/12/17	5	5.0	50	05/12/17	5	5.0	50	07/12/17	5	5.0	50	09/12/17	5	5.0	50	11/12/17	5	5.0	50
29/11/17	6	No Data	No Data	01/12/17	6	No Data	No Data	03/12/17	6	5.0	50	05/12/17	6	5.0	50	07/12/17	6	5.0	50	09/12/17	6	5.0	50	11/12/17	6	5.4	50
29/11/17	7	No Data	No Data	01/12/17	7	No Data	No Data	03/12/17	7	5.0	50	05/12/17	7	5.0	50	07/12/17	7	5.0	50	09/12/17	7	5.0	50	11/12/17	7	5.0	50
29/11/17	8	No Data	No Data	01/12/17	8	No Data	No Data	03/12/17	8	5.0	50	05/12/17	8	5.0	50	07/12/17	8	5.0	50	09/12/17	8	5.0	50	11/12/17	8	5.0	50
29/11/17	9	No Data	No Data	01/12/17	9	No Data	No Data	03/12/17	9	5.0	50	05/12/17	9	5.0	50	07/12/17	9	5.0	50	09/12/17	9	5.0	50	11/12/17	9	No Data	50
29/11/17	10	No Data	No Data	01/12/17	10	No Data	No Data	03/12/17	10	5.0	50	05/12/17	10	5.0	50	07/12/17	10	5.0	50	09/12/17	10	5.0	50	11/12/17	10	No Data	50
29/11/17	11	No Data	No Data	01/12/17	11	No Data	No Data	03/12/17	11	5.0	50	05/12/17	11	5.0	50	07/12/17	11	5.0	50	09/12/17	11	5.0	50	11/12/17	11	No Data	50
29/11/17	12	No Data	No Data	01/12/17	12	No Data	No Data	03/12/17	12	5.0	50	05/12/17	12	5.0	50	07/12/17	12	5.0	50	09/12/17	12	5.0	50	11/12/17	12	No Data	50
29/11/17	13	No Data	No Data	01/12/17	13	5.0	50	03/12/17	13	5.0	50	05/12/17	13	No Data	No Data	07/12/17	13	5.0	50	09/12/17	13	5.0	50	11/12/17	13	No Data	50
29/11/17	14	No Data	No Data	01/12/17	14	5.0	50	03/12/17	14	5.0	50	05/12/17	14	No Data	No Data	07/12/17	14	5.4	50	09/12/17	14	5.0	50	11/12/17	14	No Data	50
29/11/17	15	No Data	No Data	01/12/17	15	5.0	50	03/12/17	15	5.0	50	05/12/17	15	No Data	No Data	07/12/17	15	5.0	50	09/12/17	15	5.0	50	11/12/17	15	No Data	50
29/11/17	16	No Data	No Data	01/12/17	16	5.0	50	03/12/17	16	5.0	50	05/12/17	16	No Data	No Data	07/12/17	16	5.0	50	09/12/17	16	5.0	50	11/12/17	16	No Data	50
29/11/17	17	No Data	No Data	01/12/17	17	5.0	50	03/12/17	17	5.0	50	05/12/17	17	No Data	No Data	07/12/17	17	5.0	50	09/12/17	17	5.0	50	11/12/17	17	No Data	50
29/11/17	18	No Data	No Data	01/12/17	18	5.4	50	03/12/17	18	5.0	50	05/12/17	18	No Data	No Data	07/12/17	18	5.0	50	09/12/17	18	5.0	50	11/12/17	18	No Data	50
29/11/17	19	No Data	No Data	01/12/17	19	6.7	50	03/12/17	19	5.0	50	05/12/17	19	No Data	No Data	07/12/17	19	5.0	50	09/12/17	19	5.0	50	11/12/17	19	No Data	50
29/11/17	20	No Data	No Data	01/12/17	20	5.0	50	03/12/17	20	5.0	50	05/12/17	20	No Data	No Data	07/12/17	20	8.3	50	09/12/17	20	5.0	50	11/12/17	20	No Data	50
29/11/17	21	No Data	No Data	01/12/17	21	5.0	50	03/12/17	21	5.0	50	05/12/17	21	No Data	No Data	07/12/17	21	5.0	50	09/12/17	21	5.0	50	11/12/17	21	No Data	50
29/11/17	22	No Data	No Data	01/12/17	22	5.0	50	03/12/17	22	5.0	50	05/12/17	22	No Data	No Data	07/12/17	22	5.0	50	09/12/17	22	5.0	50	11/12/17	22	No Data	50
29/11/17	23	No Data	No Data	01/12/17	23	5.0	50	03/12/17	23	5.0	50	05/12/17	23	No Data	No Data	07/12/17	23	5.0	50	09/12/17	23	5.0	50	11/12/17	23	No Data	50
30/11/17	0	No Data	No Data	02/12/17	0	5.0	50	04/12/17	0	5.0	50	06/12/17	0	No Data	No Data	08/12/17	0	5.0	50	10/12/17	0	5.0	50	12/12/17	0	5.0	50
30/11/17	1	No Data	No Data	02/12/17	1	5.0	50	04/12/17	1	5.0	50	06/12/17	1	No Data	No Data	08/12/17	1	5.0	50	10/12/17	1	5.0	50	12/12/17	1	5.0	50
30/11/17	2	No Data	No Data	02/12/17	2	5.0	50	04/12/17	2	5.0	50	06/12/17	2	No Data	No Data	08/12/17	2	5.0	50	10/12/17	2	5.0	50	12/12/17	2	5.0	50
30/11/17	3	No Data	No Data	02/12/17	3	5.0	50	04/12/17	3	5.0	50	06/12/17	3	No Data	No Data	08/12/17	3	5.0	50	10/12/17	3	5.0	50	12/12/17	3	5.0	50
30/11/17	4	No Data	No Data	02/12/17	4	5.0	50	04/12/17	4	5.0	50	06/12/17	4	No Data	No Data	08/12/17	4	5.0	50	10/12/17	4	6.7	50	12/12/17	4	5.0	50
30/11/17	5	No Data	No Data	02/12/17	5	5.0	50	04/12/17	5	5.0	50	06/12/17	5	No Data	No Data	08/12/17	5	5.0	50	10/12/17	5	5.0	50	12/12/17	5	5.0	50
30/11/17	6	No Data	No Data	02/12/17	6	5.0	50	04/12/17	6	5.4	50	06/12/17	6	No Data	No Data	08/12/17	6	5.0	50	10/12/17	6	5.0	50	12/12/17	6	5.0	50
30/11/17	7	No Data	No Data	02/12/17	7	5.0	50	04/12/17	7	5.0	50	06/12/17	7	No Data	No Data	08/12/17	7	5.0	50	10/12/17	7	5.0	50	12/12/17	7	5.0	50
30/11/17	8	No Data	No Data	02/12/17	8	5.0	50	04/12/17	8	5.0	50	06/12/17	8	No Data	No Data	08/12/17	8	5.0	50	10/12/17	8	5.0	50	12/12/17	8	5.0	50
30/11/17	9	No Data	No Data	02/12/17	9	5.0	50	04/12/17	9	5.0	50	06/12/17	9	No Data	No Data	08/12/17	9	5.0	50	10/12/17	9	5.0	50	12/12/17	9	No Data	50
30/11/17	10	No Data	No Data	02/12/17	10	5.0	50	04/12/17	10	5.0	50	06/12/17	10	No Data	No Data	08/12/17	10	5.0	50	10/12/17	10	5.0	50	12/12/17	10	No Data	50
30/11/17	11	No Data	No Data	02/12/17	11	5.0	50	04/12/17	11	5.0	50	06/12/17	11	No Data	No Data	08/12/17	11	5.0	50	10/12/17	11	5.0	50	12/12/17	11	No Data	50
30/11/17	12	No Data	No Data	02/12/17	12	5.0	50	04/12/17	12	5.0	50	06/12/17	12	No Data	No Data	08/12/17	12	5.0	50	10/12/17	12	5.0	50	12/12/17	12	No Data	50
30/11/17	13	No Data	No Data	02/12/17	13	5.0	50	04/12/17	13	5.0	50	06/12/17	13	5.0	50	08/12/17	13	5.0	50	10/12/17	13	5.0	50	12/12/17	13	No Data	50
30/11/17	14	No Data	No Data	02/12/17	14	5.0	50	04/12/17	14	5.0	50	06/12/17	14	6.7	50	08/12/17	14	5.4	50	10/12/17	14	5.0	50	12/12/17	14	No Data	50
30/11/17	15	No Data	No Data	02/12/17	15	5.0	50	04/12/17	15	5.0	50	06/12/17	15	5.0	50	08/12/17	15	5.0	50	10/12/17	15	5.0	50	12/12/17	15	No Data	50
30/11/17	16	No Data	No Data	02/12/17	16	5.0	50	04/12/17	16	5.0	50	06/12/17	16	5.0	50	08/12/17	16	5.4	50	10/12/17	16	5.0	50	12/12/17	16	No Data	50
30/11/17	17	No Data	No Data	02/12/17	17	5.0	50	04/12/17	17	5.0	50	06/12/17	17	5.0	50	08/12/17	17	12.9	50	10/12/17	17	5.0	50	12/12/17	17	No Data	50
30/11/17	18	No Data	No Data	02/12/17	18	5.0	50	04/12/17	18	5.0	50	06/12/17	18	5.0	50	08/12/17	18	5.0	50	10/12/17	18	5.0	50	12/12/17	18	No Data	50
30/11/17	19	No Data	No Data	02/12/17	19	5.0	50	04/12/17	19	5.0	50	06/12/17	19	5.0	50	08/12/17	19	5.0	50	10/12/17	19	5.0	50	12/12/17	19	No Data	50
30/11/17	20	No Data	No Data	02/12/17	20	5.0	50	04/12/17	20	5.0	50	06/12/17	20	5.0	50	08/12/17	20	5.0	50	10/12/17	20	5.0	50	12/12/17	20	No Data	50
30/11/17	21	No Data	No Data	02/12/17	21	5.0	50	04/12/17	21	5.0	50	06/12/17	21	5.0	50	08/12/17	21	5.0	50	10/12/17	21	5.0	50	12/12/17	21	No Data	50
30/11/17	22	No Data	No Data	02/12/17	22	5.0	50	04/12/17	22	5.0	50	06/12/17	22	5.0	50	08/12/17	22	5.0	50	10/12/17	22	5.0	50	12/12/17	22	No Data	50
30/11/17	23	No Data	No Data	02/12/17	23	5.0	50	04/12/17	23	5.0	50	06/12/17	23	5.0	50	08/12/17	23	5.0	50	10/12/17	23	5.0	50	12/12/17	23	No Data	50

Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)
13/12/17	0	No Data	50	15/12/17	0	5.0	50	17/12/17	0	5.0	50	19/12/17	0	5.0	50	21/12/17	0	5.0	50	23/12/17	0	5.0	50	25/12/17	0	5.0	50
13/12/17	1	No Data	50	15/12/17	1	5.0	50	17/12/17	1	5.0	50	19/12/17	1	5.0	50	21/12/17	1	5.0	50	23/12/17	1	5.0	50	25/12/17	1	5.0	50
13/12/17	2	No Data	50	15/12/17	2	5.0	50	17/12/17	2	7.1	50	19/12/17	2	5.0	50	21/12/17	2	5.0	50	23/12/17	2	5.0	50	25/12/17	2	5.0	50
13/12/17	3	No Data	50	15/12/17	3	5.0	50	17/12/17	3	5.0	50	19/12/17	3	5.0	50	21/12/17	3	5.0	50	23/12/17	3	5.0	50	25/12/17	3	5.0	50
13/12/17	4	No Data	50	15/12/17	4	5.0	50	17/12/17	4	5.0	50	19/12/17	4	5.0	50	21/12/17	4	5.0	50	23/12/17	4	5.0	50	25/12/17	4	5.0	50
13/12/17	5	No Data	50	15/12/17	5	5.0	50	17/12/17	5	5.0	50	19/12/17	5	5.0	50	21/12/17	5	5.0	50	23/12/17	5	5.0	50	25/12/17	5	5.0	50
13/12/17	6	No Data	50	15/12/17	6	5.0	50	17/12/17	6	5.0	50	19/12/17	6	5.0	50	21/12/17	6	5.0	50	23/12/17	6	5.0	50	25/12/17	6	5.0	50
13/12/17	7	No Data	50	15/12/17	7	5.0	50	17/12/17	7	5.0	50	19/12/17	7	5.0	50	21/12/17	7	5.0	50	23/12/17	7	5.0	50	25/12/17	7	5.0	50
13/12/17	8	No Data	50	15/12/17	8	5.0	50	17/12/17	8	5.0	50	19/12/17	8	5.0	50	21/12/17	8	5.0	50	23/12/17	8	5.0	50	25/12/17	8	5.0	50
13/12/17	9	No Data	50	15/12/17	9	5.0	50	17/12/17	9	5.0	50	19/12/17	9	5.0	50	21/12/17	9	5.0	50	23/12/17	9	5.0	50	25/12/17	9	5.0	50
13/12/17	10	No Data	50	15/12/17	10	5.0	50	17/12/17	10	5.0	50	19/12/17	10	5.0	50	21/12/17	10	5.0	50	23/12/17	10	5.0	50	25/12/17	10	5.0	50
13/12/17	11	No Data	50	15/12/17	11	5.0	50	17/12/17	11	5.0	50	19/12/17	11	5.0	50	21/12/17	11	5.0	50	23/12/17	11	5.0	50	25/12/17	11	5.0	50
13/12/17	12	No Data	50	15/12/17	12	5.0	50	17/12/17	12	5.0	50	19/12/17	12	5.0	50	21/12/17	12	5.0	50	23/12/17	12	5.0	50	25/12/17	12	5.0	50
13/12/17	13	No Data	50	15/12/17	13	5.0	50	17/12/17	13	5.0	50	19/12/17	13	5.0	50	21/12/17	13	5.0	50	23/12/17	13	5.0	50	25/12/17	13	5.0	50
13/12/17	14	No Data	50	15/12/17	14	5.0	50	17/12/17	14	5.0	50	19/12/17	14	5.0	50	21/12/17	14	5.0	50	23/12/17	14	5.0	50	25/12/17	14	5.0	50
13/12/17	15	5.0	50	15/12/17	15	5.0	50	17/12/17	15	5.0	50	19/12/17	15	5.0	50	21/12/17	15	5.0	50	23/12/17	15	5.0	50	25/12/17	15	5.0	50
13/12/17	16	5.0	50	15/12/17	16	5.0	50	17/12/17	16	5.0	50	19/12/17	16	5.0	50	21/12/17	16	5.0	50	23/12/17	16	5.0	50	25/12/17	16	5.0	50
13/12/17	17	5.0	50	15/12/17	17	5.0	50	17/12/17	17	5.0	50	19/12/17	17	5.0	50	21/12/17	17	5.0	50	23/12/17	17	5.0	50	25/12/17	17	5.0	50
13/12/17	18	5.0	50	15/12/17	18	5.0	50	17/12/17	18	5.0	50	19/12/17	18	5.0	50	21/12/17	18	5.0	50	23/12/17	18	5.0	50	25/12/17	18	5.0	50
13/12/17	19	5.0	50	15/12/17	19	5.0	50	17/12/17	19	5.0	50	19/12/17	19	5.0	50	21/12/17	19	5.0	50	23/12/17	19	7.5	50	25/12/17	19	5.0	50
13/12/17	20	5.0	50	15/12/17	20	5.0	50	17/12/17	20	5.0	50	19/12/17	20	5.0	50	21/12/17	20	5.0	50	23/12/17	20	5.0	50	25/12/17	20	5.0	50
13/12/17	21	5.0	50	15/12/17	21	5.0	50	17/12/17	21	5.0	50	19/12/17	21	5.0	50	21/12/17	21	5.0	50	23/12/17	21	5.0	50	25/12/17	21	5.0	50
13/12/17	22	5.0	50	15/12/17	22	5.0	50	17/12/17	22	5.0	50	19/12/17	22	5.0	50	21/12/17	22	5.0	50	23/12/17	22	5.0	50	25/12/17	22	5.0	50
13/12/17	23	5.0	50	15/12/17	23	5.0	50	17/12/17	23	5.0	50	19/12/17	23	5.0	50	21/12/17	23	5.0	50	23/12/17	23	5.0	50	25/12/17	23	5.0	50
14/12/17	0	5.0	50	16/12/17	0	5.0	50	18/12/17	0	5.0	50	20/12/17	0	5.0	50	22/12/17	0	5.0	50	24/12/17	0	5.0	50	26/12/17	0	5.0	50
14/12/17	1	5.0	50	16/12/17	1	5.0	50	18/12/17	1	5.0	50	20/12/17	1	5.0	50	22/12/17	1	5.0	50	24/12/17	1	5.0	50	26/12/17	1	5.0	50
14/12/17	2	5.0	50	16/12/17	2	5.0	50	18/12/17	2	5.0	50	20/12/17	2	5.0	50	22/12/17	2	5.0	50	24/12/17	2	5.0	50	26/12/17	2	5.0	50
14/12/17	3	5.0	50	16/12/17	3	5.0	50	18/12/17	3	5.0	50	20/12/17	3	5.0	50	22/12/17	3	5.0	50	24/12/17	3	5.0	50	26/12/17	3	5.0	50
14/12/17	4	5.0	50	16/12/17	4	5.0	50	18/12/17	4	5.0	50	20/12/17	4	5.0	50	22/12/17	4	5.0	50	24/12/17	4	5.0	50	26/12/17	4	5.0	50
14/12/17	5	5.0	50	16/12/17	5	5.0	50	18/12/17	5	5.0	50	20/12/17	5	5.0	50	22/12/17	5	5.0	50	24/12/17	5	5.0	50	26/12/17	5	5.0	50
14/12/17	6	5.0	50	16/12/17	6	5.0	50	18/12/17	6	5.0	50	20/12/17	6	5.0	50	22/12/17	6	5.0	50	24/12/17	6	5.0	50	26/12/17	6	5.0	50
14/12/17	7	5.0	50	16/12/17	7	5.0	50	18/12/17	7	5.0	50	20/12/17	7	5.0	50	22/12/17	7	5.0	50	24/12/17	7	5.0	50	26/12/17	7	5.0	50
14/12/17	8	5.0	50	16/12/17	8	5.0	50	18/12/17	8	5.0	50	20/12/17	8	5.0	50	22/12/17	8	5.0	50	24/12/17	8	5.0	50	26/12/17	8	5.0	50
14/12/17	9	5.0	50	16/12/17	9	5.0	50	18/12/17	9	5.0	50	20/12/17	9	5.0	50	22/12/17	9	5.0	50	24/12/17	9	5.0	50	26/12/17	9	5.0	50
14/12/17	10	5.0	50	16/12/17	10	5.0	50	18/12/17	10	5.0	50	20/12/17	10	5.0	50	22/12/17	10	5.0	50	24/12/17	10	5.0	50	26/12/17	10	5.0	50
14/12/17	11	5.0	50	16/12/17	11	5.0	50	18/12/17	11	5.0	50	20/12/17	11	5.0	50	22/12/17	11	5.0	50	24/12/17	11	5.0	50	26/12/17	11	5.0	50
14/12/17	12	5.0	50	16/12/17	12	5.0	50	18/12/17	12	5.7	50	20/12/17	12	5.0	50	22/12/17	12	5.0	50	24/12/17	12	5.0	50	26/12/17	12	5.0	50
14/12/17	13	5.0	50	16/12/17	13	5.0	50	18/12/17	13	5.0	50	20/12/17	13	5.0	50	22/12/17	13	5.0	50	24/12/17	13	5.0	50	26/12/17	13	5.0	50
14/12/17	14	5.0	50	16/12/17	14	5.0	50	18/12/17	14	5.0	50	20/12/17	14	5.0	50	22/12/17	14	5.0	50	24/12/17	14	7.9	50	26/12/17	14	5.0	50
14/12/17	15	5.0	50	16/12/17	15	5.0	50	18/12/17	15	5.0	50	20/12/17	15	5.0	50	22/12/17	15	5.0	50	24/12/17	15	10.0	50	26/12/17	15	5.0	50
14/12/17	16	5.0	50	16/12/17	16	5.0	50	18/12/17	16	No Data	No Data	20/12/17	16	5.0	50	22/12/17	16	5.0	50	24/12/17	16	5.0	50	26/12/17	16	5.0	50
14/12/17	17	8.3	50	16/12/17	17	5.0	50	18/12/17	17	5.0	50	20/12/17	17	25.8	50	22/12/17	17	5.0	50	24/12/17	17	12.1	50	26/12/17	17	5.0	50
14/12/17	18	5.0	50	16/12/17	18	5.0	50	18/12/17	18	5.0	50	20/12/17	18	5.0	50	22/12/17	18	5.0	50	24/12/17	18	33.8	50	26/12/17	18	5.0	50
14/12/17	19	5.0	50	16/12/17	19	5.0	50	18/12/17	19	5.0	50	20/12/17	19	5.0	50	22/12/17	19	5.0	50	24/12/17	19	5.0	50	26/12/17	19	5.0	50
14/12/17	20	5.8	50	16/12/17	20	5.0	50	18/12/17	20	5.0	50	20/12/17	20	5.0	50	22/12/17	20	5.0	50	24/12/17	20	5.0	50	26/12/17	20	5.0	50
14/12/17	21	5.0	50	16/12/17	21	5.0	50	18/12/17	21	5.0	50	20/12/17	21	5.0	50	22/12/17	21	5.0	50	24/12/17	21	5.0	50	26/12/17	21	5.0	50
14/12/17	22	5.0	50	16/12/17	22	5.0	50	18/12/17	22	5.0	50	20/12/17	22	5.0	50	22/12/17	22	5.0	50	24/12/17	22	5.0	50	26/12/17	22	5.0	50
14/12/17	23	5.0	50	16/12/17	23	5.0	50	18/12/17	23	5.0	50	20/12/17	23	5.0	50	22/12/17	23	5.0	50	24/12/17	23	5.0	50	26/12/17	23	5.0	50

Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)	Date	Hour	H$_2$S 1hr Average (ppb)	SO$_2$ 1hr Average (ppb)
27/12/17	0	5.4	50	29/12/17	0	5.0	50	31/12/17	0	No Data	No Data
27/12/17	1	5.0	50	29/12/17	1	5.0	50	31/12/17	1	No Data	No Data
27/12/17	2	5.0	50	29/12/17	2	5.0	50	31/12/17	2	No Data	No Data
27/12/17	3	5.0	50	29/12/17	3	5.0	50	31/12/17	3	No Data	No Data
27/12/17	4	5.0	50	29/12/17	4	5.0	50	31/12/17	4	No Data	No Data
27/12/17	5	5.0	50	29/12/17	5	5.0	50	31/12/17	5	No Data	No Data
27/12/17	6	5.0	50	29/12/17	6	No Data	No Data	31/12/17	6	No Data	No Data
27/12/17	7	5.0	50	29/12/17	7	No Data	No Data	31/12/17	7	No Data	No Data
27/12/17	8	5.0	50	29/12/17	8	No Data	No Data	31/12/17	8	No Data	No Data
27/12/17	9	5.0	50	29/12/17	9	No Data	No Data	31/12/17	9	No Data	No Data
27/12/17	10	5.0	50	29/12/17	10	No Data	No Data	31/12/17	10	5.0	50
27/12/17	11	5.0	50	29/12/17	11	No Data	No Data	31/12/17	11	5.0	50
27/12/17	12	5.0	50	29/12/17	12	No Data	No Data	31/12/17	12	5.0	50
27/12/17	13	5.0	50	29/12/17	13	No Data	No Data	31/12/17	13	5.0	50
27/12/17	14	5.0	50	29/12/17	14	No Data	No Data	31/12/17	14	5.0	50
27/12/17	15	5.0	50	29/12/17	15	No Data	No Data	31/12/17	15	5.0	50
27/12/17	16	5.0	50	29/12/17	16	No Data	No Data	31/12/17	16	5.0	50
27/12/17	17	5.0	50	29/12/17	17	No Data	No Data	31/12/17	17	5.0	50
27/12/17	18	5.0	50	29/12/17	18	No Data	No Data	31/12/17	18	5.0	50
27/12/17	19	5.0	50	29/12/17	19	No Data	No Data	31/12/17	19	5.0	50
27/12/17	20	5.0	50	29/12/17	20	No Data	No Data	31/12/17	20	5.0	50
27/12/17	21	5.0	50	29/12/17	21	No Data	No Data	31/12/17	21	5.0	50
27/12/17	22	5.0	50	29/12/17	22	No Data	No Data	31/12/17	22	5.0	50
27/12/17	23	5.0	50	29/12/17	23	No Data	No Data	31/12/17	23	5.0	50
28/12/17	0	5.0	50	30/12/17	0	No Data	No Data				
28/12/17	1	5.0	50	30/12/17	1	No Data	No Data				
28/12/17	2	5.0	50	30/12/17	2	No Data	No Data				
28/12/17	3	5.0	50	30/12/17	3	No Data	No Data				
28/12/17	4	5.0	50	30/12/17	4	No Data	No Data				
28/12/17	5	5.0	50	30/12/17	5	No Data	No Data				
28/12/17	6	5.4	50	30/12/17	6	No Data	No Data				
28/12/17	7	5.0	50	30/12/17	7	No Data	No Data				
28/12/17	8	5.0	50	30/12/17	8	No Data	No Data				
28/12/17	9	5.0	50	30/12/17	9	No Data	No Data				
28/12/17	10	5.0	50	30/12/17	10	No Data	No Data				
28/12/17	11	5.0	50	30/12/17	11	No Data	No Data				
28/12/17	12	5.0	50	30/12/17	12	No Data	No Data				
28/12/17	13	5.0	50	30/12/17	13	No Data	No Data				
28/12/17	14	5.0	50	30/12/17	14	No Data	No Data				
28/12/17	15	5.0	50	30/12/17	15	No Data	No Data				
28/12/17	16	5.0	50	30/12/17	16	No Data	No Data				
28/12/17	17	5.0	50	30/12/17	17	No Data	No Data				
28/12/17	18	5.0	50	30/12/17	18	No Data	No Data				
28/12/17	19	5.0	50	30/12/17	19	No Data	No Data				
28/12/17	20	5.0	50	30/12/17	20	No Data	No Data				
28/12/17	21	5.0	50	30/12/17	21	No Data	No Data				
28/12/17	22	5.0	50	30/12/17	22	No Data	No Data				
28/12/17	23	5.0	50	30/12/17	23	No Data	No Data				

GAS MONITORING RESULTS – 24 HOUR SUMMARY

Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)	Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)	Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)	Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)	Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)	Date	H$_2$S 24hr Average (ppb)	SO$_2$ 24hr Average (ppb)
26/07/2017	6.4	50	1/08/2017	13.2	50	1/09/2017	17.5	50	1/10/2017	No Data	No Data	1/11/2017	5.0	50	1/12/2017	5.2	50
27/07/2017	17.5	50	2/08/2017	5.0	50	2/09/2017	28.6	50	2/10/2017	No Data	No Data	2/11/2017	5.1	50	2/12/2017	5.0	50
28/07/2017	18.2	50	3/08/2017	5.3	50	3/09/2017	18.6	50	3/10/2017	5.1	50	3/11/2017	5.1	50	3/12/2017	5.0	50
29/07/2017	22.6	50	4/08/2017	5.0	50	4/09/2017	5.0	50	4/10/2017	5.1	50	4/11/2017	5.0	50	4/12/2017	5.0	50
30/07/2017	7.2	50	5/08/2017	5.0	50	5/09/2017	5.0	50	5/10/2017	5.0	50	5/11/2017	5.0	50	5/12/2017	5.0	50
31/07/2017	5.4	50	6/08/2017	5.0	50	6/09/2017	5.1	50	6/10/2017	5.0	50	6/11/2017	5.4	50	6/12/2017	5.2	50
			7/08/2017	5.0	50	7/09/2017	11.5	50	7/10/2017	5.0	50	7/11/2017	5.0	50	7/12/2017	5.2	50
			8/08/2017	5.6	50	8/09/2017	5.0	50	8/10/2017	5.0	50	8/11/2017	5.0	50	8/12/2017	5.4	50
			9/08/2017	5.1	50	9/09/2017	5.2	50	9/10/2017	5.0	50	9/11/2017	5.0	50	9/12/2017	5.0	50
			10/08/2017	5.7	50	10/09/2017	5.2	50	10/10/2017	5.0	50	10/11/2017	5.0	50	10/12/2017	5.1	50
			11/08/2017	5.0	50	11/09/2017	5.3	50	11/10/2017	5.0	50	11/11/2017	5.0	50	11/12/2017	5.1	50
			12/08/2017	5.1	50	12/09/2017	5.1	50	12/10/2017	5.1	50	12/11/2017	5.0	50	12/12/2017	No data	50
			13/08/2017	5.1	50	13/09/2017	5.0	50	13/10/2017	5.5	50	13/11/2017	5.0	50	13/12/2017	5.0	50
			14/08/2017	5.9	50	14/09/2017	5.2	50	14/10/2017	5.0	50	14/11/2017	5.0	50	14/12/2017	5.0	50
			15/08/2017	5.0	50	15/09/2017	5.0	50	15/10/2017	5.0	50	15/11/2017	5.0	50	15/12/2017	5.0	50
			16/08/2017	5.0	50	16/09/2017	5.1	50	16/10/2017	5.0	50	16/11/2017	5.0	50	16/12/2017	5.1	50
			17/08/2017	5.2	50	17/09/2017	5.2	50	17/10/2017	5.0	50	17/11/2017	5.0	50	17/12/2017	5.1	50
			18/08/2017	5.0	50	18/09/2017	5.2	50	18/10/2017	5.0	50	18/11/2017	5.0	50	18/12/2017	5.0	50
			19/08/2017	5.0	50	19/09/2017	5.3	50	19/10/2017	5.0	50	19/11/2017	5.0	50	19/12/2017	5.0	50
			20/08/2017	5.6	50	20/09/2017	5.3	50	20/10/2017	5.0	50	20/11/2017	5.0	50	20/12/2017	5.9	50
			21/08/2017	5.0	50	21/09/2017	5.2	50	21/10/2017	5.0	50	21/11/2017	5.0	50	21/12/2017	5.0	50
			22/08/2017	5.1	50	22/09/2017	5.1	50	22/10/2017	5.0	50	22/11/2017	5.0	50	22/12/2017	5.0	50
			23/08/2017	5.5	50	23/09/2017	5.0	50	23/10/2017	5.0	50	23/11/2017	5.0	50	23/12/2017	5.1	50
			24/08/2017	5.2	50	24/09/2017	5.2	50	24/10/2017	5.1	50	24/11/2017	5.1	50	24/12/2017	6.8	50
			25/08/2017	5.1	50	25/09/2017	5.0	50	25/10/2017	5.2	50	25/11/2017	5.0	50	25/12/2017	5.0	50
			26/08/2017	6.3	50	26/09/2017	5.5	50	26/10/2017	5.8	50	26/11/2017	5.0	50	26/12/2017	5.0	50
			27/08/2017	5.0	50	27/09/2017	5.0	50	27/10/2017	5.0	50	27/11/2017	5.0	50	27/12/2017	5.0	50
			28/08/2017	5.2	50	28/09/2017	5.0	50	28/10/2017	5.0	50	28/11/2017	5.0	50	28/12/2017	5.0	50
			29/08/2017	6.2	50	29/09/2017	5.0	50	29/10/2017	5.1	50	29/11/2017	5.0	50	29/12/2017	5.0	50
			30/08/2017	5.1	50	30/09/2017	5.0	50	30/10/2017	5.0	50	30/11/2017	No Data	No Data	30/12/2017	No data	No data
			31/08/2017	5.2	50				31/10/2017	5.1	50				31/12/2017	5.0	50

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Appendix 2: Water Monitoring Results

MONTHLY SURFACE WATER MONITORING RESULTS - pH

DATE	Dam 1/2	MCC12 Final Settling Pond	No.2 Open Cut Void	No.1 Open Cut Void	MCC07	MCC08
18-Jan-17	8.11	8.24	8.06	no access	8.03	7.95
15-Feb-17	7.77	8.26	8.08	no access	8.06	7.97
13-Mar-17	8.02	8.50	8.05	no access	7.93	7.92
12-Apr-17	8.10	8.27	7.87	no access	7.95	7.97
10-May-17	8.10	8.20	8.06	no access	8.08	8.09
20-Jun-17	8.07	8.31	8.05	no access	8.03	7.99
17-Jul-17	7.91	8.27	7.99	no access	8.01	8.01
22-Aug-17	7.94	8.48	7.86	no access	7.80	7.72
20-Sep-17	7.82	8.52	8.11	no access	7.95	7.96
19-Oct-17	7.69	9.08	8.03	no access	7.93	7.89
27-Nov-17	8.00	8.47	8.14	no access	8.03	8.01
15-Dec-17	7.93	8.55	8.00	no access	7.66	8.05

MONTHLY SURFACE WATER MONITORING RESULTS – ELECTRICAL CONDUCTIVITY

DATE	Dam 1/2	MCC12 Final Settling Pond	No.2 Open Cut Void	No.1 Open Cut Void	MCC07	MCC08
18-Jan-17	6,880	9,300	6,880	no access	5,900	6,120
15-Feb-17	6,860	11,800	7,420	no access	7,370	6,820
13-Mar-17	7,110	7,740	7,300	no access	6,230	6,330
12-Apr-17	6,790	3,840	7,120	no access	1,140	1,430
10-May-17	6,700	7,590	6,780	no access	2,120	3,080
20-Jun-17	6,460	6,060	6,520	no access	2,150	3,160
17-Jul-17	6,900	6,730	6,910	no access	2,460	3,710
22-Aug-17	6,730	7,060	6,840	no access	3,240	5,020
20-Sep-17	6,620	7,180	6,680	no access	4,820	5,580
19-Oct-17	6,420	7,520	6,670	no access	5,210	6,000
27-Nov-17	6,770	7,480	6,790	no access	6,200	6,450
15-Dec-17	6,840	8,140	6,980	no access	9,840	6,730

