

Minutes of the 56th Meeting of the Tarrawonga Coal Mine Community Consultative Committee (TCCC)

Meeting Held	15 th May 2019 between 10:00AM- 11:45AM		
Venue	Tarrawonga Coal Mine (TCM), training room		
Agenda Item	Discussion and Description	Action and Accountability	Status/ Date

1. Present and Apologies	<p><u>Present:</u> Mr David Ross (DR)- Independent Chairman, Mr David Moses (DM), Gunnedah Shire council Representative, Mrs Cath Collyer (CC)- Community Representative, Mrs Julie Heiler (JH)- Community Representative, Mr John Hamson (JHa), Operations Manager-TCM, Mr Sebastien Moreno (SM)- Environmental Superintendent- TCM, Mr Tim Muldoon (TM)- Group Manager Community Relations and Pty</p>		
	<p><u>Apologies:</u> Mrs Colleen Fuller (CF)- Community Representative Mr Andrew Johns (AJ), Gunnedah Shire Council Representative Mr Cameron Staines (CS), Narrabri Shire council Representative, Mrs Rebecca Ryan (RR)- Community Representative,</p>		

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2. Declaration of Pecuniary or Non-Pecuniary Interests	DR- declared that he is paid a fee for participation as Independent Chairman		
3. Previous Minutes Actions	JHa- wants to discuss fire emergency with RFS members.	SM- to send invitation to RFS to come to site. SM- to follow up and contact local RFS. (JH -provided local RFS contacts to SM to organise a site visit.)	Complete SM- has contacted RFS superintendent (Michael Brook) who will send someone to the mine.
	SM- TCM working toward a new MOP and MOD7 of the Project Approval.	CCC members- requested SM to explain details of MOD7 and confirm date of submission.	Complete MOD7 items and changes were presented at the BTM CCC meeting on (16/05/2018). MOD7 submission date is expected for Q3 2019.
	CC- Dust A side description and usage	JHa- to invite the company “Dust A Side” at next CCC meeting to talk about dust suppressant.	
		DR- to discuss with EPA availability to attend next BTM CCC meeting to explain air matters.	

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	<p>CC (rep CF)- what will be the measure taken by TCM and WHC if the water is depleted? What contingency plan is in place?</p> <p>JHa- Several scenarios are possible, but options will be unveiled once the mine gets closer to deplete all the stored water. Priority will be given to WHC employees and some of the measures can include reduction of shift and sending employees to other part of the business or sites.</p>	<p>JHa- to provide an action/measure plan to the CCC members for the case of complete water depletion.</p>	<p>Complete</p> <p>JHa- : -Water inventory onsite was ~140ML (mid- May) and mine expected to have enough water for coming 6-8 months. -TCM will continue to use Dust a Side products and investigate water reduction opportunities.</p>
4. Business Arising	<p>DR- discussion around revisiting number of CCC members and potential requirement to increase members' number.</p>	<p>DR- to contact TCCC members and confirm attendance/availability for next meeting.</p>	
5. Mine Progress Report	<p>JHa:</p> <ul style="list-style-type: none"> - WHC bought new machines, - Change of roster temporary (day shift Saturday/Sunday) to ramp up to 3Mt, - On track with production rate 2.3-2.4Mt, -New building to extend offices, -Safety- LTI free- 165 days - New excavator operating and named after the admin 'Squeezee'. - Rocglen ending production in few month and TCM discussing work opportunity with interested staff. 		

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	<p>- On-going usage of “Dust A Side” product.</p> <p>-Girls “rocking day” organised with BIS to promote career for female in mining industry.</p> <p>TM:</p> <p>-WHC run several programs with TAFE, High schools and Universities and has a strong focus on career development.</p>		
6. Environmental Monitoring report	<p>SM- read and explained the Quarterly Environmental Report results.</p> <p>SM- Annual Review 2018 was reviewed by DPE and is now available on the website.</p> <p>CCC Members- Thankful for the good presentation and explanation of the Environmental quarterly report.</p>	<p>SM- to include link to Annual Review (AR) 2018 report on WHC website.</p>	<p>Complete:</p> <p>AR 2018 accessible at: http://www.whitehavencoal.com.au/sustainability/environmental-management/tarrawonga-mine/ or http://www.whitehavencoal.com.au/wp-admin/admin-ajax.php?action=letsbox-preview&id=457194751524&listtoken=8bd742da67bf23c91b0eab5a62381328&inline=0</p>
7. General business	<p>CCC Members- requested to organise a site tour next year.</p>	<p>JHa- to organise site tour at next CCC meeting.</p> <p>DR- to confirm attendance of all CCC members.</p>	

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8.Complaints	SM- No Complaint received since last CCC meeting.		
9. Next Meeting and Other Comments	DR- next TCCC meetings will be held on 14 th August 2019.		

Tarrawonga Coal Mine Community Consultative Committee Meeting #56

Quarterly Environmental Monitoring Report
1 February 2019 – 30 April 2019



Photo taken during the clearing campaign 2019 showing one of two Nebulifera robusta (Robust Velvet Gecko) individuals captured and released successfully (April 2019)

This report has been prepared for the Community Consultative Committee (CCC) Meeting to show Environmental monitoring performance at Tarrawonga Coal Mine (TCM) for the reporting period from February 1st to April 30th 2019. Maps with all the monitoring locations are available in *Appendix A*.

Noise Monitoring

Attended noise monitoring was conducted at the “Bungalow” (TN4), “Barbers Lagoon” (TN3) and “Matong” (TN2) properties from 25th to 28th February 2019. The noise criterion for the mine is 35dB(A) Leq (15 min) for all operating times.

The results below and in *Appendix B* show that noise emissions from the mine did not exceed the operational noise criterion at the “Barbers Lagoon”, “Bungalow” or “Matong” monitoring locations during the monitoring event.

(Summary table extracted from SLR Quarter 1 report 2019).

EPL ID	Location	Date	Tarrawonga Coal Mine Contribution dBA				Criteria	Measurement Periods	Weather Compliant			Compliant
			L _{Aeq} (15minute) Day	L _{Aeq} (15minute) Evening	L _{Aeq} (15minute) Night	L _{A1} (1minute) Night			Day	Eve	Night	
79a	Barbers Lagoon	25/02/2019	26	N/M	I/A	I/A	Day, Evening and Night – 35 dBA L _{Aeq} (15minute)	Day - 1.5 hrs Evening - 0.5 hrs Night – 1hrs	N	N	N	Y
		26/02/2019	I/A	I/A	25	27			Y	Y	Y	Y
		27/02/2019	26	I/A	N/M	N/M			Y	N	N	Y
		28/02/2019	I/A	N/M	31	33			Y	N	N	Y
89	Bungalow	25/02/2019	I/A	N/M	27	29	Night – 45 dBA L _{A1} (1minute) Cumulative Day, Evening, Night 40 dBA L _{Aeq} (15minute)	Day - 1.5 hrs Evening - 0.5 hrs Night – 1hrs	N	N	N	Y
		26/02/2019	I/A	I/A	I/A	I/A			Y	Y	Y	Y
		27/02/2019	I/A	I/A	N/M	N/M			Y	N	Y	Y
		28/02/2019	<25	I/A	I/A	I/A			Y	N	N	Y
60a	Coomalgah/ Matong	25/02/2019	25	N/M	I/A	I/A	Night – 45 dBA L _{A1} (1minute) Cumulative Day, Evening, Night 40 dBA L _{Aeq} (15minute)	Day - 1.5 hrs Evening - 0.5 hrs Night – 1hrs	Y	N	N	Y
		26/02/2019	26	<25	<25	25			Y	Y	N	Y
		27/02/2019	31	I/A	I/A	I/A			Y	N	N	Y
		28/02/2019	26	N/M	I/A	I/A			Y	N	Y	Y

Note:
I/A = Inaudible
N/M = Not Measurable

Noise from the mine must not exceed 45 dB(A) L₁ (1 min) between 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The results of the sleep disturbance monitoring show that the measured L₁ (1 min) noise level did not exceed the sleep disturbance criterion.

The real time noise monitor located on the “Coomalgah” property remains a management tool so the noise criteria are not applicable at that site. Level of noise recorded at that location is managed according to the noise management plan and trigger action response plan.

Blast Monitoring

Blasting Results

Since 2006, there have been 875 blasts (until 30/04/2019) at TCM.

There has been no exceedance of blast criteria since the last meeting. The highest result obtained for blasting overpressure was **113.3 dB** recorded on 01/03/19 at Tarrawonga property and the highest result for ground vibration was **1.79mm/s** recorded at the Coomalgah station on the same day.

Table- 2: Max Peak Overpressure and Ground Pressure for the Quarter

Monitor Location	Date	Max. Peak Overpressure (dB)	Criterion (dB)	Date	Max. Peak Ground Pressure (mm/s)	Criterion (mm/s)
Tarrawonga*	113.3	01/03/2019	N/A	01/03/2019	1.12	N/A
Coomalgah	106.1	14/02/2019	115	01/03/2019	1.79	10

**Limit Not applicable according to EPL and PA11_0047 because project related property*

Air Quality Monitoring

Dust Deposition Results

Table 3 shows deposited dust gauge results over 12 months. All the monitors are located on project related land; as such compliance criteria (**4g/m²/month**) do not apply. Recorded rainfall for March was above Bureau of Meteorology long term mean with 95mm, however overall deposited dust trends remain steady during the reporting period (refer graph in *Appendix C*).

Table 3 – Deposited Dust Gauge Results [g/m²/month]

MONTH	TEMPLEMORE (EB-4)	BOLLOL CREEK STN (EB-5)	AMBARDO (EB-6)	TARRAWONGA (EB-7)	THUIN (EB-8)	PINE GROVE (EB-9)	TARRAWONGA MINE (EB-10)	TARRAWONGA MINE (EB-11)	TARRAWONGA MINE (EB-14)	TARRAWONGA MINE (EB-15)	JERALONG NORTH (EB-16)
Apr-18	1.2	3.4	1.2	0.9	3.4	2.4	4.8	4.5	1.9	4	3.3
May-18	2.3	2.7	1	0.9	1.6	1.9	2	6.9	1.7	3.1	2.8
June-18	1.2	2.4	0.9	0.8	2.1	2.4	3.4	3.1	2.1	4.7	0.8
Jul-18	18.4	3.4	0.9	0.6	3.4	1.1	2.2	2	1.8	5	1.1
Aug-18	5.19	4.01	11.55	1.77	3.63	2.11	3.85	5.08	3.58	4.35	1.94
Sep-18	5.9	9.8	3.6	3.4	4.1	4.4	5.6	3.4	4.3	6.1	3.1
Oct-18	5.9	4.3	11.1	1.7	3.8	4.7	10.8	3.5	3	5.4	2.7
Nov-18	4.3	1.6	3.2	4.1	6.2	5.8	5.5	11.3	4.6	6.8	3.32
Dec-18	18.9	11.1	11.1	2.8	4.2	4.6	5.7	3	47.2*	8	4.3
Jan-19	7.8	2.4	5.6	5.7	9.5	7.8	9.2	6.2	3.3	4	7.6
Feb-19	4.6	5.5	11.9	4.3	5.2	2.8	5.5	5.0	6.8	3.5	5.7
Mar-19	2.1	4.8	4	2.2	4.1	2.9	8.6	2.4	1.9	2.2	2.6
Apr-19	2.7	4.5	4.1	1.6	2.8	1.8	4.7	2.6	2.7	3.9	6.2
12 MONTH ROLLING AVERAGE	6.2	4.6	5.4	2.4	4.2	3.4	5.5	4.5	2.9	4.7	3.5

*ALS advised the sample was contaminated and the value is not included in the annual rolling average.

