



Wongawilli Colliery

Quarterly Air Quality and Noise Monitoring Report (October to December 2018)

19 November 2019

Project No.: 0506254

Document details	
Document title	Wongawilli Colliery
Document subtitle	Quarterly Air Quality and Noise Monitoring Report (October to December 2018)
Project No.	0506254
Date	19 November 2019
Version	2.0
Author	Tajwar Dar, Robbie Cain
Client Name	Wollongong Coal Ltd

Document history

Version	Revision	Author	Reviewed by	ERM approval to issue		Comments
				Name	Date	
Report	01	Tajwar Dar, Robbie Cain	Aaron McKenzie	Damon Roddiss	08/11/2019	
Report	02	Tajwar Dar, Robbie Cain	Aaron McKenzie	Damon Roddiss	19/11/2019	

19 November 2019

Wongawilli Colliery

Quarterly Air Quality and Noise Monitoring Report (October to December 2018)

Aaron McKenzie
Principal Consultant

Damon Roddis
Partner

ERM Australia Pacific Pty Ltd
Level 15, 309 Kent Street
Sydney NSW 2000
Australia

© Copyright 2019 by ERM Worldwide Group Ltd and / or its affiliates ("ERM").
All rights reserved. No part of this work may be reproduced or transmitted in any form,
or by any means, without the prior written permission of ERM

CONTENTS

1	INTRODUCTION	1
2	PROJECT ENVIRONMENTAL CONDITIONS.....	2
2.1	Monitoring Requirements.....	2
2.2	Air Quality	3
2.3	Noise	4
3	METEOROLOGICAL MONITORING RESULTS	5
3.1	Wind data.....	5
3.2	Temperature	6
3.3	Rainfall.....	6
4	PM₁₀ MONITORING RESULTS.....	8
4.1	Continuous Air Quality Particulate Monitoring.....	8
5	NOISE MONITORING RESULTS	8
5.1	Unattended Noise Measurements	8
5.2	Unattended Noise Monitoring Graphs.....	11
5.3	Attended Noise Measurements.....	14

List of Tables

Table 1.1: Monitoring Network	1
Table 2.1: Monitoring Summary	3
Table 2.2: Project Air Quality Criteria.....	3
Table 2.3: Noise Criteria dB(A) – Medium term intrusive noise limits.....	4
Table 2.4: Noise Criteria dB(A) – Amenity Noise Limits	4
Table 3.1: Valid Data Recovery Rates - AWS	5
Table 3.2: Summary Statistics	5
Table 5.1: Fourth Quarter Noise Monitoring Summary, dB(A).....	8
Table 5.2: October – December 2018 L _{A1,15minute} Noise Monitoring Summary, dB(A)	9
Table 5.3: Wind Speed Exceedances Percentages October - December 2018.....	9
Table 5.4: NMT3 Daily Noise Monitoring Results – October 2018	10

List of Figures

Figure 1.1: Monitoring Locations	2
Figure 3.1: Windrose for Wongawilli Colliery October to December 2018	6
Figure 3.2: Hourly Average Temperature at 2m and 10m	7
Figure 3.3: Daily Rainfall	7
Figure 5.1: NMT3 Noise Monitoring Results – October 2018	11
Figure 5.2: L _{1,15minute} (night time only) NMT3 Noise Monitoring Results – October 2018	12
Figure 5.3: Wind Speed and Rainfall Monitoring Data	13

1 INTRODUCTION

Environmental Resource Management (ERM) provides air quality and noise monitoring data analysis and reporting for the Wollongong Coal (WCL) Wongawilli Colliery, in Wongawilli, NSW.

The following report provides a summary of the data collected during the third quarter, October to December 2018. The monitoring network comprises one continuous ambient air quality particulate monitor, one continuous ambient noise monitor and one continuous automatic weather station.

The monitoring network is summarised in **Table 1.1** and presented in **Figure 1.1**.

Table 1.1: Monitoring Network

Description	Site	Address / Location	MGA 56 Easting (m)	MGA 56 Northing (m)
Continuous PM10 Monitor	BAM	Jersey Farm Road	294129	6182474
Meteorological Station	AWS	SW of Rail Loading Area	293360	6181777
Continuous Noise Monitor	NMT 3	Jersey Farm Road	294137	6182448