MONTHLY SURFACE WATER MONITORING RESULTS – TOTAL SUSPENDED SOLIDS

DATE	Dam 1/2	MCC12 Final Settling Pond	No.2 Open Cut Void	No.1 Open Cut Void	MCC07 Muscle Creek - upstream	MCC08 Muscle Creek - downstream
18-Jan-17	10	8	20	no access	7	6
15-Feb-17	5	<5	<5	no access	<5	<5
13-Mar-17	<5	9	<5	no access	15	18
12-Apr-17	8	13	10	no access	<5	<5
10-May-17	24	41	21	no access	5	6
20-Jun-17	16	16	10	no access	58	5
17-Jul-17	15	20	14	no access	10	7
22-Aug-17	7	20	7	no access	<5	<5
20-Sep-17	36	26	17	no access	30	13
19-Oct-17	9	20	14	no access	10	9
27-Nov-17	10	29	5	no access	6	<5
15-Dec-17	7	6	5	no access	20	<5

QUARTERLY SURFACE WATER MONITORING RESULTS – pH

DATE	MCC9	MCC23	MCC24	MCC25	MCC26	MCC27
13-Mar-17	8.10	8.14	dry	8.25	8.42	8.15
20-Jun-17	dry	8.11	dry	7.91	8.81	8.20
20-Sep-17	dry	dry	dry	8.19	8.97	8.24
15-Dec-17	dry	dry	dry	7.81	9.03	8.40

QUARTERLY SURFACE WATER MONITORING RESULTS – ELECTRICAL CONDUCTIVITY

DATE	MCC9	MCC23	MCC24	MCC25	MCC26	MCC27
13-Mar-17	5,220	6,330	dry	5,740	9,340	13,700
20-Jun-17	dry	3,200	dry	4,470	5,840	8,440
20-Sep-17	dry	dry	dry	4,910	7,040	10,800
15-Dec-17	dry	dry	dry	6,760	9,370	18,000

QUARTERLY SURFACE WATER MONITORING RESULTS – TOTAL SUSPENDED SOLIDS

DATE	MCC9	MCC23	MCC24	MCC25	MCC26	MCC27
13-Mar-17	8	24	dry	24	47	103
20-Jun-17	dry	25	dry	9	14	16
20-Sep-17	dry	dry	dry	19	30	<5
15-Dec-17	dry	dry	dry	43	47	40

ANNUAL SURFACE WATER MONITORING RESULTS

Sampled 13 March 2017

ANALYTE	Dam 1/2	MCC12 Final Settling Pond	No.1 Open Cut Void	No.2 Open Cut Void	MCC7	MCC8	MCC9	MCC23	MCC24	MCC25	MCC26	MCC27
pH	8.02	8.5	No access	8.05	7.93	7.92	8.1	8.14	Dry	8.25	8.42	8.15
EC (µS/cm)	7,110	7,740		7,300	6,230	6,330	5,220	4,810		5,740	9,340	13,700
TSS (mg/L)	<5	9		<5	15	18	8	24		24	47	103
Hardness - total (calculation - mg/L)	3,260	3,870		3,460	1,360	1,560	2,290	2,170		1,650	5,870	6,130
Alkalinity - Carbonate (mg $CaCO_3$/L)	<1	22		<1	<1	<1	<1	<1		<1	30	<1
Alkalinity - Bicarbonate (mg $CaCO_3$/L)	256	135		239	329	320	62	167		250	356	282
Sulphates (mg/L)	3,060	3,660		3,220	745	1,140	2,910	2,180		1,330	5,790	7,050
Chloride (mg/L)	658	634		649	1,390	1220	351	287		986	469	1,600
Calcium - total (mg/L)	565	433		582	273	298	510	207		224	274	460
Magnesium - total (mg/L)	450	678		487	164	199	248	401		265	1130	1110
Sodium - total (mg/L)	548	634		572	790	778	355	375		626	732	1840
Potassium - total (mg/L)	42	33		44	7	4	27	42		13	30	44
Iron- filterable (mg/L)	<0.05	<0.05		<0.05	<0.05	<0.05	0.06	<0.05		<0.05	<0.05	<0.05
Arsenic (mg/L)	<0.001	<0.001		<0.001	0.006	0.003	0.002	0.007		0.002	0.009	0.008
Barium (mg/L)	0.03	0.037		0.029	0.046	0.015	0.061	0.209		0.09	0.054	0.049

ANALYTE	Dam 1/2	MCC12 Final Settling Pond	No.1 Open Cut Void	No.2 Open Cut Void	MCC7	MCC8	MCC9	MCC23	MCC24	MCC25	MCC26	MCC27
Cadmium (mg/L)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Chromium (mg/L)	<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001		<0.001	0.003	0.002
Copper (mg/L)	<0.001	<0.001		<0.001	<0.001	<0.001	0.004	<0.001		<0.001	0.002	0.001
Nickel (mg/L)	<0.001	<0.001		<0.001	<0.001	<0.001	0.011	<0.001		<0.001	<0.001	<0.001
Lead (mg/L)	0.133	0.031		0.293	0.481	0.148	<0.001	0.069		1.1	0.2	0.846
Zinc (mg/L)	0.024	0.015		0.041	<0.001	<0.001	<0.005	0.011		0.003	0.012	0.009
Manganese - filterable (mg/L)	<0.01	<0.01		<0.01	<0.01	<0.01	0.224	<0.01		<0.01	<0.01	<0.01
Selenium (mg/L)	<0.005	<0.005		<0.005	<0.005	<0.005	<0.01	<0.005		<0.005	0.008	0.012
Boron (mg/L)	0.69	0.41		0.64	0.1	0.1	0.15	0.34		0.06	0.18	0.41
Iron - total (mg/L)	0.09	<0.05		<0.05	0.43	0.1	0.3	0.77		1.7	3.12	1.72
Mercury (mg/L)	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001
Fluoride - total (mg/L)	0.7	1		0.8	0.4	0.5	0.6	0.9		0.4	1	0.8
Nitrogen Ammonia (mg N/L)	4.64	0.03		2.4	0.03	0.05	0.05	0.07		0.03	0.1	0.34
Nitrates (mg N/L)	1.61	<0.01		1.96	<0.01	<0.01	<0.01	<0.01		<0.01	0.04	0.1
Oil & Grease (mg/L)	<5	<5		<5	<5	<5	<5	<5		<5	<5	<5
PAH (mg/L)	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5
Total Petroleum Hydrocarbons (mg/L)	<70	<70		<70	<70	<70	<70	<70		<70	<70	<70

GROUND WATER MONITORING RESULTS – MINING AREAS

DATE	Relative Level (mAHD)	pH	Electrical Conductivity (µS/cm)	Depth to Water (mbgl)		
	BORE RDH650			RDH616	RDH617	RDH624
Jan-17	113.67			55.77	48.46	34.28
Feb-17	113.74	7.60	6,780	56.22	48.54	34.33
Mar-17	113.72	7.79	6,310	56.14	48.35	34.37
Apr-17	113.75	7.50	7,000	54.34	46.93	34.40
May-17	113.72	7.82	6,540	56.31	48.56	34.44
Jun-17	113.70	7.71	6,320	55.33	48.21	34.48
Jul-17	113.74	7.65	6,600	55.71	48.29	34.50
Aug-17	113.72	7.12	6,590	56.31	48.40	34.55
Sep-17	113.72	7.50	6,240	56.39	48.40	34.60
Oct-17	113.72	7.80	6,070	56.53	48.43	35.65
Nov-17	113.72	6.80	6,180	56.18	48.31	34.70
Dec-17	113.73	7.10	6,380	56.21	48.33	34.70
AVERAGE	**113.72**	**7.49**	**6,455**	**55.95**	**48.27**	**34.58**

ANNUAL GROUNDWATER MONITORING RESULTS – MINING AREAS

Sampled 13 March 2017

ANALYTE	RDH529
pH	7.79
EC (µS/cm)	6,310
TSS (mg/L)	<5
Hardness - total (calculation - mg/L)	1,900
Alkalinity - Carbonate (mg $CaCO_3$/L)	<1
Alkalinity - Bicarbonate (mg $CaCO_3$/L)	529
Sulfates (mg/L)	1,910
Chloride (mg/L)	729
Calcium - total (mg/L)	331
Magnesium - total (mg/L)	260
Sodium - total (mg/L)	735
Potassium - total (mg/L)	27
Iron- filterable (mg/L)	0.18
Arsenic (mg/L)	<0.001
Barium (mg/L)	0.057
Cadmium (mg/L)	<0.0001
Chromium (mg/L)	<0.001
Copper (mg/L)	0.009
Lead (mg/L)	<0.001
Manganese - filterable (mg/L)	0.46
Nickel (mg/L)	0.006
Selenium (mg/L)	<0.01
Zinc (mg/L)	0.154
Boron (mg/L)	0.69
Iron - total (mg/L)	0.66
Mercury (mg/L)	<0.0001
Fluoride - total (mg/L)	0.9
Nitrogen Ammonia (mg N/L)	5.35
Nitrates (mg N/L)	<0.01
Oil & Grease (mg/L)	<5
PAH (mg/L)	<0.5
Total Petroleum Hydrocarbons (mg/L)	<70

GROUND WATER MONITORING RESULTS – SANDY CREEK

Date Sampled	MCC 1003			MCC 1005			MCC 1006			MCC 1015			MCC 1017	MCC 1018
	Depth (mbgl)	pH	EC (µS/cm)	Depth (mbgl)	pH	EC (µS/cm)	Depth (mbgl)	pH	EC (µS/cm)	Depth (mbgl)	pH	EC (µS/cm)	Depth (mbgl)	Depth (mbgl)
18-Jan-17	4.07	7.2	1,415	7.71	7.0	2,190	5.77	7.3	904	too low to sample			17.08	17.79
15-Feb-17	4.89	7.2	1,417	7.94	7.0	2,220	6.33	7.1	880	too low to sample			17.09	17.81
13-Mar-17	5.24	7.6	1,660	8.03	7.6	2,330	6.93	7.5	956	too low to sample			17.22	17.76
12-Apr-17	2.50	7.5	1,092	7.28	7.2	2,120	6.16	7.4	955	too low to sample			17.18	17.78
10-May-17	3.59	7.0	1,314	7.51	6.9	2,100	5.74	7.1	947	too low to sample			17.21	17.79
9-Jun-17	4.10	6.9	1,396	7.73	7.0	2,150	6.07	7.1	948	too low to sample			17.24	17.91
17-Jul-17	4.17	6.9	1,245	7.87	7.0	2,240	6.38	7.0	885	too low to sample			17.22	17.81
22-Aug-17	4.50	7.0	1,424	7.93	7.0	2,240	6.59	7.0	958	too low to sample			17.24	17.86
20-Sep-17	4.96	7.1	1,367	8.12	7.1	2,290	6.86	7.2	949	too low to sample			17.25	17.87
19-Oct-17	5.32	6.9	1,278	8.31	7.0	2,220	7.29	too low to sample		too low to sample			17.26	17.91
27-Nov-17	5.84	7.0	1,301	8.46	6.9	2,350	dry			too low to sample			17.34	17.87
15-Dec-17	6.06	7.1	1,253	8.55	7.0	2,370	dry			too low to sample			17.33	17.89