High Volume Air sampler (PM10) Results

The High Volume Air Sampler (HVAS) installed at Coomalgah property monitors level of Particle Matter under 10 micron (PM₁₀). It operates for 24hr every 6 days. Table 4 shows all the 24hr average values recorded for this quarter and the rolling Annual average. Elevated levels of dust were investigated and in all cases wind, grazing or farming activity near the monitor location were direct cause of the elevated reading.

Table- 4: HVAS PM10 24 hr average levels for the Quarter

Date	24hr averaged PM10 (µg/m ³)	Criterion 24hr average (µg/m ³)	Rolling Annual average (µg/m ³)	Criterion Annual Average (µg/m ³)	Comments
1/2/2019	34.1	50	19.57	30	
7/2/2019	17.2		19.83		
13/02/2019	154		19.83		Not Mine related. Excluded from the annual average. Dust storm on the sampling day. Extremely windy noted on the field sheet by ALS. Excluded from annual average.
19/02/2019	102		19.07		Not Mine related. Regional elevated dust level. Windy and grazing activity noted on the field sheet by the contractor. Excluded from annual average.
25/02/2019	18.8		18.95		
3/3/2019	18.2		18.83		
9/3/2019	101		18.83		Not Mine related. Winds recorded coming from West most of the day. Real-time monitor near the mine recorded a maximum 24hr average of 32ug/m3. Windy recorded in the field sheet by the contractor. Excluded from annual average calculation.
15/03/2019	47.9		19.50		
21/03/2019	10.6		19.24		
27/03/2019	22		19.38		
2/4/2019	15.7		19.02		
8/4/2019	37.9		19.61		
14/04/2019	37.1		19.81		
20/04/2019	34		19.61		
26/04/2019	59.7		19.38		Not Mine related. Grazing activity noted on the field sheet by the contractor. Most wind was coming from North East of the monitor according to the weather station. Excluded from annual average

According to the current Air Quality and Greenhouse gas Management Plan, the real time air quality unit (TEOM) installed at the “Flixton” property monitors PM₁₀ levels in ambient air. It is an operational management tool and dust levels nearing or reaching the nominated criteria will trigger actions onsite to assess the source of dust and modify operations if it is determined to be related to Tarrawonga operations.



TEOM installed at Flixton property

Water Monitoring

Groundwater

Routine groundwater monitoring was undertaken in March 2019 and showed in **Table 5** (refer to graphs in *Appendix D*).

Table 5- Groundwater results Summary

Site	Date	SWL (mbgl)	pH (units)	Elect. Conduct (µS/cm)
MW1				
	December 2017	6.73	7.7	3,280
	February 2018	6.81	7.9	3,460
	June 2018	6.91	7.9	3,350
	September 2018	6.92	7.7	3,430
	December 2018	7.03	7.8	3,420
	March 2019	7.78	8.1	3,640
MW2				
	December 2017	3.68	7	545
	February 2018	4.23	7.3	519
	June 2018	4.67	7.3	547
	September 2018	4.79	6.8	615
	December 2018	3.53	6.8	545
	March 2019	4.34	7.1	532
MW4				
	December 2017	8.95	7.2	4,440
	February 2018	9.08	7.4	4,610
	June 2018	9.14	7.3	4,430
	September 2018	9.34	6.9	4,560
	December 2018	9.46	7.0	4,610
	March 2019	10.20	7.2	4,840
MW5				
	December 2017	2.78	7.7	2,630
	February 2018	3.12	7.9	2,320
	June 2018	3.31	7.9	1,413
	September 2018	3.56	7.8	2,040
	December 2018	3.41	7.7	2,130
	March 2019	4.20	7.9	1,220
MW6				
	December 2017	4.55	7.6	1,738
	February 2018	4.76	7.8	1,833
	June 2018	4.75	7.7	1,828
	September 2018	4.84	8.0	2,090
	December 2018	4.85	7.6	2,200
	March 2019	Casing destroyed	Casing destroyed	Casing destroyed
MW7				
	December 2017	104.53	No sample	No sample
	February 2018	104.97	No sample (Grey mud)	No sample
	June 2018	106.21	No sample (Grey mud)	No sample
	September 2018	104.65	No sample (Grey mud)	No sample
	December 2018	105.01	No sample (Grey mud)	No sample
	March 2019	Dry	Dry	Dry
MW8				
	December 2017	13.12	Casing blocked	Casing blocked
	February 2018	12.52	Casing blocked	Casing blocked
	June 2018	13.33	Casing blocked	Casing blocked
	September 2018	13.48	Casing blocked	Casing blocked
	December 2018	13.29	Casing blocked	Casing blocked
	March 2019	13.66	Casing blocked	Casing blocked

Surface Water

Estimated volume of water stored onsite as 29th April 2019 was approximately **110 ML**.
(The water inventory was taken before the 68.8mm of rainfall recorded on 4th May)

According to the BTM Complex strategy, water sharing opportunity is continuously discussed between the three mines. TCM continue assessing options to source additional water in order to maintain the mine in operation in the long run.

Rehabilitation and Clearing

Rehabilitation

Operations and Environment departments work together to develop and implement a more efficient rehabilitation program. The aim is to enhance the quantity of areas rehabilitated.

In 2018, TCM planted approximately 2,400 trees in the designated rehabilitation areas including *Eucalyptus albens*, *Eucalyptus blakelyi*, *Eucalyptus crebra*, *Eucalyptus melliodora*, *Eucalyptus pilligaensis*, *Eucalyptus populanea*, *Eucalyptus macrocarpa*, *Eucalyptus Melanophloia*, *Eucalyptus Crebra*, *Eucalyptus Dealbata* and *Eucalyptus Dwyeri*.

For 2019, 4,200 trees have been ordered and they will be planted in the two emplacement areas before winter.

Clearing

The trees clearing campaign 2019 was completed during the authorised timeframe (February-April). An area of 19.8Ha was cleared in accordance with the current Mining Operations Plan (MOP) and the Biodiversity Management Plan. Several fauna species observed during clearing activities were captured and safely relocated and released.



Strophurus intermedius (Southern Spiny-tailed Gecko) captured on the ground near a felled *Eucalyptus crebra*. Successfully released.



Saccolaimus flaviventris (Yellow-bellied Sheath-tail-bat) found in a medium sized hollow of a felled *Eucalyptus crebra*. Successfully released.

Complaints

Since the last meeting, no complaint was received.

Environmental Management Plans

In April 2019, the Department provided some comments to the updated Management Plans submitted in August 2018. TCM is working with experts to address all the Department's comments.

Management plans submitted at the end of August 2018 to agencies, CCC members (for feedbacks) and DPE (for approval) include:

Noise Management Plan

The Noise management Plan was revised by Todoroski Air Science (TAS).

Blast Management Plan

The Blast Management Plan was revised by TAS.

Air Quality Greenhouse Gas Management Plan

The Air Quality Management Plan was revised by TAS too.

Water Management Plan

The Water Management plan was revised by WRM.

BTM Water Strategy

The Draft BTM Water Strategy was sent to CCC members and agencies for consultations in July 2018.

The BTM complex mines received comments from DPE and Natural Resources Access Regulator (NRAR) regarding the draft Water Strategy. The three mine are currently working with the groundwater expert (AGE) to address the comments related to the groundwater model. Agencies agreed the action plan and timeframe proposed by the BTM mines to address and submit a revised Water strategy and an updated BTM groundwater model.

Annual and Compliance Reporting

Annual Review and Annual Return Reports

TCM submitted Annual Return and Annual Review on 9th and 31st March respectively.

Annual Compliance EPBC statement

TCM will prepare and submit the Annual Compliance EPBC statement by 9th June 2019.

Environmental Improvement and Initiatives

Dust Management

TCM have engaged the company Dust A Side to provide advice and solution to minimise potential fugitive dust generated by exposed surfaces such as haul roads. Since end of April 2018, TCM have been monitoring the results and trying to improve the spraying and mixing techniques. The product used is totally organic, has no corrosive chloride compounds, and is environmentally friendly and readily biodegradable.

Usage of that product on mine haul truck roads is ongoing.

Water Management

TCM have installed marked gauge boards in the authorised discharged dams. This initiative improves water management practices.

Noise Management

The portable noise monitor was relocated few hundreds meter away from farming/ grazing activity zone at Coomalgah and a new fence was installed around it.

Rehabilitation

TCM have used an ATV to water the rehabilitated areas. That initiative improved the chance of tree survival during prolonged dry weather condition.

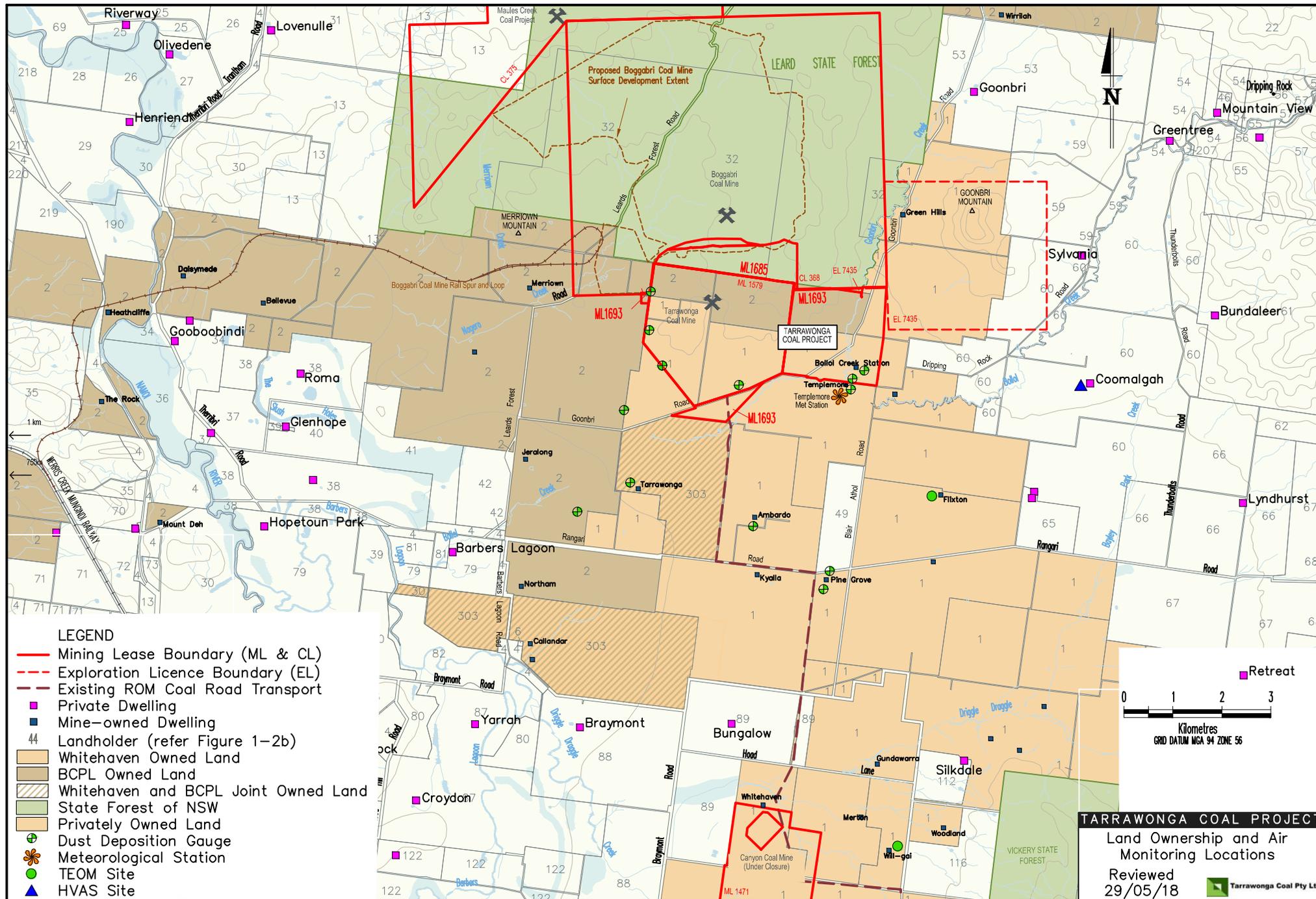
Air Quality

Two Portable dust (PM10) monitors have been ordered to upgrade the air monitoring network. They have been installed and record continuously data