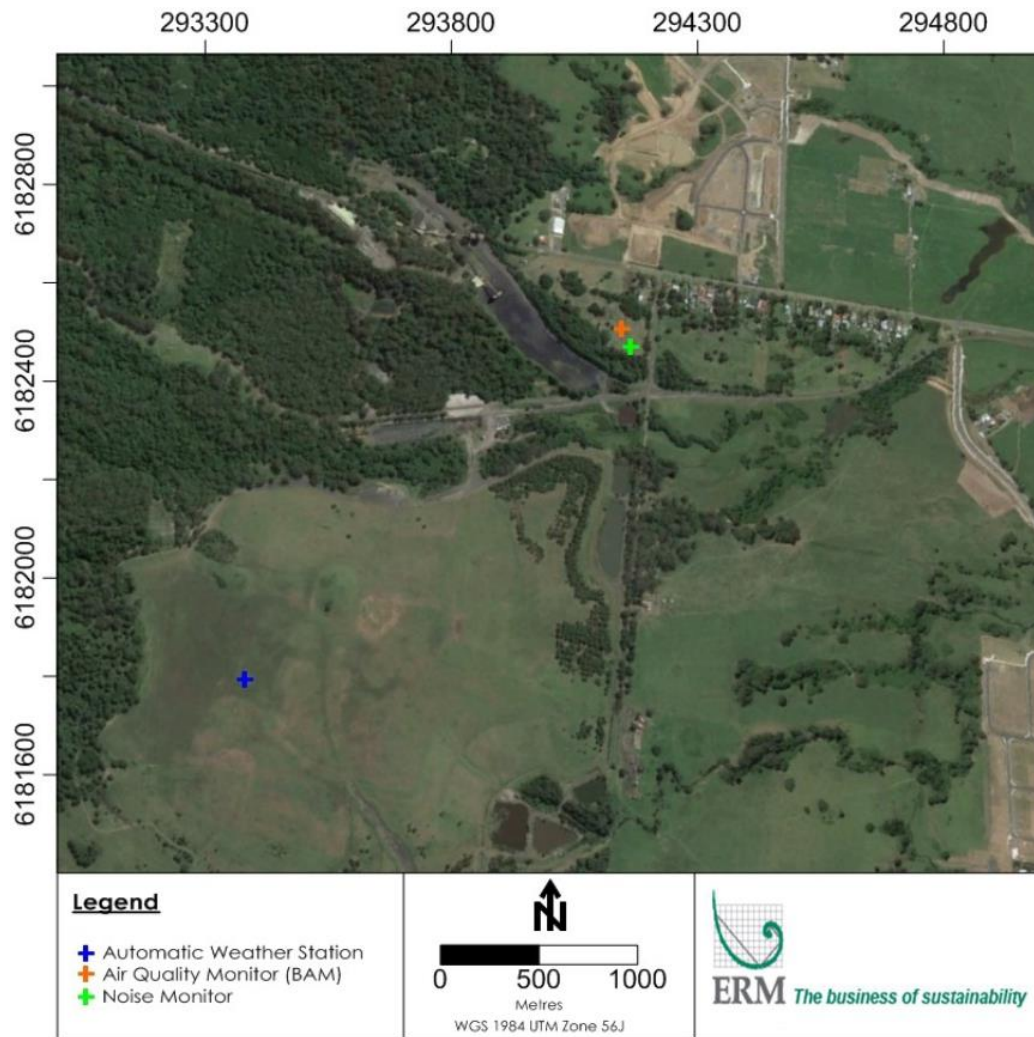


Figure 1.1: Monitoring Locations

2 PROJECT ENVIRONMENTAL CONDITIONS

2.1 Monitoring Requirements

In accordance with Project Approval (09_0161), air quality, meteorology and noise parameters are monitored as summarised in **Table 2.1**.

Table 2.1: Monitoring Summary

Item	Quantity Measured	Unit	Monitoring Frequency
Air Quality	Particulate Matter < 10 µm (PM ₁₀)	µg/m ³	24 h
Meteorology	Temperature at 10m	°C	Real Time
	Temperature at 2m	°C	
	Wind Speed at 10m	m/s	
	Wind Direction	°	
	Standard Deviation of Wind Speed (sigma theta)	-	
	Barometric Pressure	hPa	
	Rainfall	mm	
Noise	15 minute ambient continuous equivalent energy average noise level	LAeq,15min dB(A)	15 min
	1 minute LA1 noise level	LA1,1min dB(A)	1 min
	Period ambient continuous equivalent energy average noise level	LAeq, period dB(A)	Day, evening, night

2.2 Air Quality

The project is subject to environmental conditions as part of the Approval. For air quality these are summarised in **Table 2.2**.

Table 2.2: Project Air Quality Criteria

Pollutant	Averaging Period	Criterion ^a
Particulate Matter < 10 µm (PM ₁₀)	Annual	30 µg/m ³ (b)
Particulate Matter < 10 µm (PM ₁₀)	24 hour	50µg/m ³ (b)

- a) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with OEH.
- b) Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to all other sources)

2.3 Noise

The Project Approval states both an amenity and intrusive noise criteria. The intrusive criteria are assessed over a 15 minute period and the amenity criteria are assessed over the relevant period (day, evening and night).