ANNUAL GROUNDWATER MONITORING RESULTS – SANDY CREEK

Sampled 13 March 2017

Analyte	MCC1003	MCC1005	MCC1006	MCC1015
pH	7.55	7.59	7.53	
EC (µS/cm)	1660	2330	956	
TSS (mg/L)	<5	37	669	
Hardness - total (calculation - mg/L)	430	480	240	
Alkalinity - Carbonate (mg CaCO$_3$/L)	<1	<1	<1	
Alkalinity - Bicarbonate (mg CaCO$_3$/L)	246	271	188	
Sulfates (mg/L)	135	153	65	
Chloride (mg/L)	324	515	154	
Calcium - total (mg/L)	103	100	55	
Magnesium - total (mg/L)	42	56	25	
Sodium - total (mg/L)	171	280	101	
Potassium - total (mg/L)	2	2	2	
Iron- filterable (mg/L)	<0.05	<0.05	0.13	
Arsenic (mg/L)	<0.001	<0.001	0.012	
Barium (mg/L)	0.043	0.03	0.424	
Cadmium (mg/L)	<0.0001	<0.0001	0.0004	
Chromium (mg/L)	<0.001	<0.001	0.031	dry
Copper (mg/L)	<0.001	0.003	0.129	
Lead (mg/L)	<0.001	<0.001	0.057	
Manganese - filterable (mg/L)	<0.001	0.03	0.28	
Nickel (mg/L)	<0.001	0.001	0.028	
Selenium (mg/L)	<0.01	<0.01	<0.01	
Zinc (mg/L)	0.012	0.042	0.86	
Boron (mg/L)	0.12	0.08	0.12	
Iron - total (mg/L)	<0.05	0.31	78.5	
Mercury (mg/L)	<0.0001	<0.0001	<0.0001	
Fluoride - total (mg/L)	0.3	0.3	0.3	
Ammonia (mg/L)	0.02	0.02	0.17	
Nitrite (mg N/L)	<0.01	<0.01	<0.01	
Nitrate (mg N/L)	0.31	0.81	0.25	
Oil & Grease (mg/L)	7	<5	<5	
PAH (mg/L)	<0.5	<0.5	<0.5	
Total Petroleum Hydrocarbons (mg/L)	<70	<70	<70	

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Appendix 3: Blast Monitoring Data

BLAST MONITORING RESULTS

Date	Time	Queen Street (B1)		School (B2)		99 Queen Street (B3)		Nisbet (B4)	
		Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s
5-Jan-17	12:49	110.3	0.26	106.6	0.10	107.1	0.25	105.8	0.51
6-Jan-17	16:08	104.5	0.24	102.8	0.11	103.4	0.22	102.8	0.64
11-Jan-17	12:23	103.0	0.20	96.1	0.07	98.8	0.18	99.8	0.55
13-Jan-17	12:03	111.1	0.26	107.7	0.12	102.3	0.21	109.6	0.87
16-Jan-17	13:23	103.6	0.12	99.8	0.05	102.9	0.14	95.0	0.28
17-Jan-17	13:01	105.0	0.20	101.7	0.07	103.9	0.21	106.4	0.60
18-Jan-17	15:35	108.2	0.21	102.8	0.07	101.1	0.19	106.2	0.40
31-Jan-17	12:52	108.5	0.28	112.4	0.13	101.7	0.30	109.9	0.42
3-Feb-17	13:31	101.2	0.18	99.3	0.05	102.9	0.13	104.0	0.17
8-Feb-17	14:10	107.2	0.18	103.5	0.06	106.4	0.16	108.7	0.57
13-Feb-17	10:29	101.6	0.21	98.8	0.07	99.6	0.21	100.6	0.25
15-Feb-17	9:04	98.4	0.12	98.2	0.05	101.1	0.14	101.0	0.23
16-Feb-17	15:20	101.2	0.17	100.3	0.07	100.4	0.14	101.8	0.17
17-Feb-17	12:43	105.5	0.17	95.2	0.10	95.7	0.12	92.2	0.14
22-Feb-17	9:48	103.9	0.17	100.8	0.05	102.3	0.16	105.8	0.21
23-Feb-17	13:13	95.2	0.18	92.1	0.05	94.3	0.13	97.7	0.15
28-Feb-17	12:42	102.3	0.16	101.7	0.05	99.6	0.13	101.0	0.16
1-Mar-17	12:48	103.0	0.19	100.8	0.08	103.9	0.19	98.8	0.70
15-Mar-17	13:13	111.5	0.24	109.6	0.16	111.5	0.31	112.2	0.52
16-Mar-17	13:47	97.3	0.19	93.3	0.05	94.3	0.15	97.1	0.26
20-Mar-17	14:51	94.4	0.18	97.5	0.06	95.7	0.13	95.8	0.15
20-Mar-17	15:11	107.6	0.19	105.3	0.08	102.9	0.21	108.2	0.26
22-Mar-17	13:30	106.4	0.16	102.5	0.09	104.8	0.23	107.8	0.40
28-Mar-17	12:48	106.4	0.23	103.2	0.11	104.4	0.26	100.2	0.44
30-Mar-17	10:15	102.3	0.19	101.3	0.11	101.7	0.22	100.6	0.36
3-Apr-17	14:51	111.6	0.23	108.3	0.12	110.4	0.28	106.4	0.70
4-Apr-17	12:12	104.7	0.19	100.8	0.07	100.4	0.18	103.4	0.33
5-Apr-17	14:36	95.2	0.26	94.3	0.10	96.8	0.29	95.8	0.54

Date	Time	Queen Street (B1)		School (B2)		99 Queen Street (B3)		Nisbet (B4)	
		Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s
13-Apr-17	14:36	107.2	0.32	102.5	0.20	102.9	0.44	99.8	0.74
19-Apr-17	12:45	97.9	0.17	96.1	0.05	No Result	No Result	98.3	0.15
21-Apr-17	14:42	103.3	0.31	100.8	0.21	103.0	0.35	106.2	0.69
27-Apr-17	13:08	96.6	0.17	93.3	0.05	96.8	0.15	99.8	0.27
28-Apr-17	12:41	96.6	0.16	94.3	0.04	95.7	0.12	95.0	0.16
1-May-17	14:18	110.2	0.19	107.3	0.07	109.7	0.19	107.8	0.31
2-May-17	14:50	99.9	0.22	96.1	0.07	96.8	0.20	102.5	0.46
4-May-17	14:56	106.8	0.22	102.5	0.08	106.4	0.25	104.3	0.28
5-May-17	13:14	103.6	0.20	101.7	0.10	101.7	0.17	101.4	0.16
12-May-17	12:44	86.4	0.17	84.8	0.08	88.3	0.18	86.2	0.35
17-May-17	12:50	102.0	0.56	99.3	0.21	101.1	0.65	99.8	1.69
23-May-17	13:30	98.4	0.33	96.5	0.18	97.7	0.36	102.1	0.62
25-May-17	13:12	106.5	0.43	104.4	0.26	104.7	0.44	111.6	0.80
29-May-17	14:01	104.4	0.22	100.5	0.14	99.5	0.20	106.7	1.09
1-Jun-17	14:39	108.8	0.16	106.6	0.11	110.1	0.17	105.8	0.20
2-Jun-17	14:32	100.1	0.21	98.7	0.11	99.5	0.17	102.8	0.31
6-Jun-17	13:14	103.9	0.26	96.5	0.16	96.3	0.24	105.6	0.36
14-Jun-17	9:20	101.6	0.46	98.7	0.24	101.5	0.42	105.6	1.12
19-Jun-17	12:53	101.6	0.16	100.0	0.11	101.0	0.11	106.1	0.13
21-Jun-17	12:50	101.6	0.40	100.0	0.21	100.5	0.34	102.8	0.56
22-Jun-17	15:01	105.3	0.25	104.8	0.13	101.5	0.22	108.1	0.48
27-Jun-17	13:28	104.9	0.19	104.4	0.13	100.1	0.16	106.3	0.27
30-Jun-17	14:39	105.7	0.22	104.8	0.19	105.8	0.18	113.2	0.57
3-Jul-17	15:05	106.1	0.18	104.4	0.13	102.7	0.15	103.4	0.23
6-Jul-17	16:15	96.2	0.16	94.5	0.10	92.3	0.12	93.6	0.13
7-Jul-17	13:09	100.9	0.17	97.3	0.10	101.9	0.11	106.3	0.15
11-Jul-17	12:49	91.3	0.16	88.5	0.10	89.4	0.12	93.6	0.14
13-Jul-17	11:26	104.4	0.14	101.6	0.09	105.3	0.10	103.1	0.11
14-Jul-17	11:57	107.6	0.17	111.7	0.10	104.1	0.10	106.7	0.12

Date	Time	Queen Street (B1)		School (B2)		99 Queen Street (B3)		Nisbet (B4)	
		Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s
18-Jul-17	9:38	102.2	0.15	101.6	0.10	103.0	0.11	99.6	0.11
20-Jul-17	9:40	102.8	0.15	100.5	0.09	92.3	0.11	102.4	0.13
21-Jul-17	12:36	96.2	0.18	93.4	0.10	96.3	0.12	94.5	0.15
25-Jul-17	10:35	96.2	0.15	90.4	0.09	93.5	0.11	99.6	0.11
31-Jul-17	14:42	115.6	0.27	98.7	0.20	105.3	0.35	115.5	0.77
2-Aug-17	12:34	98.4	0.17	96.5	0.10	97.0	0.11	96.7	0.14
3-Aug-17	12:49	98.4	0.18	98.0	0.11	97.0	0.13	101.7	0.15
8-Aug-17	12:44	105.7	0.21	96.5	0.11	89.4	0.18	99.1	0.21
9-Aug-17	12:44	100.1	0.19	97.3	0.12	98.4	0.17	104.0	0.26
14-Aug-17	12:38	88.8	0.23	94.5	0.13	93.5	0.22	100.9	0.34
15-Aug-17	12:41	104.4	0.18	100.0	0.12	100.1	0.18	104.3	0.44
21-Aug-17	10:24	100.9	0.16	100.0	0.11	98.4	0.13	100.9	0.17
22-Aug-17	13:04	98.4	0.25	95.6	0.15	97.7	0.17	96.8	0.31
23-Aug-17	14:29	106.5	0.28	105.1	0.18	104.4	0.34	114.5	0.77
24-Aug-17	12:06	96.2	0.22	93.4	0.15	91.0	0.27	100.1	0.34
28-Aug-17	14:09	104.4	0.19	103.3	0.12	101.0	0.18	110.0	0.48
30-Aug-17	12:43	103.4	0.26	102.0	0.17	99.5	0.26	107.3	0.71
1-Sep-17	13:09	110.2	0.28	106.6	0.18	111.8	0.33	110.7	0.70
6-Sep-17	7:33	103.4	0.17	102.0	0.12	98.4	0.14	103.4	0.21
8-Sep-17	10:09	106.9	0.16	92.0	0.11	105.8	0.12	104.8	0.14
15-Sep-17	12:16	102.8	0.17	100.5	0.13	101.0	0.14	107.7	0.18
18-Sep-17	12:43	102.2	0.24	101.6	0.16	96.3	0.29	99.6	0.53
26-Sep-17	12:16	102.8	0.21	101.6	0.14	101.9	0.17	109.9	0.17
29-Sep-17	9:09	102.2	0.19	99.4	0.11	101.0	0.14	104.0	0.14
4-Oct-17	12:49	104.9	0.24	102.9	0.14	103.4	0.18	106.3	0.24
6-Oct-17	12:50	91.3	0.17	97.3	0.15	91.0	0.12	91.4	0.13
13-Oct-17	13:15	96.2	0.17	96.5	0.11	97.7	0.12	102.1	0.14
24-Oct-17	12:46	105.7	0.29	104.1	0.14	101.0	0.18	103.1	0.25
3-Nov-17	13:24	111.8	0.21	111.9	0.11	107.7	0.16	105.3	0.16