Portable Dust monitor installed at TCM in November 2018

Appendix A

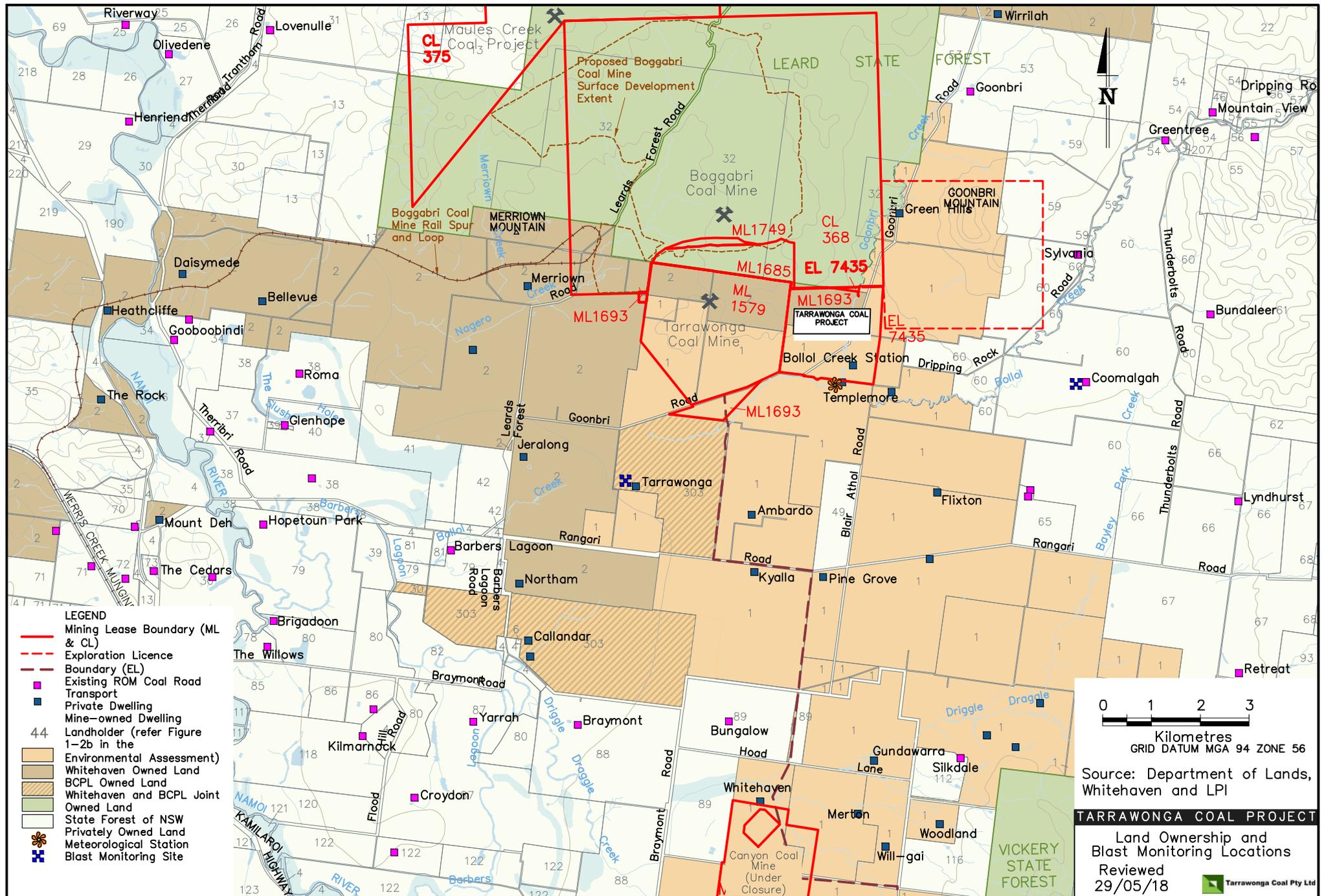


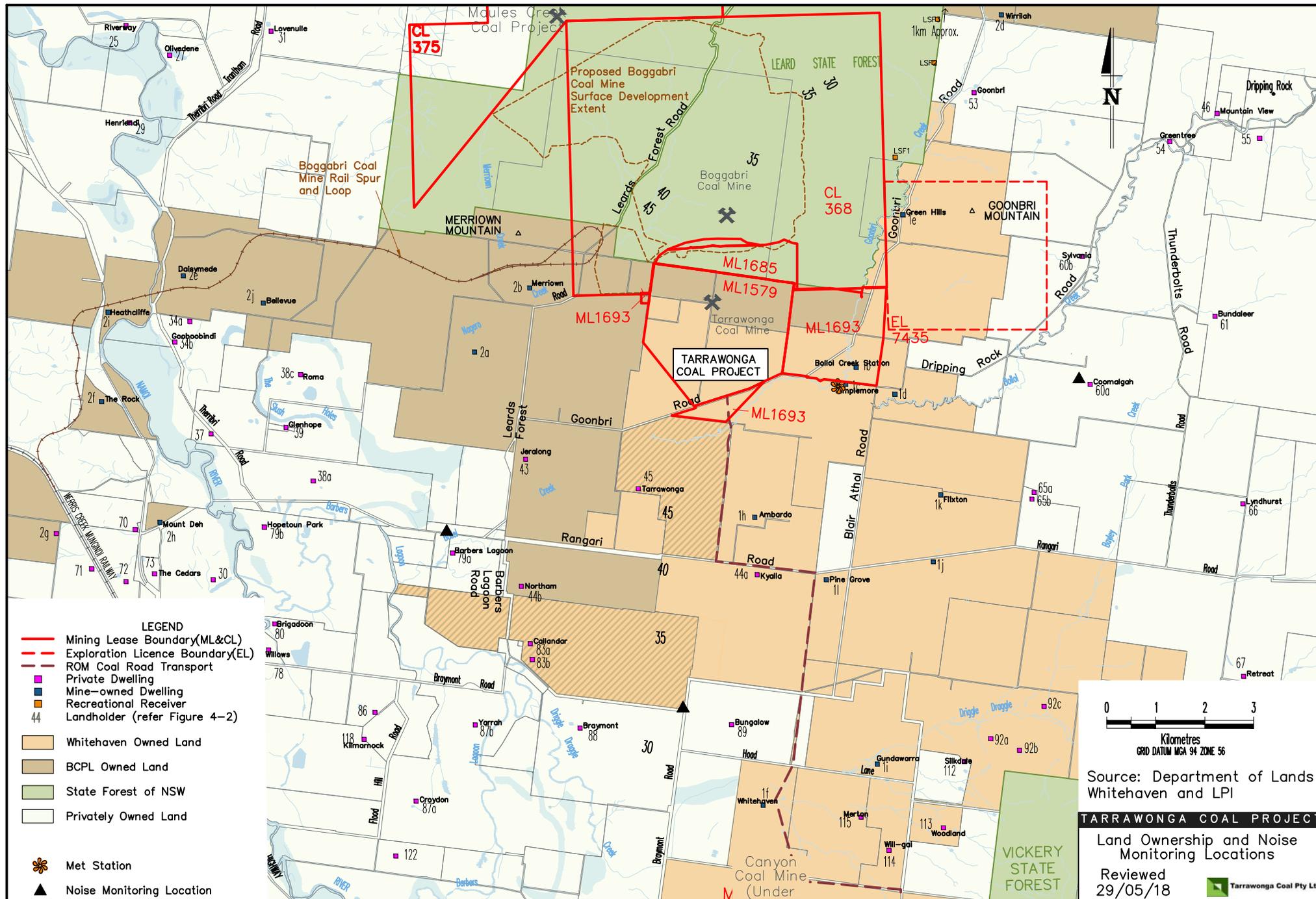
LEGEND

- Mining Lease Boundary (ML & CL)
- - - Exploration Licence Boundary (EL)
- - - Existing ROM Coal Road Transport
- Private Dwelling
- Mine-owned Dwelling
- 44 Landholder (refer Figure 1-2b)
- Whitehaven Owned Land
- BCPL Owned Land
- Whitehaven and BCPL Joint Owned Land
- State Forest of NSW
- Privately Owned Land
- + Dust Deposition Gauge
- ✿ Meteorological Station
- TEOM Site
- ▲ HVAS Site

TARRAWONGA COAL PROJECT
 Land Ownership and Air Monitoring Locations
 Reviewed 29/05/18