The intrusive criteria are both lower and assessed over a shorter time period, they represent the most onerous criteria and are therefore the limiting criteria.

These criteria are reproduced in **Table 2.3** and **Table 2.4**.

Table 2.3: Noise Criteria dB(A) – Medium term intrusive noise limits

Location		Day	Evening	Night	
Area	Receiver Number	L _{Aeq} (15mins)	L _{Aeq} (15mins)	L _{Aeq} (15mins)	L _{A1} (15mins)
Lot 2410 Smiths Lane	RA1	43	43	43	59
120/130 Smiths Lane					
18 Wongawilli Road	RA2	44	43	43	60
1 Wongawilli Road					
Jersey Farm road	RA3	40	40	38	48
Horsley (closest receiver)					
All other privately owned land		40	40	38	48

Note: Day is defined as 7.00am to 6.00pm, evening as 6.00pm to 10.00pm and night as 10.00pm to 7.00am

Table 2.4: Noise Criteria dB(A) – Amenity Noise Limits

Receiver Area	Day	Evening	Night
	L _{Aeq} (11hr)	L _{Aeq} (4hr)	L _{Aeq} (9hr)
All privately-owned land	60	50	45

3 METEOROLOGICAL MONITORING RESULTS

A summary of the data collected during the fourth quarter of 2018 is provided in the following sections. The valid data recovery rate was 97% for all parameters (refer **Table 3.1**).

Table 3.1: Valid Data Recovery Rates - AWS

Parameter	Valid Data Recovery Rate %
Wind Speed	97%
Wind Direction	97%
Temperature – 2 m	97%
Temperature – 10 m	97%
Relative Humidity	No data available
Pressure	
Solar Radiation	

A summary of statistics for the data collected during the reporting period are shown in **Table 3.2**.

Table 3.2: Summary Statistics

Parameter (units)	Statistical measure	Value
Wind Speed (m/s)	Mean	2.6
Temperature (°C) – 10m		19.0
Temperature (°C) – 2m		18.2
Barometric pressure (hPa)		1005.7
Wind Speed (m/s)	Median	2.1
Temperature (°C) – 10m		18.4
Temperature (°C) – 2m		17.5
Barometric pressure (hPa)		1006.9
Wind Speed (m/s)	Standard Deviation	2.0
Temperature (°C) – 10m		4.0
Temperature (°C) – 2m		4.5
Barometric pressure (hPa)		7.1
Rainfall (mm)	Quarterly Total	18.4
Calms	%	9

3.1 Wind data

A windrose for the quarter is presented in **Figure 3.1**. The windrose indicates that for the period of monitoring, winds from the West South West, South East and North North East were dominant.

The average wind speed for the period was 2.6 m/s and the percentage occurrence of calm wind conditions (less than or equal to 0.5 m/s) was approximately 9%.