Date	Time	Queen Street (B1)		School (B2)		99 Queen Street (B3)		Nisbet (B4)	
		Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s	Overpressure dB(L)	Ground Vibration mm/s
8-Nov-17	12:42	107.3	0.21	104.8	0.13	104.7	0.18	117.1	0.31
14-Nov-17	10:45	105.3	0.18	104.4	0.11	106.3	0.15	116.3	0.18
15-Nov-17	12:13	102.8	0.18	102.9	0.13	101.5	0.15	100.5	0.34
22-Nov-17	12:13	100.1	0.16	98.0	0.10	97.7	0.14	104.0	0.17
24-Nov-17	12:47	100.9	0.19	100.0	0.12	99.0	0.15	105.8	0.17
30-Nov-17	12:16	107.6	0.21	106.0	0.13	106.8	0.21	116.7	0.28
7-Dec-17	14:59	104.9	0.25	102.9	0.14	103.7	0.25	108.6	0.34
11-Dec-17	14:35	114.9	0.25	114.3	0.18	113.2	0.21	115.1	0.28
13-Dec-17	12:46	105.7	0.24	103.7	0.13	104.1	0.21	111.6	0.32
14-Dec-17	13:03	94.9	0.21	98.7	0.19	93.5	0.17	98.5	0.20
18-Dec-17	12:42	94.9	0.19	93.4	0.11	94.5	0.13	103.4	0.17
19-Dec-17	14:29	107.3	0.27	95.6	0.13	99.5	0.26	100.5	0.38
22-Dec-17	13:11	97.4	0.27	94.5	0.15	95.4	0.27	105.1	0.48
28-Dec-17	13:21	100.9	0.30	99.4	0.16	98.4	0.29	105.3	0.56

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Appendix 4: Noise Monitoring Results

Detailed Noise Monitoring Results

Table 2									
MCC Operational Noise Monitoring Results – 17 May 2017									
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	10:30 pm	35	32	41	39	45	F/0.4/250	Yes	**MCC (32)**, traffic (31), frogs & insects (25)
R15 Queen St.	11:15 pm	36	33	37	40	45	F/1.0/255	Yes	**MCC (33)**, traffic (31), frogs & insects (27)
R17 Queen St.	10:55 pm	34	30	35	38	45	E/0.6/244	Yes	Traffic and other mines (31), **MCC (30)**, insects (27)
R25 Sandy Creek Rd.	10:10 pm	31	29	42	37	45	E/0.1/250	Yes	**MCC (29)**, Frogs (22), traffic (20)
R32 Muscle Creek Rd.	11:40 pm	33	25	35	28	45	F/1.0/292	Yes	Traffic (30), insects (28), **MCC (25)**

1. L1 (1 min) from MCC mine noise only

Table 2									
MCC Operational Noise Monitoring Results – 30 June 2017									
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	10:35 pm	41	25	41	<30	45	F/0.3/219	Yes	Traffic (41), **MCC (25)**, frogs (21)
R15 Queen St.	10:55 pm	40	25	37	<30	45	E/F/1.7/18.2	Yes	Traffic (40), frogs (28), **MCC (25)**
R17 Queen St.	11:15 pm	33	30	35	39	45	F/1.2/33.5	Yes	**MCC (30)**, traffic (29), frogs (20)
R25 Sandy Creek Rd.	10:15 pm	36	27	42	30	45	F/0/4/267	Yes	Substation (32), traffic (30), **MCC (27)**, frogs (26)
R32 Muscle Creek Rd.	11:35 pm	32	29	35	36	45	F/1.5/147	Yes	**MCC (29)**, traffic (27), frogs (22)

1. L1 (1 min) from MCC mine noise only

Table 2
MCC Operational Noise Monitoring Results – 11 July 2017

Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	10:30 pm	41	37	41	43	45	F/0.4/270	Yes	Train (41), traffic (37), **MCC (37)**, birds (25)
R15 Queen St.	10:55 pm	40	33	37	40	45	F/1.4/271	Yes	Train (37), traffic (35), **MCC (33)**
R17 Queen St.	11:15 pm	44	<30	35	<35	45	F/0.8/53	Yes	Trains (44), traffic (32), **MCC (<30)**
R25 Sandy Creek Rd.	10:10 pm	33	30	42	39	45	F/0.3/191	Yes	**MCC (30)**, traffic (28), train (25)
R32 Muscle Creek Rd.	11:40 pm	33	29	35	36	45	F/0.4/155	Yes	Traffic (31), **MCC (29)**

1. L1 (1 min) from MCC mine noise only

Table 2
MCC Operational Noise Monitoring Results – 25/26 August 2017

Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	11:20 pm	38	35	41	43	45	F/0.9/163	Yes	**MCC (35)**, traffic (31), frogs (29)
R15 Queen St.	11:40 pm	35	30	37	40	45	E/F/1.0/214	Yes	Traffic (33), **MCC (30)**
R17 Queen St.	11:58 pm	44	32	35	43	45	E/1.1/225	Yes	Trains (44), **MCC (32)**, traffic (25)
R25 Sandy Creek Rd.	11:00 pm	39	36	42	40	45	F/1.4/116	Yes	**MCC (36)**, frogs (35), traffic (30)
R32 Muscle Creek Rd.	12:20 am	26	<20	35	25	45	E/1.1/192	Yes	Traffic (25), frogs (23), **MCC (<20)**

1. L1 (1 min) from MCC mine noise only

| Table 2 | | | | | | | | | |
| MCC Operational Noise Monitoring Results – 21 September 2017 | | | | | | | | | |
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	1:53 am	38	25	41	32	45	F/1.1/292	Yes	Traffic (37), frogs & insects (29), MCC (25)
R15 Queen St	2:12 am	35	25	37	33	45	F/1.5/103	Yes	Traffic (34), birds & insects (27), MCC (25)
R17 Queen St	2:30 am	42	n/a	35	n/a	45	F/1.5/290	Yes	Trains (40), traffic (37), MCC inaudible
R25 Sandy Creek Rd.	1:35 am	32	30	42	34	45	F/2.0/88	Yes	MCC (30), traffic (25), frogs (23)
R32 Muscle Creek Rd.	2:55 am	39	34	35	38	45	F/1.1/292	Yes	Birds (36), MCC (34), traffic (30)

1. L1 (1 min) from MCC mine noise only

| Table 2 | | | | | | | | | |
| MCC Operational Noise Monitoring Results – 12/13 October 2017 | | | | | | | | | |
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]
R13 Sandy Creek Rd.	12:05 am	30	<20	41	20	45	F/1.7/130	Yes	Birds & insects (28), traffic (26), MCC (<20)
R15 Queen St.	11:23 pm	29	n/a	37	n/a	45	D/E/1.8/139	Yes	Traffic (27), birds & insects (25), MCC inaudible
R17 Queen St.	11:05 pm	34	n/a	35	n/a	45	D/1.2/249	Yes	Birds & frogs (33), traffic (26), MCC inaudible
R25 Sandy Creek Rd.	11:47 pm	31	n/a	42	n/a	45	F/2.0/115	Yes	Frogs & insects (29), traffic (25), MCC inaudible
R32 Muscle Creek Rd.	10:37 pm	41	n/a	35	n/a	45	F/G/1.8/303	Yes	Bats & frogs (41), traffic (31), MCC inaudible

1. L1 (1 min) from MCC mine noise only

							Table 2			
			MCC Operational Noise Monitoring Results – 24 November 2017							
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]	
R13 Sandy Creek Rd.	2:50 am	38	35	41	42	45	E/1.3/127	Yes	MCC (35), traffic (34), frogs & insects (28)	
R15 Queen St.	2:05 am	31	26	37	30	45	E/0.3/152	Yes	Insects (29), MCC (26), traffic (20)	
R17 Queen St.	1:45 am	34	n/a	35	n/a	45	E/1.0/159	Yes	Birds & insects (33), traffic (27), MCC inaudible	
R25 Sandy Creek Rd.	2:30 am	34	33	42	40	45	G/0.7/96	No	MCC (33), frogs & insects (26)	
R32 Muscle Creek Rd.	3:20 am	28	n/a	35	n/a	45	F/1.0/142	Yes	Frogs & insects (27), traffic (20), MCC inaudible	

1. L1 (1 min) from MCC mine noise only

							Table 2			
			MCC Operational Noise Monitoring Results – 19 December 2017							
Location	Time	dB(A), Leq	MCC Contribution dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min)[1]	Criterion dB(A), L1 (1min)[1]	Stability Class/ Wind speed (m/s)/dir°	Compliant Met Conditions?	Identified Noise Sources[2]	
R13 Sandy Creek Rd.	10:30 pm	34	n/a	41	n/a	45	F/2.5/212	No	Traffic (32), insects (28) MCC inaudible	
R15 Queen St.	10:55 pm	46	<25	37	30	45	E/D/3.1/50	No	Insects (46), traffic (35), MCC (<25)	
R17 Queen St.	11:15 pm	33	28	35	33	45	D/3.5/52	No	Insects (30), MCC (28), traffic (26)	
R25 Sandy Creek Rd.	10:10 pm	37	n/a	42	n/a	45	E/F/2.7/259	Yes	Frogs & insects (35), substation (33), MCC inaudible	
R32 Muscle Creek Rd.	11:40 pm	35	32	35	37	45	F/2.7/161	No	MCC (32), frogs & insects (32)	

1. L1 (1 min) from MCC mine noise only

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Appendix 5: Complaints Summary