0 1 2 3
Kilometres
GRID DATUM MGA 94 ZONE 56

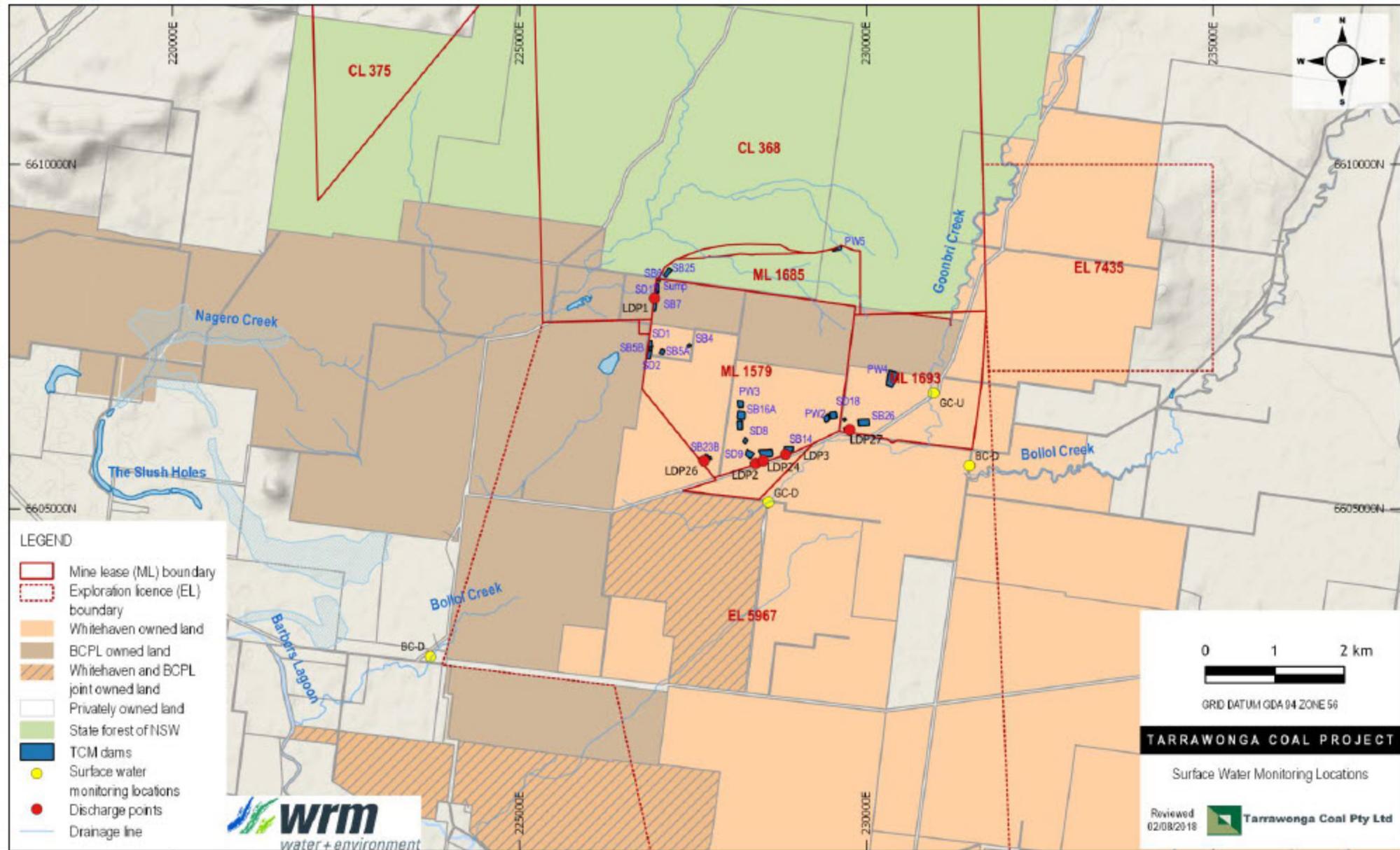
Source: Department of Lands
Whitehaven and LPI

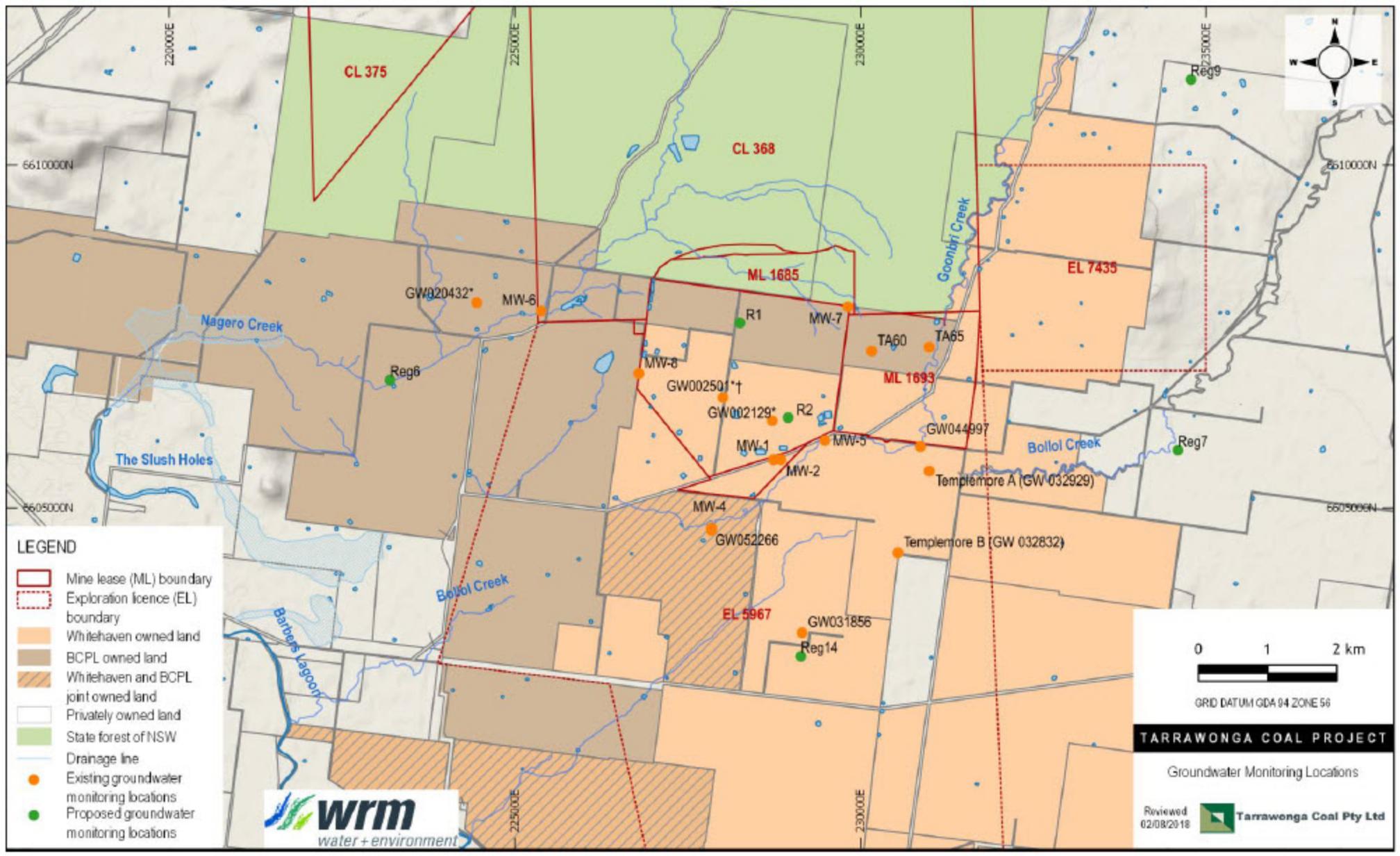
TARRAWONGA COAL PROJECT

Land Ownership and Noise
Monitoring Locations

Reviewed
29/05/18

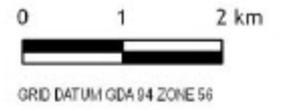
Tarrawonga Coal Pty Ltd





LEGEND

- Mine lease (ML) boundary
- Exploration licence (EL) boundary
- Whitehaven owned land
- BCPL owned land
- Whitehaven and BCPL joint owned land
- Privately owned land
- State forest of NSW
- Drainage line
- Existing groundwater monitoring locations
- Proposed groundwater monitoring locations



TARRAWONGA COAL PROJECT

Groundwater Monitoring Locations

Appendix B

WHITEHAVEN COAL OPERATIONAL NOISE MONITORING

**Tarrawonga Coal Mine
Quarter Ending March 2019**

Prepared for:

Whitehaven Coal Mining Limited
10409 Kamilaroi Hwy
GUNNEDAH NSW 2380

SLR Ref: 610.18063-R05
Version No: -v0.1
March 2019



EXECUTIVE SUMMARY

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street
Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: +61 2 9427 8100 F: +61 2 9427 8200
E: sydney@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Whitehaven Coal Mining Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.18063-R05-v0.1	15/03/2019	Adam Sirianni	Nicholas Vandenberg	Mark Russell

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APPENDICES

Appendix A	Acoustic Terminology
Appendix B	Calibration Certificates

1 Introduction

Whitehaven Coal Limited (Whitehaven) has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct operational noise monitoring for Tarrawonga Coal Mine (TCM) located approximately 16 km east of Boggabri, New South Wales (NSW) in accordance with the approved Tarrawonga Noise Management Plan (NMP) dated December 2014, the Whitehaven Project Approval (PA 11_0047 – May 2017) and the Environment Protection Licence (EPL) 12365 dated 27/06/2017 (EPL 12365).

The objectives of the noise monitoring programme for this operating period were as follows:

- Conduct operator attended noise surveys at three (3) locations (79a, 89 and 60a) surrounding the mine during the day, evening and night-time periods.
- Quantify all sources of noise within each of the attended noise surveys, including their measured and/or estimated contribution and maximum level of individual noise sources.
- Assess the noise emissions of TCM and determine compliance with respect to the limits contained in Section 2 of the NMP, Schedule 3 - Condition 3 & 6 of the PA and Condition L4.1 of the EPL.

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

2 Performance Assessment and Discussion

The following provides a summary of the attended noise measurements undertaken at each monitoring location. Further details are provided for each location in **Section 5** of this report.

Table 1 Performance Assessment – Operations

EPL ID	Location	Date	Tarrawonga Coal Mine Contribution dBA				Criteria	Measurement Periods	Weather Compliant			Compliant
			LAeq(15minute) Day	LAeq(15minute) Evening	LAeq(15minute) Night	LA1(1minute) Night			Day	Eve	Night	
79a	Barbers Lagoon	25/02/2019	26	N/M	I/A	I/A	Day, Evening and Night – 35 dBA LAeq(15minute)	Day - 1.5 hrs Evening - 0.5 hrs Night – 1hrs	N	N	N	Y
		26/02/2019	I/A	I/A	25	27			Y	Y	Y	Y
		27/02/2019	26	I/A	N/M	N/M			Y	N	N	Y
		28/02/2019	I/A	N/M	31	33			Y	N	N	Y
89	Bungalow	25/02/2019	I/A	N/M	27	29	Night – 45 dBA LA1(1minute)		N	N	N	Y
		26/02/2019	I/A	I/A	I/A	I/A	Y		Y	Y	Y	
		27/02/2019	I/A	I/A	N/M	N/M	Cumulative Day, Evening, Night 40 dBA LAeq(15minute)		Y	N	Y	Y
		28/02/2019	<25	I/A	I/A	I/A	Y		N	N	Y	
60a	Coomalgah/ Matong	25/02/2019	25	N/M	I/A	I/A	Y	N	N	Y		
		26/02/2019	26	<25	<25	25	Y	Y	N	Y		
		27/02/2019	31	I/A	I/A	I/A	Y	N	N	Y		
		28/02/2019	26	N/M	I/A	I/A	Y	N	Y	Y		

Note:

I/A = Inaudible

N/M = Not Measurable

3 Noise Criteria

3.1 Project Approval, EPL and NMP

Noise monitoring at TCM was conducted in accordance with the EPL 12365, the PA 11_0047 requirements and the NMP. The site specific EPL and PA noise limits are summarised in Section 2 of the NMP and are reproduced in **Table 2**.

Table 2 Project Approval and EPL Noise Criteria- dBA (re 20 µPa)

Location	Day	Cumulative Criteria1	Evening	Night	
	LAeq(15minute)	LAeq(15minute)	LAeq(15minute)	LAeq(15minute)	LA1(1minute)
All Privately owned Residences	35 dBA	40 dBA	35 dBA	35 dBA	45 dBA

Note 1. Cumulative noise criteria to include noise generated by other mines

3.1.1 Non-compliances & Exemptions

In accordance with Section 11.1.3 of the Noise Policy for Industry (NPfI) a development is deemed to be in non-compliance with a noise consent or licence condition if the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence. This may occur for two reasons:

- The noise from the TCM is excessive, in which case TCM will be not complying with its consent or licence condition.
- The noise was increased by extreme, nonstandard weather effects—in which case the TCM is not considered to be in non-compliance with its consent or licence condition.

In this latter case, further monitoring at a later date is required to determine compliance under “normal” meteorological conditions.