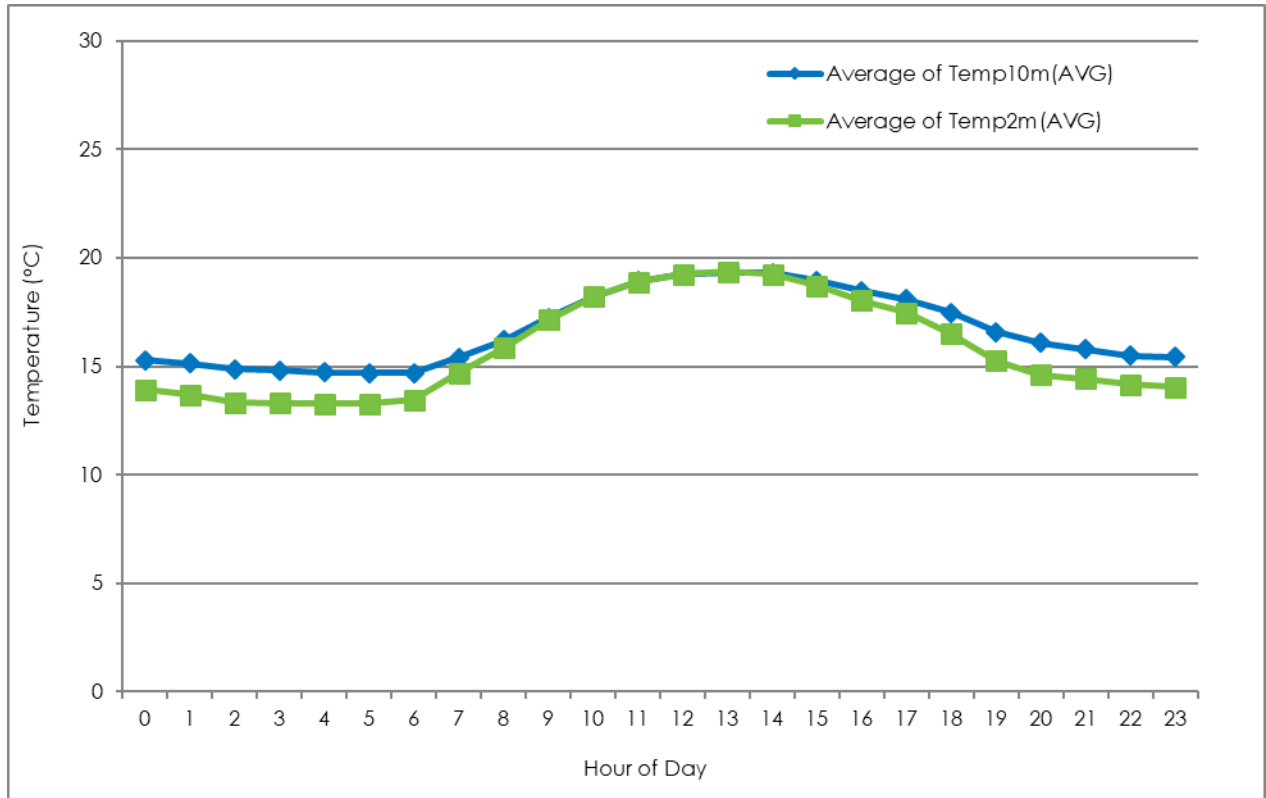


Figure 3.2: Hourly Average Temperature at 2m and 10m

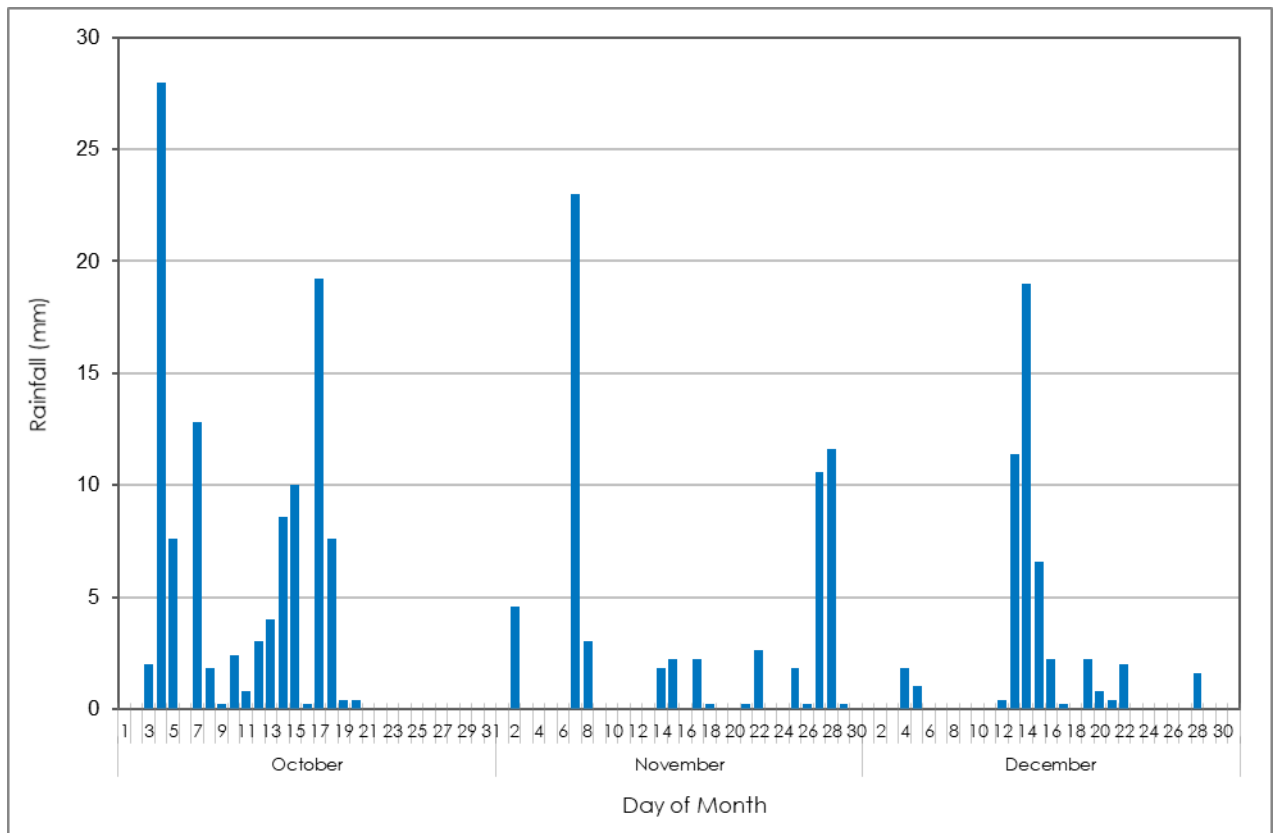


Figure 3.3: Daily Rainfall

4 PM₁₀ MONITORING RESULTS

4.1 Continuous Air Quality Particulate Monitoring

PM10 data capture and validation was not satisfactory for reporting during the fourth quarter of 2018.