SUMMARY OF COMPLAINTS

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
06-Jan-17	4:18 PM	06-Jan-17	4:08 PM	McCully's Gap	Blast	Direct call to Environmental Coordinator	Dust cloud from blast went across McCullys Gap area	A blast was fired at 12:08pm in the Upper West Road area. Due to the sleep time of the blasting product the blast needed to be fired that day. The activities leading up to the blast and the requirement to fire that day were discussed with the complainant.
13-Jan-17	8:54 PM	13-Jan-17	8:54 PM	Woodlands Ridge	Dust	Environmental Hotline - OCE responded.	Dust going over the house and neighbourhood	At the time of the complaint the OCE was in the process of shutting down a digger circuit and moving the digger to a new location. The complainant was appreciative that the digger had been moved to stop the dust.
17-Jan-17	9:52 AM	17-Jan-17	6:30 AM	Muscle Creek	Odour	Environmental Hotline - EC responded.	Strong sulphur smell and smoke	Spontaneous combustion management activities were in place. The EC visited the complainant to discuss their concerns. They commented that the smell was strong at 6:30am. MCC's odour observations did not detect any odour around this time and this was discussed with the complainant. The current spontaneous combustion management measures were discussed with the complainant and they were appreciative that the activities are ongoing. They commented that things have been a lot better lately.
17-Jan-17	7:26 AM	17-Jan-17	7:26 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong odour smell	Spontaneous combustion management activities were in place. Odour observations approximately 1 hour before the complaint detected no odour in the area. The OCE rang the complainant back and left a message for them to call back if they wished to discuss further.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
31-Jan-17	4:12 PM	31-Jan-17	12:55 PM	Woodlands Ridge	Blast	EPA via phone and email	Could smell dust and dust was obscuring the view of the mine	Blasting activities occurred at 12:52pm. A detailed response was provided to the EPA.
23-Feb-17	5:42 PM	20-Feb-17	7:30 AM	Woodlands Ridge	Odour	Email from EPA	Strong burning coal smell	Normal mining operations were occurring. A response was provided to the EPA.
23-Feb-17	5:42 PM	21-Feb-17	8:00 AM	Woodlands Ridge	Odour	Email from EPA	Very strong sulphur smell	Normal mining operations were occurring. A response was provided to the EPA.
23-Feb-17	5:42 PM	22-Feb-17	9:30 AM	Unknown	VISUAL	Email from EPA	Caller could see dust on the horizon	Normal mining operations were occurring. There were major bushfires burning in the area that would have contributed to the hazy conditions from a distance. A response was provided to the EPA.
23-Feb-17	5:42 PM	19-Feb-17	7:45 AM	Scone	Odour	Email from EPA	Acrid sulphur smell coming from one of the local coal mines.	No machinery was operating due to overnight rain. A response was provided to the EPA.
28-Feb-17	3:26 PM	24-Feb-17	7:00 PM	Scone	Odour	Email from EPA and direct call to OCE	Sulphur odour	Normal mining operations were occurring. A response was provided to the EPA.
17-Mar-17	10:40 AM	17-Mar-17	7:00 AM	Scone	Odour	Direct call to office and email from EPA	Sulphur odour	Mining operations were delayed by rain during morning with an infusion spray being installed in the goaf area. Lengthy conversations were held with the complainant to discuss their concerns. A response was provided to the EPA.
24-Mar-17	12:48 PM	22-Mar-17	3:15 PM	Woodlands Ridge	Odour	Email from EPA	Excessive smoke and odour from the mine	Normal mining operations were occurring. Steam was being generated from the infusion spray in the goaf area. A response was provided to the EPA.
30-Mar-17	9:45 AM	29-Mar-17	5:40 PM	Muscle Creek	Driving	Direct call to office	Vehicle not stopping at Stop sign	The driver of the vehicle was identified and was genuinely surprised of the reported event. The driver was reminded of MCC's rules and policies relating to driving.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
19-Apr-17	12:46 PM	19-Apr-17	12:45 PM	McCully's Gap	Blast	Direct call to ES	Could hear the blast in the shed. This is not normal	The blast was reviewed and nothing abnormal was noted. All results were within compliance. The complainant observed the next blast in the same area and did not hear the blast.
20-Apr-17	1:29 PM	19-Apr-17	6:30 AM	Woodlands Ridge	Odour	Email from EPA	Smell from odour	Ongoing mining operations and spontaneous management occurring at MCC. Odour observations by the Environmental Superintendent did not detect any odour in the area at approx. 7:35 am. A response was provided to the EPA.
21-Apr-17	9:43 AM	21-Apr-17	9:43 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Can see and smell smoke	Ongoing mining operations and spontaneous management occurring at MCC. Odour observations by the Environmental Superintendent did not detect any odour in the area at approx. 7:15 am. OCE discussed operations with the complainant.
24-Apr-17	7:45 AM	24-Apr-17	7:45 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Sulphur odour	Ongoing mining operations and spontaneous management occurring at MCC. Odour observations by the Environmental Superintendent did not detect any odour in the area at approx. 7:20 am. A review of the odour by the ES detected odour at low levels at approx. 8:00am. OCE and ES discussed operations and observations with the complainant.
26-Apr-17	4:45 PM	23-Apr-17	12:05 AM	Woodlands Ridge	Noise	Email through website to corporate	Scrapping noise from the operation	Crushing at CHPP was the only activity occurring at the time. Complainant commented about odour and blasting in the email. Attempts to contact the complainant have been unsuccessful.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
02-May-17	9:44 AM	29-Apr-17	7:50 AM	Woodlands Ridge	Odour	Email from EPA	Strong odour and smoke	Ongoing mining operations and spontaneous management occurring at MCC. Odour observations by the OCE detected mild odour in the area at approx. 7:55 am. They also noticed wood smoke in the area. A response was provided to the EPA.
02-May-17	9:44 AM	01-May-17	5:00 AM	Woodlands Ridge	Odour	Email from EPA	Sulphur odour	Ongoing mining operations and spontaneous management occurring at MCC. Odour observations by the Environmental Superintendent did not detect any odour in the area at approx. 8:10am. A response was provided to the EPA.
03-May-17	5:58 PM	03-May-17	5:58 PM	Scone	Odour	Direct call to site - OCE responded	Sulphur odour	Odour was detected around the Dartbrook Loadout. Ongoing spontaneous combustion management activities were occurring. The OCE and Environmental Superintendent both spoke with the complainant.
15-May-17	5:49 AM	15-May-17	5:49 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Sulphur odour	Shift change over at time of complaint with spontaneous combustion management activities ongoing. The OCE rang back and left a message. The Environmental Superintendent and Senior Operations Manager observed odour separately at ~7:00am. No odour was detected.
18-May-17	10:38 AM	18-May-17	10:38 AM	McCully's Gap	Odour	Direct call to Office - OCE responded	Sulphur smell	Excavators were removing overburden, CHPP operational, 2 watercarts and infusion sprays operating in OC1. The OCE discussed the complainants concerns with them.
23-May-17	1:35 PM	23-May-17	1:30 PM	North Muswellbrook	Blast	Environmental Hotline - OCE responded.	Blast shook their house	Blast in S19 at 1:30pm. Results were 0.3mm/s and 98.4dB at the monitor near the complainant's house. Results were within compliance. The Environmental Superintendent discussed the complainant's concerns with them.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
25-May-17	1:15 PM	25-May-17	1:12 PM	North Muswellbrook	Blast	Environmental Hotline - SOM responded.	Blast shook their house	Blast in S19 at 1:30pm. Results were 0.43mm/s and 106.5dB at the monitor near the complainant's house. Results were within compliance. The Senior Operations Manager discussed the complainants concerns with them.
27-May-17	10:22 AM	27-May-17	10:22 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Sulphur smell and large cloud hanging around	Excavators were removing overburden, CHPP operational, 2 watercarts and infusion sprays operating in OC1. The OCE left a message for the complainant to call back.
02-Jun-17	10:39 AM	01-Jun-17	9:30 AM	Woodlands Ridge	Odour	Email from EPA	Putrid burning coal sulphur	Excavators were removing overburden and infusion sprays were operating in OC1. No coaling activities were being undertaken. A response was provided to the EPA.
06-Jun-17	1:17 PM	06-Jun-17	1:17 PM	North Muswellbrook	Blast	Environmental Hotline - OCE responded.	Blast shook their house	Blast in S19 at 1:17pm. Results were 0.26mm/s and 103.9dB at the monitor near the complainant's house. Results were within compliance. The OCE discussed the complainant's concerns with them.
11-Jun-17	10:46 AM	11-Jun-17	Morning	Scone	Odour	Direct call to site - OCE responded	Sulphur odour	Odour was evident this morning and at times yesterday. No operations at time of complaint due to rain. Infusion sprays were operations. The OCE discussed the concerns with the complainant.
14-Jun-17	11:37 AM	14-Jun-17	Unknown	Scone	Odour	Email from MSC	Sulphur odour	Delayed start to operations due to wet weather. Infusion sprays were operational. MSC did not require a response.
16-Jun-17	10:52 AM	16-Jun-17	10:52 AM	North Muswellbrook	Odour	Direct call to OCE phone - OCE responded	Could smell a very strong smell of sulphur	Normal mining operations occurring with water carts and infusion sprays operational. An area of hot material was being worked. The OCE discussed the complainant's concerns with them. The OCE range back the next day and the complainant commented that things were better today.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
20-Jun-17	11:50 AM	20-Jun-17	10:15 AM	Scone	Odour	Email from EPA	Sulphur odour and acid	Spontaneous combustion management activities are ongoing and consist of water infusion, mining of hot coal and capping of hot areas. MCC has conducted geochemical testing of the material and it is not prone to acid generation. A response was provided to the EPA.
21-Jun-17	12:56 PM	21-Jun-17	12:50 PM	North Muswellbrook	Blast	Direct call to office - ES responded	Blast shook their house	Blast in S20 at 12:50pm. Results were 0.40mm/s and 101.6dB at the monitor near the complainant's house. Results were within compliance. The Environmental Superintendent and Production Superintendent were near the complainant's house at the time of the blast. No vibration was felt with a low rumbling heard in the distance. The ES attempted to discuss the complainant's concerns with them but they were not responsive to the conversation.
26-Jun-17	12:32 PM	23-Jun-17	6:00 PM	Woodlands Ridge	Odour	Email from EPA	Burning coal and sulphur smell	Spontaneous management is ongoing including water infusion. A response was provided to the EPA.
26-Jun-17	12:32 PM	25-Jun-17	8:00 AM	Woodlands Ridge	Odour	Email from EPA	Putrid burning coal smell and visible line of fog	Spontaneous management is ongoing including water infusion. Odour observations at 7:00am did not detect odour. A response was provided to the EPA.
29-Jun-17	12:45 PM	28-Jun-17	9:00 AM	Woodlands Ridge	Odour	Email from EPA	Strong sulphur odour and smoke	Spontaneous management is ongoing including water infusion. A response was provided to the EPA.
29-Jun-17	12:45 PM	27-Jun-17	6:00 AM	McCully's Gap	Noise	Email from EPA	Noise from equipment	At the time of complaint, MCC were in between shits with no Open Cut mining equipment operating. The CHPP was operational with the loader and 1 truck operating at the CHPP. A response was provided to the EPA.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
02-Jul-17	8:13 AM	02-Jul-17	8:13 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Sulphur odour	Ongoing mining operations and spontaneous combustion management activities. Attempts by the OCE to contact the complainant were unsuccessful.
02-Jul-17	9:30 AM	02-Jul-17	overnight	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong sulphur smell	Ongoing mining operations and spontaneous combustion management activities. The OCE discussed the complainant's concerns with them.
04-Jul-17	12:53 PM	03-Jul-17	3:05 PM	Woodlands Ridge	Blast	Email from EPA	Fume generation from blasting	A blast was fired at 3:05pm with a fume rating of 2 that did not leave site. This is not a reportable incident. A response was provided to the EPA.
04-Jul-17	12:53 PM	03-Jul-17	3:05 PM	Woodlands Ridge	Blast	Email from EPA	Fume generation from blasting	A blast was fired at 3:05pm with a fume rating of 2 that did not leave site. This is not a reportable incident. A response was provided to the EPA.
07-Jul-17	4:43 AM	07-Jul-17	4:34 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong sulphur smell	Ongoing mining operations and spontaneous combustion management activities. The OCE discussed the complainant's concerns with them.
11-Jul-17	9:23 AM	09-Jul-17	Various	Woodlands Ridge	Dust	Email from EPA	Excessive dust being generated	The emissions being observed were from spontaneous combustion emissions rather than other dust generating activities. The emissions were not directly impacting the Woodlands Ridge area. A response was provided to the EPA.
11-Jul-17	10:35 AM	11-Jul-17	8:15 AM	Singleton	Haulage	Direct call to Environmental Superintendent	Dangerous driving	The incident was investigated by Daracon and the driver received disciplinary action.
13-Jul-17	1:10 PM	13-Jul-17	7:15 AM	Muscle Creek	Odour	Email from EPA	Strong sulphur odour	Ongoing mining operations and spontaneous combustion management activities. A response was provided to the EPA.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
14-Jul-17	8:30 AM	Various	Various	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Spontaneous combustion	Ongoing mining operations and spontaneous combustion management activities. The OCE discussed the complainant's concerns with them.
18-Jul-17	2:29 PM	17-Jul-17	Unknown	Antiene	Odour	Email from EPA	Odour of burning coal	Ongoing mining operations and spontaneous combustion management activities. Due to location of complainant and wind direction it is unlikely MCC are the source of the odour. A response was provided to the EPA.
18-Jul-17	2:29 PM	17-Jul-07	Unknown	Muscle Creek	Odour	Email from EPA	Burning coal, sulphurous smell	Ongoing mining operations and spontaneous combustion management activities. A response was provided to the EPA.
18-Jul-17	2:29 PM	17-Jul-07	Unknown	Muscle Creek	Odour	Email from EPA	Very strong odour like a sulphur smell	Ongoing mining operations and spontaneous combustion management activities. A response was provided to the EPA.
19-Jul-17	9:05 AM	Various	Various	Woodlands Ridge	Haulage	Email from MSC	Long grass on sides of Muscle Creek Road	Grass is to be slashed by MCC. A response was provided to MSC.
21-Jul-17	2:55 PM	20-Jul-17	6:15 PM	Muscle Creek	Odour	Email from EPA	Strong smell of sulphur	Ongoing mining operations and spontaneous combustion management activities. A response was provided to the EPA.
10-Aug-17	8:33 AM	09-Aug-17	7:30 AM	Woodlands Ridge	Odour	Email from EPA	Sulphuric, burning coal smell	Ongoing mining operations and spontaneous combustion management activities. Odour observations at 7:14am at Topknot Place did not detect odour. A response was provided to the EPA.
10-Aug-17	2:13 PM	10-Aug-17	8:30 AM	Muscle Creek	Odour	Email from EPA	Cloud of smoke and strong smell of odour	Ongoing mining operations and spontaneous combustion management activities. Odour observations at 7:50am at Muscle Creek did not detect odour. Low levels of hydrogen sulphide detected at Muscle Creek with no sulphur dioxide being detected. A response was provided to the EPA.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
10-Aug-17	7:08 PM	10-Aug-17	7:00 PM	McCully's Gap	Light	Environmental Hotline - OCE responded.	Light on dump was facing house	Lighting plant was relocated. No further action was required.
13-Aug-17	9:09 AM	13-Aug-17	9:00 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Odour	OCE discussed the ongoing management of spontaneous combustion with the complainant. No further action required.
22-Aug-17	10:22 PM	22-Aug-17	10:22 PM	McCully's Gap	Noise	Environmental Hotline - OCE responded.	Machinery and dozer noise very loud	OCE changed dozer operations, which reduced the dozer noise. The Environmental Superintendent spoke with the complainant and they mentioned that the dozer noise did reduce following their complaint but the truck noise continued.
02-Sep-17	8:16 AM	02-Sep-17	8:16 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Very strong sulphur smell and plume of smoke this morning	Ongoing mining operations and spontaneous combustion management activities. Odour observations at 7:00am at Muscle Creek did not detect odour. Low levels of hydrogen sulphide detected at Muscle Creek with no sulphur dioxide being detected. Attempts to contact the complainant have been unsuccessful.
03-Sep-17	8:17 AM	03-Sep-17	8:17 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong smell and smoke across the valley	Ongoing mining operations and spontaneous combustion management activities. Odour observations at 7:05am at Muscle Creek did not detect odour. Low levels of hydrogen sulphide detected at Muscle Creek with no sulphur dioxide being detected. The OCE discussed the complainant with the complainant.
12-Sep-17	11:58 AM	12-Sep-17	7:00 AM	Woodlands Ridge	Dust	Email from EPA	A lot of dust coming from MCC	Water carts ran between shifts. Spontaneous combustion emission haze visible from Topknot Place at 7:30am but no dust was visible from Topknot Place. A response was provided to the EPA.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
20-Sep-17	8:04 AM	20-Sep-17	8:04 AM	Muscle Creek	Dust	Direct call to office reception	Dust and smoke everywhere	Caller wanted to let us know about the issue but did not want to leave there contact details for a call back. Visual haze from spontaneous combustion emissions noted.
20-Sep-17	7:48 AM	20-Sep-17	7:30 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Very strong sulphur smell and plume of smoke this morning	Ongoing mining operations and spontaneous combustion management activities. Odour observations at 7:20am at Muscle Creek did not detect odour. The OCE discussed the complainant with the complainant. The complainant also contacted the EPA and a response was provided to the EPA.
21-Sep-17	3:01 PM	21-Sep-17	Unknown	Woodlands Ridge	VISUAL	Email from EPA	Smoke coming from one end of the operation and filling the valley	Ongoing mining operations and spontaneous combustion management activities. Spontaneous combustion emission haze visible from Topknot Place at 7:30am. A response was provided to the EPA.
02-Oct-17	7:25 PM	02-Oct-17	7:25 PM	McCully's Gap	Light	Environmental Hotline - OCE responded.	Light is pointing towards house	The light was relocated and complainant was happy with the outcome.
08-Oct-17	10:57 PM	08-Oct-17	10:57 PM	Muswellbrook	Odour	Direct call to OCE phone - OCE responded	Terrible smell that could not be described	No mining operations occurring at time of complaint. OCE drove around the boundaries of the operation and could not detect odour.
09-Oct-17	3:38 PM	09-Oct-17	9:30 AM	Woodlands Ridge	Odour	Email from EPA	Odour and smoke	Hot coal on ROM was being treated with water and this was generating a lot of steam. Odour observations at ~8:00am did not detect odour at Woodlands Ridge.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
11-Oct-17	7:08 PM	11-Oct-17	7:08 PM	Woodlands Ridge	Dust	Environmental Hotline - OCE responded.	Fume and smoke	The OCE was in the process of relocating a digger to control the issue when the complaint was received. The complainant acknowledged that the issue had been resolved when the OCE called back. The complainant commented that the issues relating to spontaneous combustion had improved in the past 12 months.
12-Oct-17	1:43 PM	11-Oct-17	7:05 PM	Unknown	Dust	Email from EPA	Dust being generated and visible from New England Highway	The OCE was in the process of relocating a digger to control the issue at the time of the complaint. A response was provided to the EPA.
14-Oct-17	10:10 AM	14-Oct-17	10:10 AM	Scone	Odour	Direct call to OCE phone - OCE responded	Strong sulphur smell	The OCE discussed the complainant's concerns with them. OCE inspected the mining activities and spontaneous combustion management activities for effectiveness with no changes required.
15-Oct-17	7:12 AM	15-Oct-17	7:12 AM	McCully's Gap	Noise	Environmental Hotline - OCE responded.	Operational noise	No trucks were hailing into Open Cut 2 at the time of the complaint. One dozer was operating in Open Cut 2 and this was shut down until 8:30am. The complainant appreciated that the issue was resolved quickly but was still concerned that they were woken up by the noise.
21-Oct-17	8:00 AM	21-Oct-17	8:00 AM	Scone	Odour	Direct call to OCE phone - OCE responded	Odour at residence	The OCE discussed the complainant's concerns with them. The OCE continued to monitor the spontaneous combustion controls in the mining operations.