The NPfI states in Section 9.2 that *“it is not practicable to meet the noise limit under all inversion events; hence exceedances under extreme temperature inversions are not considered to be a non-compliance with consent or licence conditions.”*

TCM defines non standard weather effects as:

- Wind speeds greater than 3 m/s at 10m above ground level; or
- Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level; or
- Stability category G temperature inversion conditions

3.1.2 Attended Monitoring

TCM will be undertaking Attended Noise monitoring on a quarterly basis at residential areas. The attended monitoring will take place at the following locations & can be found in **Figure 1**.

- Barbers Lagoon – 6412 Rangari Road
- Bungalow – 1216 Braymont Road
- Coolmagah/Matong – Eastern boundary

This monitoring will involve Day, Evening and Night Attended monitoring to determine the $L_{Aeq(15\text{minute})}$. During attended monitoring, the following is to be monitored:

- Noise levels from TCM at residential areas.
- wind speed and direction.
- Sky cloud cover, using direct observation for night measurements.

4 Operational Noise Monitoring Methodology

4.1 General Requirements

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1 – 2004 *Electroacoustics—Sound level meters – Specifications*, AS IEC 61672.2-2004, AS IEC 61672.3-2004 and carried current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ± 0.5 dBA. Calibration Sheets are provided in **Appendix B**.

4.2 Methodology - Operator Attended Noise Monitoring

Noise monitoring was conducted in accordance with the current Tarrawonga NMP, and Conditions M7.1 and M7.4 of the EPL.

Operator attended noise measurements were conducted during the day, evening and night-time periods for a minimum of 1.5 hours during the day; 30 minutes during the evening and 1 hour during the night at each of the three (3) nominated noise monitoring locations representing the most affected receiver locations, listed in **Table 3** and shown in **Figure 1**. During the operator attended noise measurements, the character and relative contribution of ambient noise sources and mine contributions were determined.

Table 3 Noise Monitoring Locations

Monitoring Location	Receiver Type	Address	Monitoring Location - MGA Zone 56	
			Easting (m)	Northing (m)
79a	Residence	Barbers Lagoon – 6145 Rangari Road	222934	6602484
89	Residence	Bungalow – 1216 Braymont Road	227596	6599265
60a	Residence	Matong/Coomalgah – Eastern boundary	233182	6606083

The objective of the operator attended noise monitoring was to measure the maximum (L_{Amax}) and the $L_{Aeq(15minute)}$ noise level contribution from the TCM at the nearest potentially affected receptors in order to determine the noise contribution of operational activities associated with TCM operations over each 15 minute measurement period. In addition, the operator quantifies and characterises the overall levels of ambient noise in the area (i.e. L_{Amax} , $LA1$, $LA10$, $LA90$, L_{Aeq} and L_{Amin}) over the 15 minute measurement interval.

Operator attended noise measurements were conducted using one-third octave integrating Brüel & Kjær Type 2250 Sound Level Meter (SLM) (serial number 3011836) and one-third octave integrating Brüel & Kjær Type 2270 SLMs (serial numbers 3011372 & 3008204).

Table 4 presents a summary of which days of the week the quarterly monitoring was conducted, in accordance with condition M7.5 of EPL 12365.

Table 4 Days of the Week Quarterly Monitoring was Conducted, Year 2018

Period	Day of the Week					
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Day	25 February 2019	26 February 2019	27 February 2019	28 February 2019		
Evening	25 February 2019	26 February 2019	27 February 2019	28 February 2019		
Night ¹	25 February 2019	26 February 2019	27 February 2019	28 February 2019		

1. Taken to mean the night time period from 10:00 pm on the stated day to 7:00 am the following day.

Figure 1 Tarrawonga Coal Mine Attended Noise Monitoring Locations



5 Results and Discussion

5.1 Results of Operator Attended Monitoring

Results of the operator attended noise surveys at Barbers Lagoon, Bungalow and Matong/Coomalgah are provided in **Table 5** to **Table 16**.

Ambient noise levels presented include all noise sources such as transport (roads, boats and aircraft), fauna (insects, frogs, birds and bats), the natural environment (wind in trees), domestic noises, other industrial operations as well as TCM noise emissions.

Weather data during the monitoring period has been obtained from the weather station located on the TCM site and observed conditions.

The tables also provide the following information:

- Date and start time, operator and equipment details.
- Monitoring location.
- Wind velocity (m/s) and temperature (°C) at the weather station.
- Typical maximum (L_{Amax}) and contributed $L_{Aeq(15minute)}$ noise levels.

5.1.1 Operator Attended Noise Survey Results – Barbers Lagoon (79a)

Results of the operator attended noise surveys at R1 are provided in **Table 5** to **Table 8**. Monitoring location 79a represents residential receptors located to the southwest of the site in Barbers Lagoon.

Table 5 Operator Attended Noise Survey Results – 79a – Barbers Lagoon (Day 1)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution (dB)	Description
				LAmx	LA1	LA10	LA90	LAeq	LAMin		
Day 25/02/2019 11:41 1.7 – 5.1 m/s ENE/ESE 20-28 °C 3008204	35 dBA LAeq(15minute)	1	E	80	72	61	35	59	28	N/M	Site Related Noise Events: Audible but not measurable at times. Dozer 28-31 Other Noise Events: Birds 63-80 Dog 63 Car 56
		2	D	64	56	49	28	45	25	26	
		3	D	58	51	43	31	40	28	N/M	
		4	E	60	55	49	34	45	31	N/M	
		5	A	73	57	46	31	46	26	25	
		6	A	62	54	43	30	41	26	26	
Evening 25/02/2019 20:32 3.5 – 4.9 m/s ESE 26-27°C 3008204	35 dBA LAeq(15minute)	1	D	79	72	56	40	59	37	N/M	Site Related Noise Events: Not measurable. Other Noise Events: Dog 56-79 Car 51
		2	D	70	57	51	44	49	40	N/M	
Night 25/02/2019 23:30 4 - 5.3 E/ESE 25-28 °C 3011836	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	C	52	49	46	40	44	37	I/A	Site Related Noise Events: Inaudible Other Noise Events: Dog barking 56-67 Wind 35-50
		2	B	56	47	44	37	41	33	I/A	
		3	C	67	48	40	34	41	32	I/A	
		4	C	47	46	44	37	41	33	I/A	

N/M = Not Measurable

I/A = Inaudible

Table 6 Operator Attended Noise Survey Results – 79a – Barbers Lagoon (Day 2)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAmax	LA1	LA10	LA90	LAeq	L Amin		
Day 26/02/2019 11:01 0 – 3 m/s E/W 21-28 °C 3011836	35 dBA LAeq(15minute)	1	B	65	58	46	31	45	27	I/A	Site Related Noise Events: Inaudible Other Noise Events: Birdsong 35-44 Radio 34 Traffic 37-39 Farm animals 59-62 Resident vehicle pass 74-79
		2	D	79	58	48	30	49	26	I/A	
		3	E	74	59	49	30	48	26	I/A	
		4	D	62	55	45	31	43	26	I/A	
		5	E	67	59	49	32	47	27	I/A	
		6	E	66	54	45	30	43	26	I/A	
Evening 26/02/2019 20:12 1.2 – 1.3 m/s E/ESE 24-26 °C 3008204	35 dBA LAeq(15minute)	1	D	43	33	29	25	27	23	I/A	Site Related Noise Events: Inaudible. Other Noise Events: Birds 30-33 Distant Truck 28 Car 37-45
		2	D	45	42	35	27	32	26	I/A	
Night 27/02/2019 01:04 0 – 1.2 m/s N 20-23 °C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	E	57	50	29	26	35	23	25	Site Related Noise Events: Audible. Dozer <25-30 Other Noise Events: Dog 49-57 Car 33-37 Birds 35-40
		2	E	41	29	27	25	26	22	<25	
		3	F	58	51	39	25	38	23	<25	
		4	F	55	46	33	26	33	24	25	

N/M = Not Measurable

I/A = Inaudible

Table 7 Operator Attended Noise Survey Results – 79a – Barbers Lagoon (Day 3)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution (dB)	Description
				LAmax	LA1	LA10	LA90	LAeq	LAMin		
Day 27/02/2019 12:31 0 – 4.3 m/s E/SSW 21-31 °C 3008204	35 dBA LAeq(15minute)	1	E	69	60	42	28	46	24	<25	Site Related Noise Events: Audible. Dozer 28 Other Noise Events: Birds 40-79 Truck 38-44 Car 40-53
		2	A	72	63	56	32	52	24	<25	
		3	C	74	52	43	30	44	26	26	
		4	C	61	46	41	29	38	25	26	
		5	C	63	49	43	28	39	24	26	
		6	C	79	51	37	26	47	23	26	
Evening 27/02/2019 19:58 4.3 – 5.3 m/s E/ENE 27-28 °C 3011836	35 dBA LAeq(15minute)	1	D	66	53	50	43	47	40	I/A	Site Related Noise Events: Inaudible Other Noise Events: Farm operations 38 Birdsong 41-66 Wind 43-50
		2	D	55	52	48	42	46	40	I/A	
Night 27/02/2019 23:29 3 – 4.5 SSW/ESE 28-29 °C 3011836	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	A	57	46	42	36	39	33	N/M	Site Related Noise Events: Not Measureable Other Noise Events: Bats 57-65 Wind 36-49
		2	C	65	47	43	37	41	35	N/M	
		3	C	65	47	44	37	42	38	N/M	
		4	A	63	48	44	37	42	36	N/M	

N/M = Not Measurable

I/A = Inaudible

Table 8 Operator Attended Noise Survey Results – 79a – Barbers Lagoon (Day 4)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution (dB)	Description
				LAmx	LA1	LA10	LA90	LAeq	LAmIn		
Day 28/02/2019 13:07 0.3 – 3.5 m/s SE/SSW 28-30 °C 3011836	35 dBA LAeq(15minute)	1	D	83	60	50	53	59	27	I/A	Site Related Noise Events: Inaudible Other Noise Events: Birdsong 48-83 Plane 44 Car pass-by 52-61 Plane 44 Wind 40-53
		2	B	76	52	40	28	46	24	I/A	
		3	C	72	64	48	30	54	25	I/A	
		4	A	65	52	45	30	42	26	I/A	
		5	B	60	49	41	29	40	26	I/A	
		6	C	67	54	42	29	42	25	I/A	
Evening 28/02/2019 18:01 3.3 – 4.3 m/s SE 29 °C 3008204	35 dBA LAeq(15minute)	1	D	74	59	52	37	49	33	I/A	Site Related Noise Events: Not measurable. Other Noise Events: Dog 63 Car 43-53 Birds 48-87
		2	D	87	76	67	39	64	33	N/M	
Night 28/02/2019 22:13 3.1 - 5 m/s ENE 24-25 °C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	D	60	51	41	34	40	31	29	Site Related Noise Events: Mine Clearly audible. Dozer: 32 Other Noise Events: Car 45-60 Dog 50-59 Cow 35
		2	D	58	43	40	32	37	29	30	
		3	D	42	39	36	31	33	29	31	
		4	D	60	43	37	30	36	28	31	

N/M = Not Measurable

I/A = Inaudible

5.1.2 Operator Attended Noise Survey Results – Bungalow (89)

Results of the operator attended noise surveys at R1 are provided in **Table 9** to **Table 12**. Monitoring location 89 represents residential receptors located to the south of the site in Bungalow.