5 NOISE MONITORING RESULTS

5.1 Unattended Noise Measurements

One permanent ambient noise monitor continuously monitors noise levels from all sources.

The unattended noise monitoring during the fourth quarter of 2018 recovered 18% of data at NMT3.

A summary of the unattended noise monitoring is presented in **Table 5.1**. Noise monitoring is expressed in three descriptors as follows:

- Leq AP - The all-pass equivalent continuous energy average noise level. This descriptor represents the same energy as the actual fluctuating noise level over the measurement period.
- Leq LP - The low-pass equivalent continuous energy average noise level. This is the same as the Leq AP except that a frequency filter has been applied and excludes noise above the 800Hz third octave frequency band.
- RBL - The rating background level (RBL) as defined within the Industrial Noise Policy. The RBL is defined as the median of each assessment background level (ABL). The ABL is the lowest tenth percentile L₉₀ measurement for each period (day, evening and night) for the duration of the monitoring. The L₉₀ is the noise level exceeded for 90% of the measurement period.

The results in are presented in the following time periods:

- Day - 7.00am to 6.00pm;
- Evening - 6.00pm to 10.00pm; and
- Night - 10.00pm to 7.00am.

Table 5.1: Fourth Quarter Noise Monitoring Summary, dB(A)

	Day			Evening			Night		
	Leq LP ¹	Leq AP ²	RBL ³	Leq LP	Leq AP	RBL	Leq LP	Leq AP	RBL
October	45	49	39	44	46	39	44	46	36
November	-	-	-	-	-	-	-	-	-
December	-	-	-	-	-	-	-	-	-

Note:

1. Leq LP is the Leq with a low pass filter applied at the 800Hz third octave band.
2. Leq AP is Leq All Pass with no frequency filter applied.
3. RBL is the rating background level according to the Industrial Noise Policy.

The daily noise monitoring results for NMT 3 are presented in **Table 5.4** and as a graph in **Figure 5.1**. The daily noise monitoring results are expressed as a logarithmic average of each measured Leq, 15min during each period and the ABL.

The unattended noise monitor also records LA_{1,1min} levels continuously. The LA_{1,1min} represents short-term peak noise events and is the noise level exceeded for 1% of 1 minute. A summary of the LA_{1,1min} data is presented in **Table 5.2** and **Figure 5.2**.

Table 5.2: October – December 2018 $L_{A1,15\text{minute}}$ Noise Monitoring Summary, dB(A)

NMT1	$L_{A1,1\text{min}}$ Maximum dB(A)	$L_{A1,1\text{min}}$ Average dB(A)	$L_{A1,15\text{min}} > 52$ dB(A) night time (%)
October	79	48	21
November	-	-	-
December	-	-	-

The noise limits at the site apply for wind speeds less than 3 m/s. **Table 5.3** and **Figure 5.3** presents monthly percentages that wind speeds more than 3 m/s occurred from WTX monitoring data during this quarterly period.

Table 5.3: Wind Speed Exceedances Percentages October - December 2018

WTX	Exceedances (%)
October	40
November	45
December	26

Table 5.4: NMT3 Daily Noise Monitoring Results – October 2018

Date	Day			Evening			Night		
	L _{eq.11hr}	L _{eq.11hr}	ABL ²	L _{eq.4hr}	L _{eq.4hr}	ABL	L _{eq.9hr}	L _{eq.9hr}	ABL
1/10/2018	41	45	38	41	43	39	43	45	41
2/10/2018	48	50	40	41	43	39	42	44	38
3/10/2018	47	50	41	40	42	38	40	41	38
4/10/2018	45	50	41	41	45	40	40	43	37
5/10/2018	47	51	42	40	43	40	40	45	39
6/10/2018	43	47	39	48	48	46	38	43	38
7/10/2018	45	50	40	46	48	45	47	48	45
8/10/2018	41	47	39	42	44	41	46	48	45
9/10/2018	41	46	36	35	41	36	45	47	43
10/10/2018	47	49	45	45	46	44	40	44	35
11/10/2018	46	48	43	45	45	44	46	47	45
12/10/2018	45	47	43	47	47	45	46	47	45
13/10/2018	43	46	40	46	47	44	46	47	41
14/10/2018	45	48	43	45	46	43	47	48	44
15/10/2018	46	50	44	46	48	45	46	48	44
16/10/2018	46	49	42	46	47	44	46	48	43
17/10/2018	47	50	43	-	-	-	39	43	29
18/10/2018	-	-	-	-	-	-	-	-	-
19/10/2018	-	-	-	-	-	-	-	-	-
20/10/2018	-	-	-	-	-	-	-	-	-
21/10/2018	-	-	-	-	-	-	-	-	-
22/10/2018	-	-	-	-	-	-	-	-	-
23/10/2018	-	-	-	-	-	-	-	-	-
24/10/2018	-	-	-	-	-	-	-	-	-
25/10/2018	-	-	-	-	-	-	-	-	-
26/10/2018	-	-	-	-	-	-	-	-	-
27/10/2018	-	-	-	-	-	-	-	-	-
28/10/2018	-	-	-	-	-	-	-	-	-
29/10/2018	-	-	-	-	-	-	-	-	-
30/10/2018	-	-	-	-	-	-	-	-	-
31/10/2018	-	-	-	-	-	-	-	-	-
Log Avg	45	49	42	44	46	43	44	46	42
Median	45	49	41	45	46	43	45	47	41
Max	48	51	45	48	48	46	47	48	45
Min	41	45	36	35	41	36	38	41	29