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30-Oct-17	12:38 PM	30-Oct-17	6:00 AM	Woodlands Ridge	Dust	Email from EPA	Smoke and dust	Mining operations hadn't commenced for day shift at the time of the complaint. Coal loading activities into road trucks was occurring but not generating dust. A review of the operations when the complaint was received by MCC did not identify any dust being generated by operational activities.
01-Nov-17	8:43 AM	01-Nov-17	8:30 AM	West Muswellbrook	Odour	Environmental Hotline - OCE responded.	Smoke and fumes	Ongoing spontaneous combustion management occurring. Wind was blowing away from the complainant's residence.
04-Nov-17	2:35 PM	04-Nov-17	2:35 PM	Scone	Odour	Direct call to OCE phone - OCE responded	Strong sulphur smell	The OCE discussed the complainant's concerns with them. The OCE continued to monitor the spontaneous combustion controls in the mining operations. The complainant also contacted the EPA and a response was provided to the EPA.
09-Nov-17	2:06 PM	09-Nov-17	From 7:00am	Woodlands Ridge	Odour	Email from EPA	Excessive smoke and a cloud of black smoke	Water infusion on a hot area was generating a lot of white steam. This was a proactive measure being undertaken in accordance with the requirements of the Spontaneous Combustion Management Plan. A response was provided to the EPA.
09-Nov-17	2:06 PM	09-Nov-17	Unknown	Woodlands Ridge	Odour	Email from EPA	Smoke and dust cloud pollution	Water infusion on a hot area was generating a lot of white steam. This was a proactive measure being undertaken in accordance with the requirements of the Spontaneous Combustion Management Plan. A response was provided to the EPA.
09-Nov-17	9:22 PM	09-Nov-17	9:22 PM	McCully's Gap	Light	Environmental Hotline - OCE responded.	Light is pointing towards house	The set up of the lighting plant was reviewed and changes were made to the set up of the lighting plant.

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20-Nov-17	8:11 AM	20-Nov-17	8:11 AM	Scone	Odour	Direct call to OCE phone - OCE responded	Strong sulphur smell	The OCE discussed the complainant's concerns with them. They could smell the odour on the previous day. The OCE continued to monitor the spontaneous combustion controls in the mining operations. The complainant also contacted the EPA and a response was provided to the EPA.
24-Nov-17	7:45 AM	24-Nov-17	7:45 AM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Huge cloud of smoke and strong sulphur smell	The OCE discussed the complainant's concerns with them. A review of the gas data at the Muscle Creek monitor showed that no gas was detected around the time of the complaint.
01-Dec-17	10:52 AM	30-Nov-17	7:45 AM	Woodlands Ridge	Odour	Email from EPA	Air is full of dust, smoke and the odour is horrendous	Warm coal was being dug and processed at the time of the complaint. NW winds between 7:30pm and 8:00pm, otherwise the wind was from the NE or SE. No increase in dust levels at Muscle Creek monitor. Response provided to the EPA.
05-Dec-17	8:08 AM	05-Dec-17	8:08 AM	Scone	Odour	Environmental Hotline - OCE responded.	Sulphur smell	Environmental Superintendent drove to Scone to observe odour. No sulphur smell was detected but a mild cow manure smell was detected. Observations were discussed with the complainant. There were two calls from the complainant about the same matter that night.
07-Dec-17	5:36 PM	07-Dec-17	5:36 PM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong sulphur smell	The OCE discussed the complainant's concerns with them. Normal mining and spontaneous combustion management activities occurring at time of complaint. No gas was detected on the Muscle Creek gas monitor.
13-Dec-17	12:03 PM	13-Dec-17	6:30 AM	Woodlands Ridge	Odour	Email from EPA	Sulphur smell from burning of coal	Coal was being mined. Isolated areas of spontaneous combustion were being treated with water carts. A response was provided to the EPA.

Date of Complaint	Time of Complaint	Date of Incident	Time of Incident	Location	Type of Complaint	Mode of Contact	Nature of Complaint	Action Taken
18-Dec-17	3:37 PM	18-Dec-17	3:35 PM	McCully's Gap	Dust	Direct call to Env Super phone - Env Super responded	Black cloud drifting towards their house	Collapsed roadway in a highwall was generating dust clouds as coal and dirt fell into the area. Production Superintendent and OCE were reviewing options to reduce impact at the time of the complaint. The Environmental Superintendent provided information to the complainant on what was causing the dust clouds.
25-Dec-17	9:39 AM	25-Dec-17	9:39 AM	Scone	Odour	Environmental hotline	Odour issue	No mining operations due to Christmas. Water infusion sprays were operational. A second call was received at 11:52pm on 25/12/17.
29-Dec-17	8:02 PM	29-Dec-17	8:00 PM	Woodlands Ridge	Odour	Environmental Hotline - OCE responded.	Dust and smell	Spontaneous combustion being managed by water carts. 211 was mining a hot edge, which was dusty. The complainant was concerned about the issue that had lasted a short time, but overall was happy with MCC's spontaneous combustion management in the past 12 months.
30-Dec-17	9:13 PM	30-Dec-17	9:12 PM	Muscle Creek	Odour	Environmental Hotline - OCE responded.	Strong sulphur smell	No operational activities at the time of the complaint. The OCE and Environmental Superintendent spoke with the complainant. The complainant was concerned about the smell but was appreciative that work was being done to manage the situation.