Table 9 Operator Attended Noise Survey Results – 89 – Bungalow (Day 1)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAm _{ax}	LA ₁	LA ₁₀	LA ₉₀	LA _{eq}	LA _{min}		
Day 25/02/2019 09:40 4 – 6.2 m/s E/ESE 17-25 °C 3008204	35 dBA LA _{eq} (15minute)	1	C	60	55	44	33	42	28	I/A	Site related noise: Inaudible. Other noise events: Car 50- 61 Truck 67-68
		2	D	62	55	46	32	43	28	I/A	
		3	B	67	57	52	38	49	31	I/A	
		4	C	61	51	43	33	41	27	I/A	
		5	B	68	60	44	34	46	27	I/A	
		6	D	59	49	44	25	40	22	I/A	
Evening 25/02/2019 19:40 4.9 – 5.9 m/s ESE 27-28 °C 3008204	35 dBA LA _{eq} (15minute)	1	D	57	54	51	46	49	43	I/A	Site Related Noise Events: Not measurable. Other Noise Events: Wind 50-70
		2	D	70	57	53	46	51	43	N/M	
Night 26/02/2019 00:50 4.2 – 5.3 m/s E 19 °C 3011836	35 dBA LA _{eq} (15minute) 45 dBA LA ₁ (1minute)	1	D	52	49	47	42	45	40	N/M	Site Related Noise Events: Barely audible General operations 27 Other Noise Events: Insects 34-40 Wind 41-60
		2	D	60	48	46	41	44	38	N/M	
		3	D	50	45	43	38	41	35	N/M	
		4	E	44	40	38	33	36	30	27	

N/M = Not Measurable, I/A = Inaudible

Table 10 Operator Attended Noise Survey Results – 89 – Bungalow (Day 2)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAmax	LA1	LA10	LA90	LAeq	L Amin		
Day 26/02/2019 12:59 0.9 – 3.9 m/s SSE/SSW 18-30 °C 3011836	35 dBA LAeq(15minute)	1	A	73	64	43	32	52	28	I/A	Site Related Noise Events: Inaudible Other Noise Events: Car pass-by 71-74 Birdsong 46-65 Wind 27-51
		2	C	71	59	43	30	48	27	I/A	
		3	B	74	65	51	32	52	26	I/A	
		4	B	73	59	43	27	48	24	I/A	
		5	A	57	46	40	25	36	22	I/A	
		6	B	59	50	45	25	41	23	I/A	
Evening 26/02/2019 19:21 1.1 – 2.3 m/s ESE 28-29 °C 3008204	35 dBA LAeq(15minute)	1	E	54	48	43	29	39	22	I/A	Site related noise: Inaudible. Other noise events: Car 49-54 Truck 44 Insects 50-52 Birds 45-50
		2	E	52	50	48	37	45	32	I/A	
Night 26/02/2019 23:36 0 - 1 m/s S/SSW 27-28 °C 3008204	35 dBA LAeq(15minute)	1	B	60	56	54	48	52	36	I/A	Site related noise: Inaudible. Other noise events: Truck 55-63 Insects 54-56
		2	B	63	57	56	49	54	30	I/A	
	45 dBA LA1(1minute)	3	A	57	56	55	47	53	32	I/A	
		4	B	56	53	52	43	49	29	I/A	

N/M = Not Measurable

I/A = Inaudible

Table 11 Operator Attended Noise Survey Results – 89 – Bungalow (Day 3)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAmx	LA1	LA10	LA90	LAeq	LAmIn		
Day 27/02/2019 10:41 0.7 – 3.5 m/s E/S 14-27 °C 3008204	35 dBA LAeq(15minute)	1	C	62	53	40	23	40	20	I/A	Site related noise: Inaudible. Haul truck 35 Other noise events: Car 55-78 Truck 75 Birds 45-45
		2	B	78	67	48	24	53	21	I/A	
		3	E	56	39	35	24	33	22	I/A	
		4	E	68	54	41	25	41	21	I/A	
		5	E	56	37	30	21	28	20	I/A	
		6	E	54	43	37	23	33	21	I/A	
Evening 27/02/2019 20:43 4.2 – 5.1 E/ENE 26 °C 3011836	35 dBA LAeq(15minute)	1	D	63	53	50	46	49	42	I/A	Site Related Noise Events: Inaudible Other Noise Events: Wind 40-57 Car pass-by 58-63 Insects 41-43
		2	D	58	55	52	47	50	44	I/A	
Night 28/02/2019 01:06 0 – 1.2 m/s NE/WSW 19-23°C 3011836	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	D	58	49	46	39	44	35	N/M	Site Related Noise Events: Not Measureable Other Noise Events: Insects 39-44 Wind 50-61
		2	E	61	52	48	42	46	38	I/A	
		3	E	55	50	47	40	44	37	I/A	
		4	F	60	50	46	38	44	32	I/A	

N/M = Not Measurable

I/A = Inaudible

Table 12 Operator Attended Noise Survey Results – 89 – Bungalow (Day 4)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAmax	LA1	LA10	LA90	LAeq	LAmin		
Day 27/02/2019 08:59 1.2 – 2.7 m/s ESE/SSE 20-25 °C 3011836	35 dBA LAeq(15minute)	1	B	76	61	47	37	50	28	N/M	Site Related Noise Events: Intermittently audible General engine noise 24-26 Other Noise Events: Car pass-by 67-76 Plane 38-45 Birdsong 38-61
		2	B	72	59	45	27	47	25	I/A	
		3	C	72	59	42	26	46	23	<25	
		4	B	67	58	39	24	44	23	<25	
		5	A	65	49	38	26	37	24	N/M	
		6	B	64	53	42	26	41	24	I/A	
Evening 28/02/2019 18:55 3.8 – 4.7 m/s SE/SSE 28-29°C 3008204	35 dBA LAeq(15minute)	1	E	68	47	44	37	42	35	I/A	Site Related Noise Events: Inaudible. Other Noise Events: Birds 68 Truck 35
		2	E	56	46	42	35	39	32	I/A	
Night 28/02/2019 22:01 3.1 – 5 ENE 24-25 °C 3011836	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	D	62	55	53	48	51	43	I/A	Site Related Noise Events: Inaudible Other Noise Events: Insects 46 Wind 43-54 Car pass-by 56-65
		2	D	59	58	56	45	52	48	I/A	
		3	D	65	57	54	43	50	40	I/A	
		4	D	59	58	55	42	50	39	I/A	

N/M = Not Measurable

I/A = Inaudible

5.1.3 Operator Attended Noise Survey Results – Matong/Coomalgah (60a)

Results of the operator attended noise surveys at R1 are provided in **Table 13** to **Table 16**. Monitoring location 60a represents residential receptors located to the east of the site at the Matong/Coomalgah boundary.

Table 13 Operator Attended Noise Survey Results – 60a – Matong/Coolmalgah (Day 1)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	L _{Amin}		
Day 25/02/2019 07:27 0.6 – 2.5 m/s SE/ESE 18-21 °C 3008204	35 dBA L _{Aeq} (15minute)	1	C	53	48	37	21	35	19	<25	Site Related Noise Events: Mine clearly audible. Dozer 25 Other Noise Events: Plane 40-53 Car 46-53 Birds 60-72
		2	C	63	58	54	21	48	19	<25	
		3	C	64	53	40	22	40	19	<25	
		4	C	72	59	45	22	46	20	25	
		5	C	68	55	36	23	42	21	25	
		6	C	71	60	48	24	47	22	25	
Evening 25/02/2019 18:43 3.9 - 5.5 m/s ESE 29-30 °C 3008204	35 dBA L _{Aeq} (15minute)	1	D	52	47	44	34	41	29	N/M	Site Related Noise Events: Not measurable. Other Noise Events: Car 46-59
		2	D	59	47	45	36	42	33	N/M	
Night 25/02/19 22:00 3.5 – 4.9 m/s E 24 °C 3011919	35 dBA L _{Aeq} (15min) 45 dBA L _{A1} (1min)	1	E	44	41	39	30	36	26	I/A	Site Related Noise Events: Inaudible Other Noise Events: Wind 35-54 Insects 33-35
		2	E	54	43	40	30	37	26	I/A	
		3	D	46	43	40	33	37	29	I/A	
		4	E	48	44	42	32	38	29	I/A	

N/M = Not Measurable, I/A = Inaudible

Table 14 Operator Attended Noise Survey Results – 60a – Matong/Coolmalgah (Day 2)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution (dB)	Description
				LAmax	LA1	LA10	LA90	LAeq	LAmin		
Day 26/02/2019 09:02 1.3 – 3.1 m/s W/WSW 23-26 °C 3011836	35 dBA LAeq(15minute)	1	A	56	49	41	27	38	24	26	Site Related Noise Events: Audible General truck noise 25-30 Other Noise Events: Other industry 26-31 Birdsong 35-60 Plane 32
		2	C	56	44	33	24	33	23	26	
		3	A	59	41	29	24	30	22	25	
		4	A	54	43	31	24	32	22	26	
		5	A	60	50	30	23	36	22	N/M	
		6	A	51	41	32	24	30	22	26	
Evening 26/02/2019 18:28 1.3 – 2.2 m/s E/ESE 30-31 °C 3008204	35 dBA LAeq(15minute)	1	D	49	35	26	21	25	19	<25	Site Related Noise Events: Mine clearly audible. Other Noise Events: Birds 33-63
		2	D	63	45	34	21	35	20	22	
Night 26/02/2019 22:06 3.5 – 4.6 m/s E/ENE 24-26 °C 3008204	35 dBA LAeq(15minute) 45 dBA LA1(1minute)	1	D	37	35	33	28	31	24	I/A	Site Related Noise Events: Audible. Dozer 20-23 Other Noise Events: Insects 30-55
		2	D	55	32	29	22	26	19	<25	
		3	D	48	32	31	26	29	24	<25	
		4	E	49	33	32	28	30	25	<25	

N/M = Not Measurable

I/A = Inaudible

Table 15 Operator Attended Noise Survey Results – 60a – Matong/Coolmalgah (Day 3)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				LAmax	LA1	LA10	LA90	LAeq	L Amin		
Day 27/02/2019 08:41 1.4 – 2.8 m/s SW/SSW 22-25 °C 3008204	35 dBA LAeq(15minute)	1	A	55	46	33	26	33	24	29	Site Related Noise Events: Mine clearly audible. Dozer 30-35 Horn 34-35 Engine Rev: 33-35 Other Noise Events: Birds 55-79 Car 41-46
		2	B	64	51	41	29	39	26	30	
		3	A	79	73	49	29	58	26	30	
		4	D	56	45	39	28	36	24	30	
		5	A	64	55	39	26	41	23	31	
		6	A	59	47	38	27	36	24	31	
Evening 27/02/2019 19:06 3 – 3.8 m/s E 28-30 °C 3011836	35 dBA LAeq(15minute)	1	D	65	43	36	25	35	25	I/A	Site Related Noise Events: Inaudible Other Noise Events: Car pass-by 70-74 Light wind 29-38 Birdsong 32-65 Plane 37
		2	D	74	60	40	23	49	21	I/A	
Night 27/02/2019 22:01 3.4 – 4.5 m/s E/ENE 25-26 °C 3011836	35 dBA LAeq(15minute)	1	E	52	50	49	43	47	38	I/A	Site Related Noise Events: Inaudible Other Noise Events: Wind 46-57 Insects 43-45
		2	D	52	50	48	43	46	38	I/A	
	45 dBA LA1(1minute)	3	D	57	50	49	44	47	37	I/A	
		4	D	52	50	48	43	46	39	I/A	