Note: 1. LP=Low Pass, AP= All Pass
2. ABL is the Assessment Background Level and represents the lowest tenth percentile L90 measured during the period

5.2 Unattended Noise Monitoring Graphs

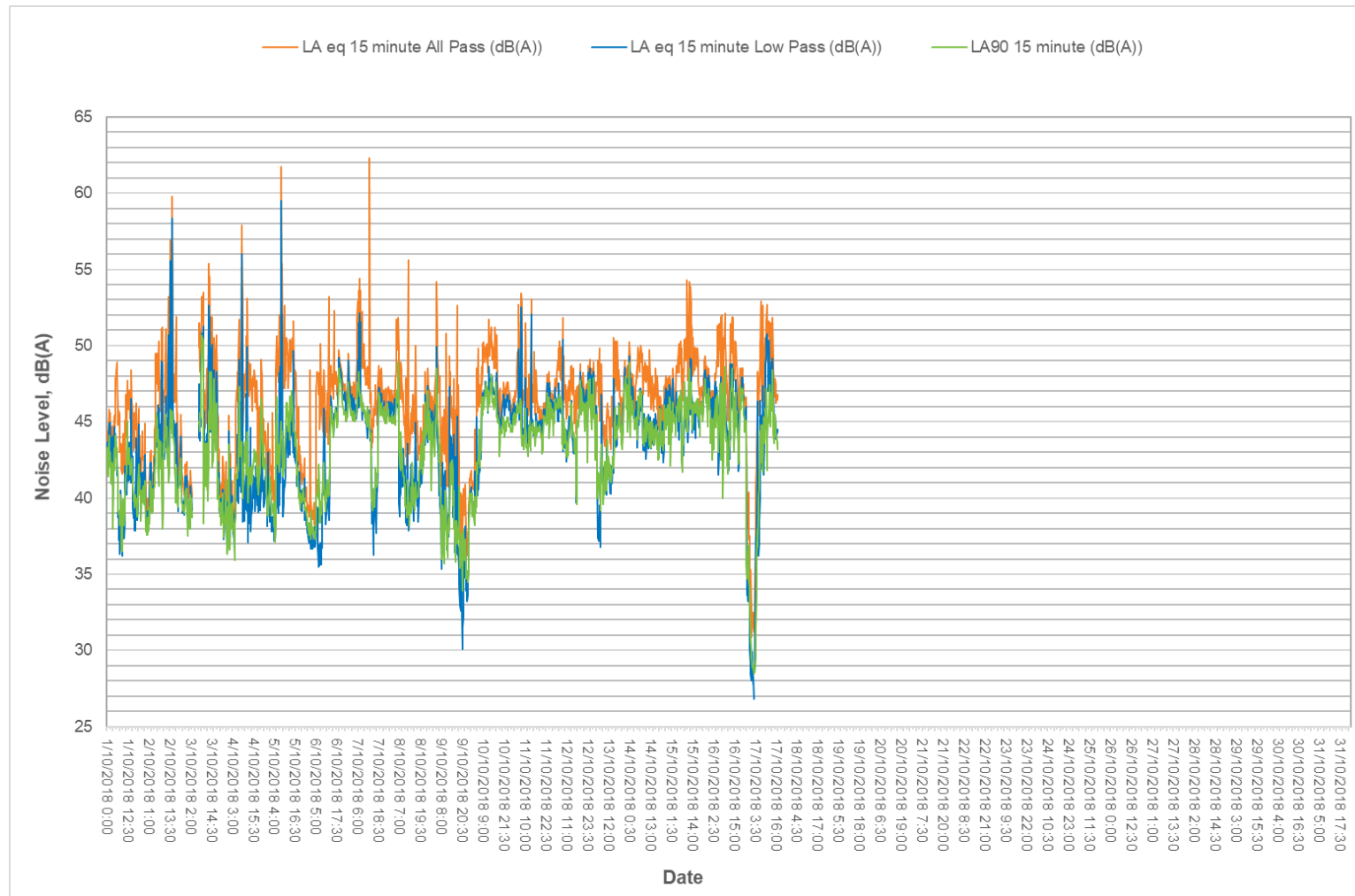


Figure 5.1: NMT3 Noise Monitoring Results – October 2018

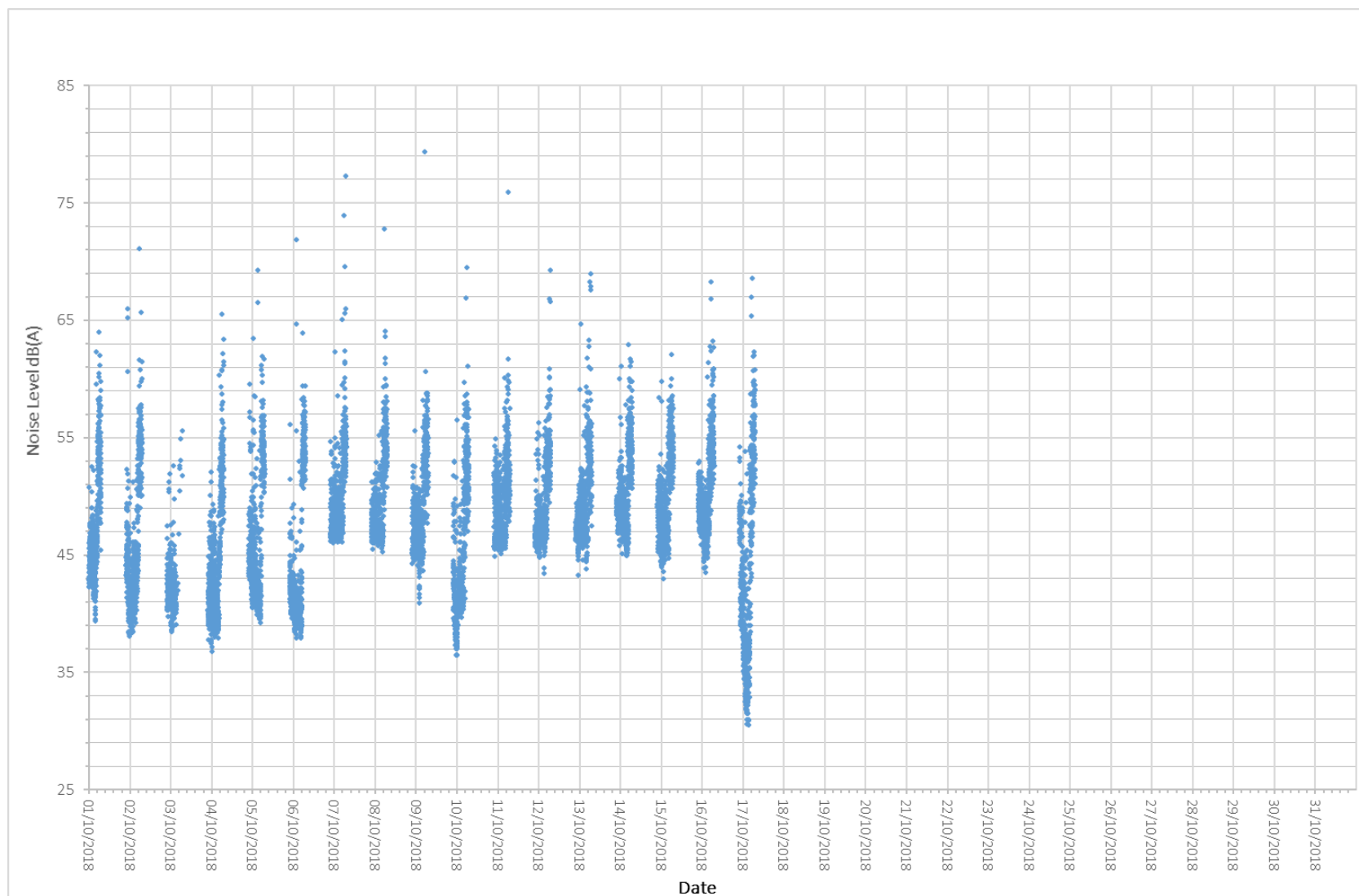


Figure 5.2: L_{1,15minute} (night time only) NMT3 Noise Monitoring Results – October 2018