N/M = Not Measurable, I/A = Inaudible

Table 16 Operator Attended Noise Survey Results – 60a – Matong/Coolmalgah (Day 4)

Period Date/Start Time Weather SLM Details	Criteria	Measurement Number	Stability Category	Primary Noise Descriptor						TCM Contribution	Description
				L _{Amax}	L _{A1}	L _{A10}	L _{A90}	L _{Aeq}	L _{Amin}		
Day 28/02/2019 11:03 1.1 – 2.9 m/s E/ENE 23-27 °C 3011836	35 dBA L _{Aeq} (15minute)	1	B	58	57	60	25	29	23	<25	Site Related Noise Events: Audible General engine noise 22-29 Other Noise Events: Other Industry 26-31 Birdsong 51-62 Car pass-by 72-81
		2	D	57	45	32	24	32	22	<25	
		3	D	58	39	28	23	29	22	<25	
		4	D	59	48	31	25	34	23	<25	
		5	D	62	49	34	24	36	22	26	
		6	D	81	67	43	24	55	23	<25	
Evening 28/02/2019 20:54 3.6 – 4.8 SE 27 °C 3008204	35 dBA L _{Aeq} (15minute)	1	D	73	43	39	31	39	29	N/M	Site Related Noise Events: Not measurable. Other Noise Events: Birds 40
		2	D	56	38	36	30	34	27	N/M	
Night 28/02/2019 22:00 0.3 – 2.1 m/s SE/ESE 23-27 °C 3011372	35 dBA L _{Aeq} (15minute)	1	D	53	34	32	28	30	25	I/A	Site Related Noise Events: Inaudible. Other Noise Events:
		2	D	53	36	33	29	32	26	I/A	
	45 dBA L _{A1} (1minute)	3	D	38	35	33	27	31	24	I/A	
		4	D	40	38	36	28	33	24	I/A	

N/M = Not Measurable

I/A = Inaudible

Both TCM and Boggabri Coal operations were audible during the day, evening and night-time noise monitoring, with both generating similar noise levels. The total noise levels remained below the 40 dBA L_{Aeq}(15minute) cumulative noise criteria.

6 Conclusion

SLR was engaged by Whitehaven Coal Limited to conduct attended noise monitoring for the TCM in accordance with the Tarrawonga Coal Mine Noise Management Plan.

Operator attended noise monitoring was conducted at three (3) locations in order to determine the noise performance of the TCM, with compliance achieved at all locations during all time periods.

Both TCM and Boggabri Coal operations were audible during the daytime noise monitoring, with both generating similar noise levels. The total noise levels remained below the 40 dBA $L_{Aeq(15\text{minute})}$ cumulative noise criteria.

APPENDIX A

Acoustic Terminology

Sound Level or Noise Level

The terms “sound” and “noise” are almost interchangeable, except that in common usage “noise” is often used to refer to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure to which the human ear responds is ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2 “A” Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an “A-weighting” filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People’s hearing is most sensitive to sounds at mid frequencies (500 Hz to 4000 Hz), and less sensitive at lower and higher frequencies. Thus, the level of a sound in dBA is a good measure of the loudness of that sound. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dBA or 2 dBA in the level of a sound is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness. A 10 dBA change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as “linear”, and the units are expressed as dB(lin) or dB.

3 Sound Power Level

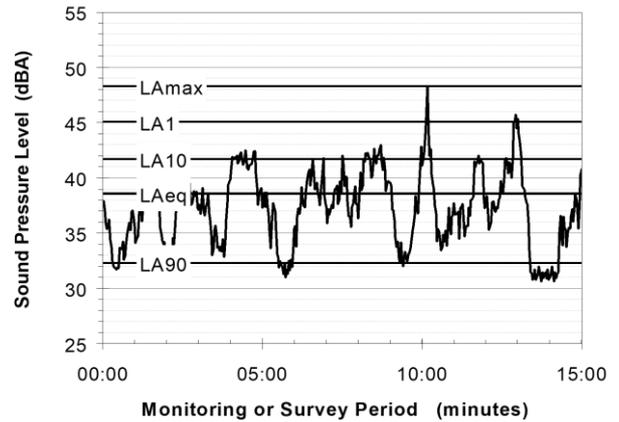
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure may be likened to an electric radiator, which is characterised by a power rating, but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4 Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

- LA1 The noise level exceeded for 1% of the 15 minute interval.
- LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.
- LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.
- LAeq The A-weighted equivalent noise level (basically the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

When dealing with numerous days of statistical noise data, it is sometimes necessary to define the typical noise levels at a given monitoring location for a particular time of day. A standardised method is available for determining these representative levels.

This method produces a level representing the “repeatable minimum” LA90 noise level over the daytime and night-time measurement periods, as required by the EPA. In addition the method produces mean or “average” levels representative of the other descriptors (LAeq, LA10, etc).

5 Tonality

Tonal noise contains one or more prominent tones (ie distinct frequency components), and is normally regarded as more offensive than “broad band” noise.

6 Impulsiveness

An impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.

7 Frequency Analysis

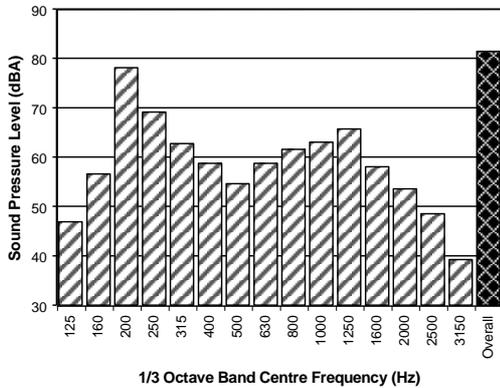
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal. This analysis was traditionally carried out using analogue electronic filters, but is now normally carried out using Fast Fourier Transform (FFT) analysers.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (3 bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



8 Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of “peak” velocity or “rms” velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as “peak particle velocity”, or PPV. The latter incorporates “root mean squared” averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements. Where triaxial measurements are used, the axes are commonly designated vertical, longitudinal (aligned toward the source) and transverse.

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used by some organizations.

9 Human Perception of Vibration

People are able to “feel” vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual’s perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as “normal” in a car, bus or train is considerably higher than what is perceived as “normal” in a shop, office or dwelling.

10 Over-pressure

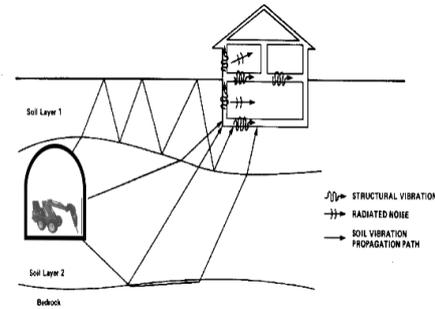
The term “over-pressure” is used to describe the air pressure pulse emitted during blasting or similar events. The peak level of an event is normally measured using a microphone in the same manner as linear noise (ie unweighted), at frequencies both in and below the audible range.

Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed “structure-borne noise”, “ground-borne noise” or “regenerated noise”. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term “regenerated noise” is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise

ASIA PACIFIC OFFICES

BRISBANE

Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

MACKAY

21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

ROCKHAMPTON

rockhampton@slrconsulting.com
M: +61 407 810 417

AUCKLAND

68 Beach Road
Auckland 1010
New Zealand
T: +64 27 441 7849

CANBERRA

GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

MELBOURNE

Suite 2, 2 Domville Avenue
Hawthorn VIC 3122
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

SYDNEY

2 Lincoln Street
Lane Cove NSW 2066
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

NELSON

5 Duncan Street
Port Nelson 7010
New Zealand
T: +64 274 898 628

DARWIN

5 Foelsche Street
Darwin NT 0800
Australia
T: +61 8 8998 0100
F: +61 2 9427 8200

NEWCASTLE

10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

TAMWORTH

PO Box 11034
Tamworth NSW 2340
Australia
M: +61 408 474 248
F: +61 2 9427 8200

NEW PLYMOUTH

Level 2, 10 Devon Street East
New Plymouth 4310
New Zealand
T: +64 0800 757 695

GOLD COAST

Ground Floor, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

PERTH

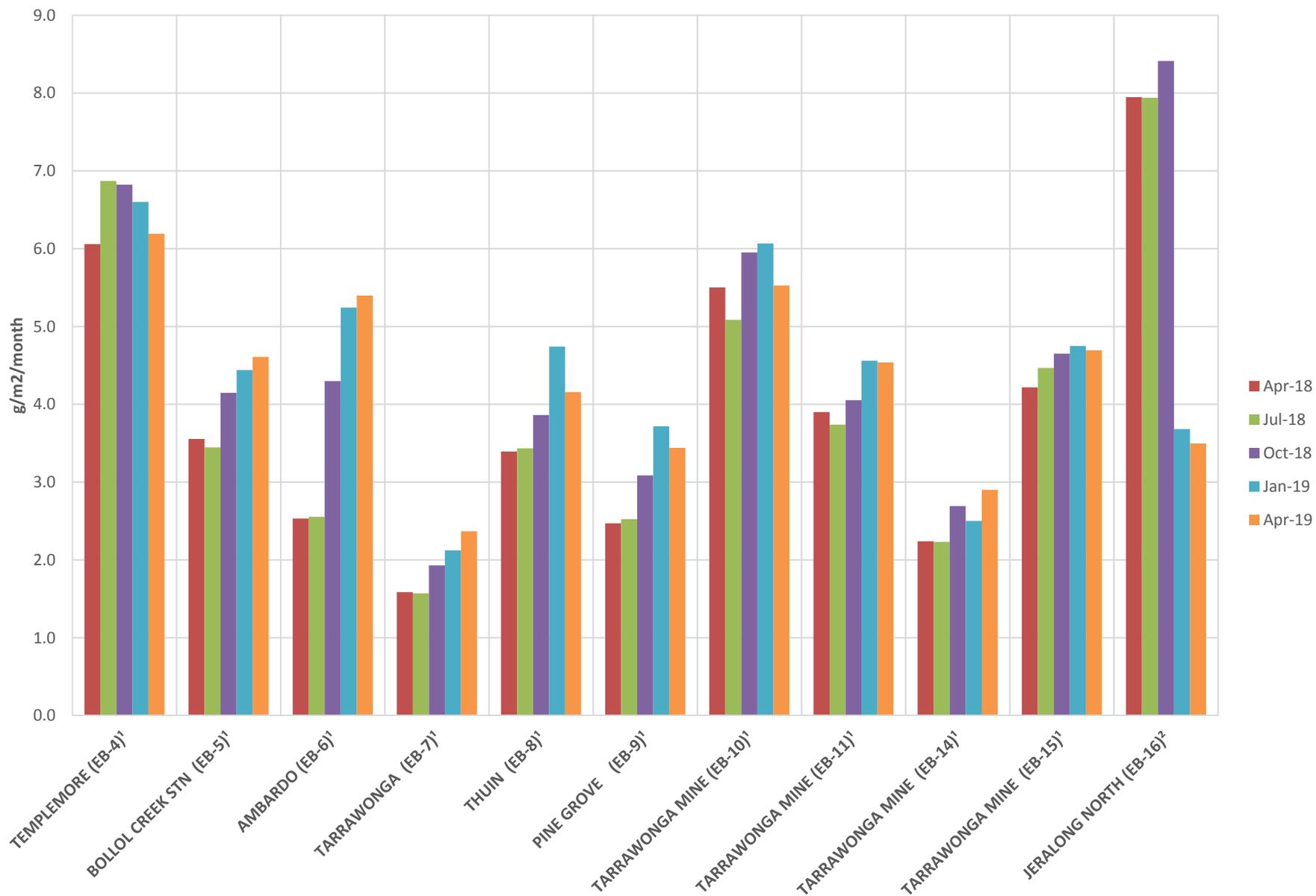
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Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