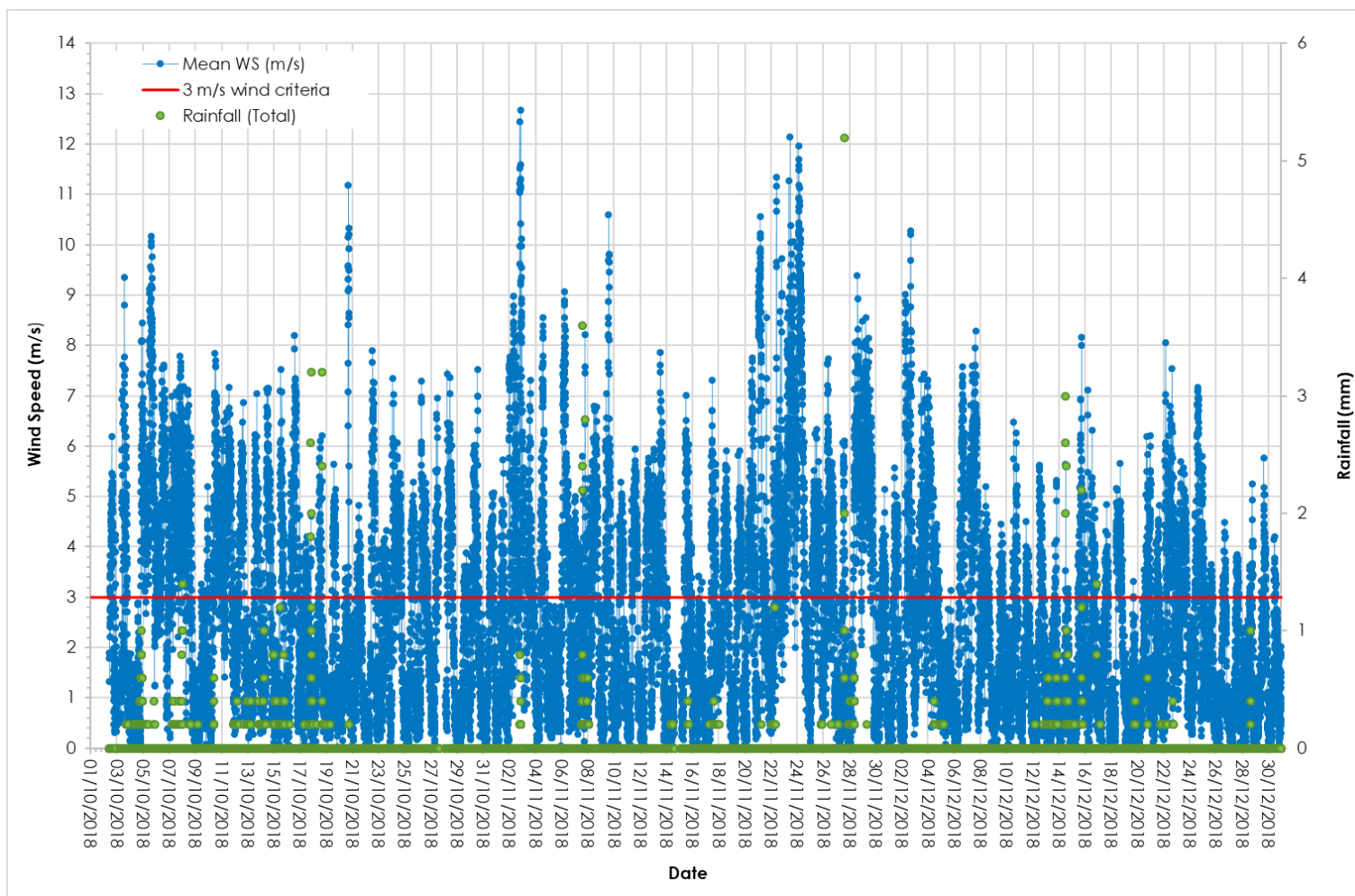


Figure 5.3: Wind Speed and Rainfall Monitoring Data

5.3 Attended Noise Measurements

Whilst operational, attended noise measurements are carried out once every three months to establish compliance with the site's noise limits at up to six compliance locations surrounding the site during the day, evening and night and rail noise monitoring on the Wongawilli Rail Spur

Attended noise compliance monitoring was undertaken during this quarter.

**ERM has over 160 offices across the following
countries and territories worldwide**

Argentina	New Zealand
Australia	Panama
Belgium	Peru
Brazil	Poland
Canada	Portugal
China	Puerto Rico
Colombia	Romania
France	Russia
Germany	Singapore
Hong Kong	South Africa
Hungary	South Korea
India	Spain
Indonesia	Sweden
Ireland	Taiwan
Italy	Thailand
Japan	UAE
Kazakhstan	UK
Kenya	US
Malaysia	Vietnam
Mexico	
The Netherlands	

ERM Sydney

Level 15
309 Kent Street
Sydney 2000

T: 02 8584 8852

www.erm.com