TOWNSVILLE

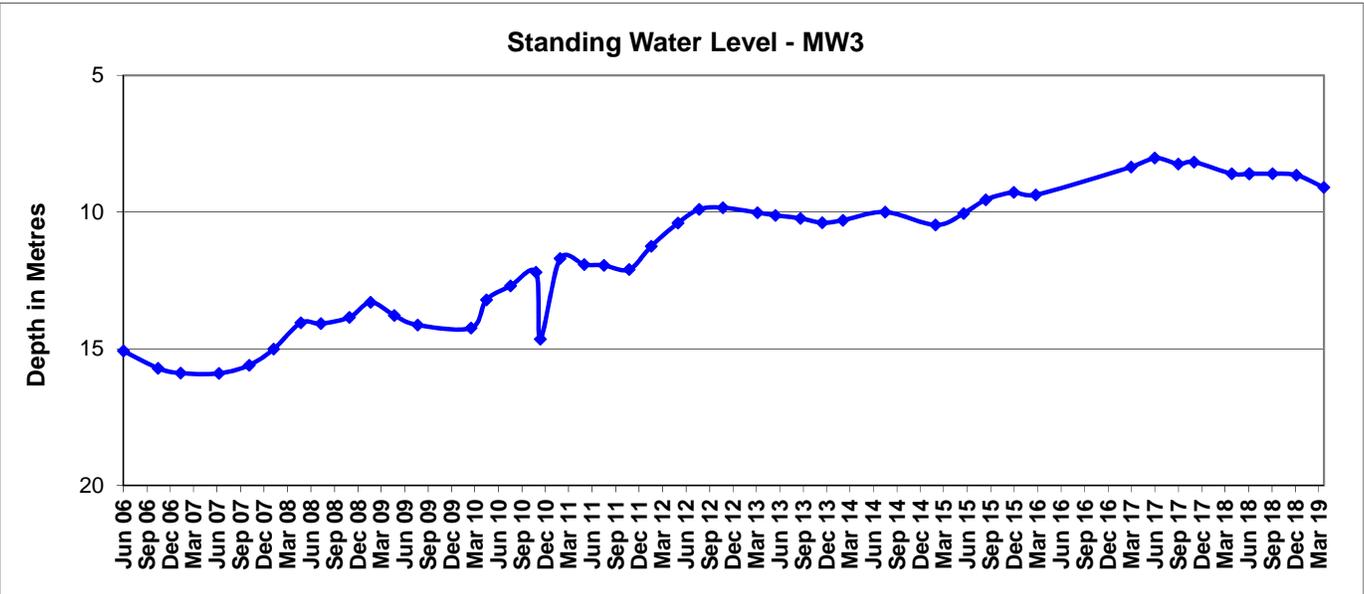
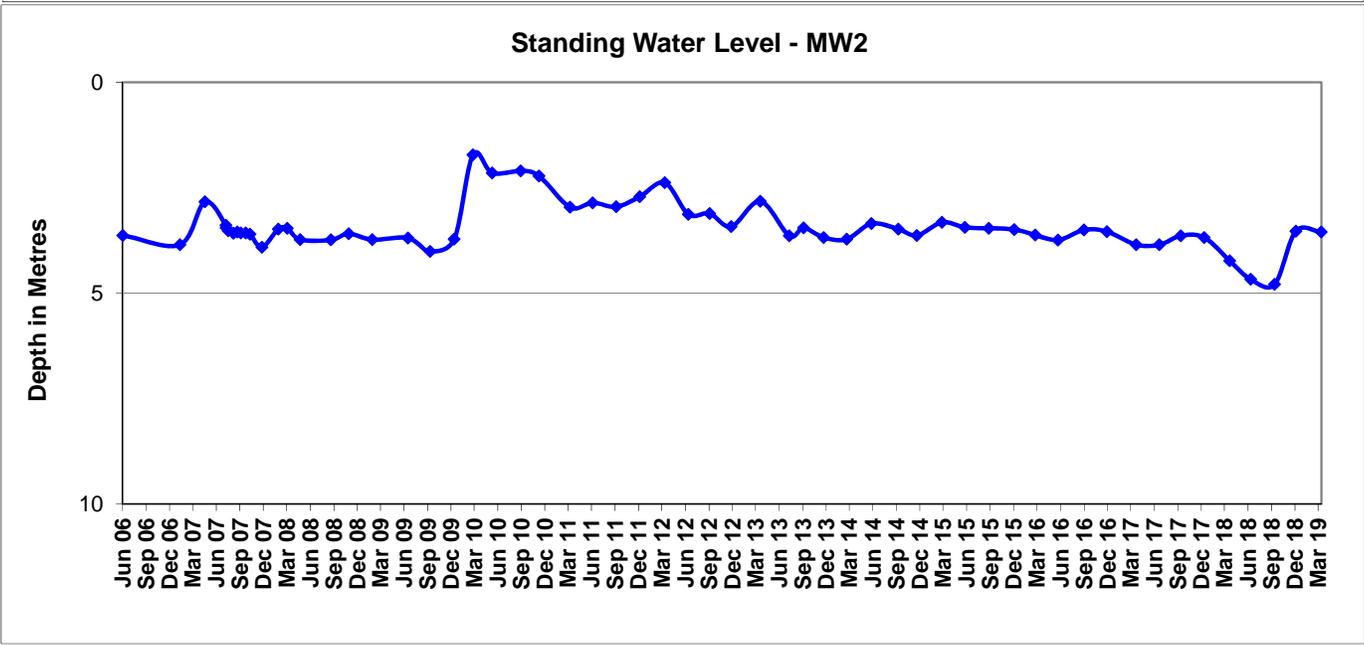
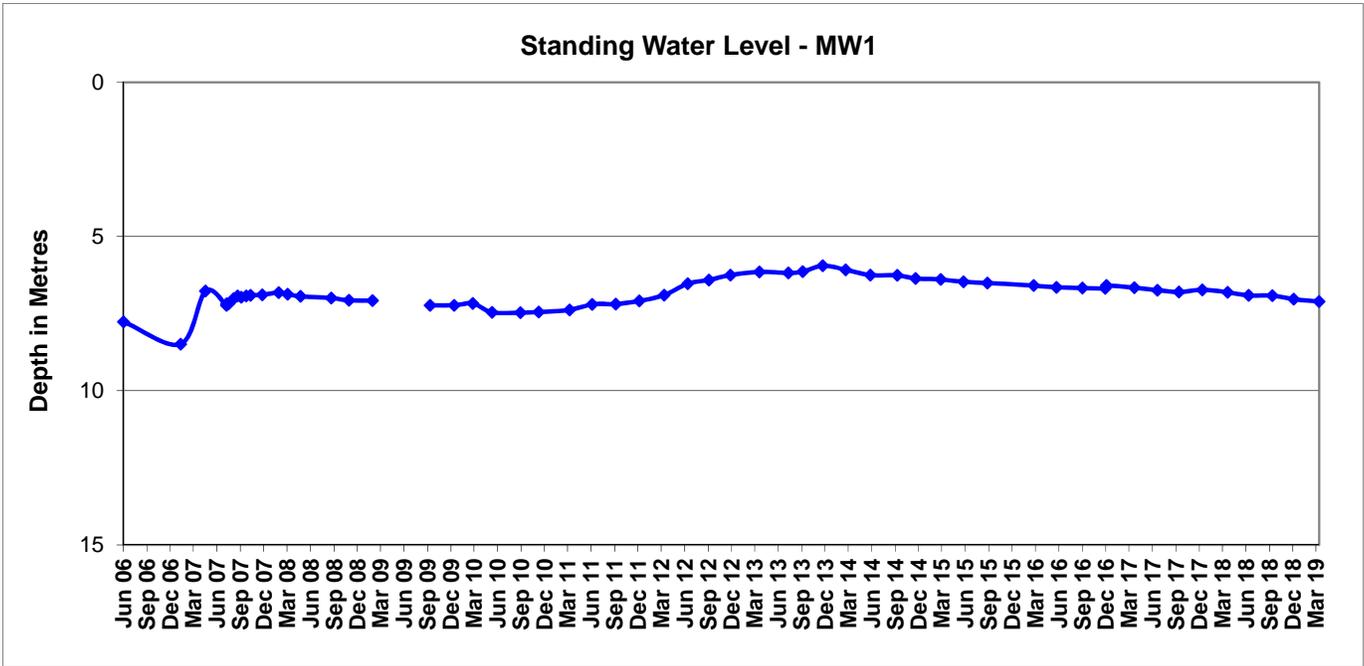
Level 1, 514 Sturt Street
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Australia
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F: +61 7 4722 8001

Appendix C

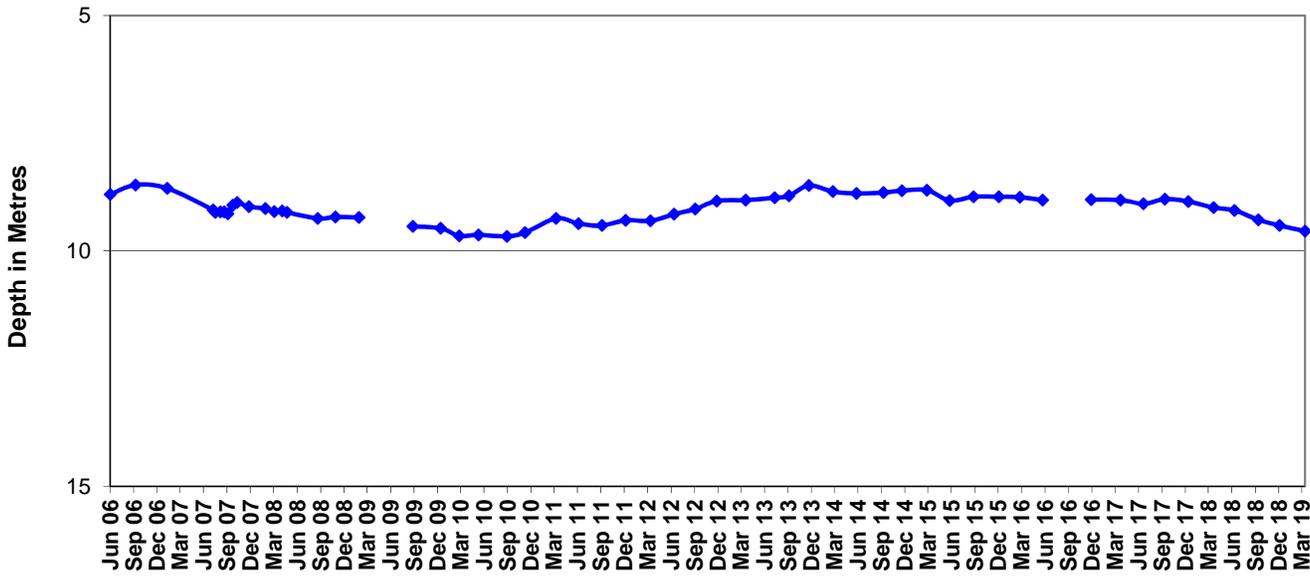
Deposited Dust Gauge Results- Quarterly rolling average [g/m²/month]



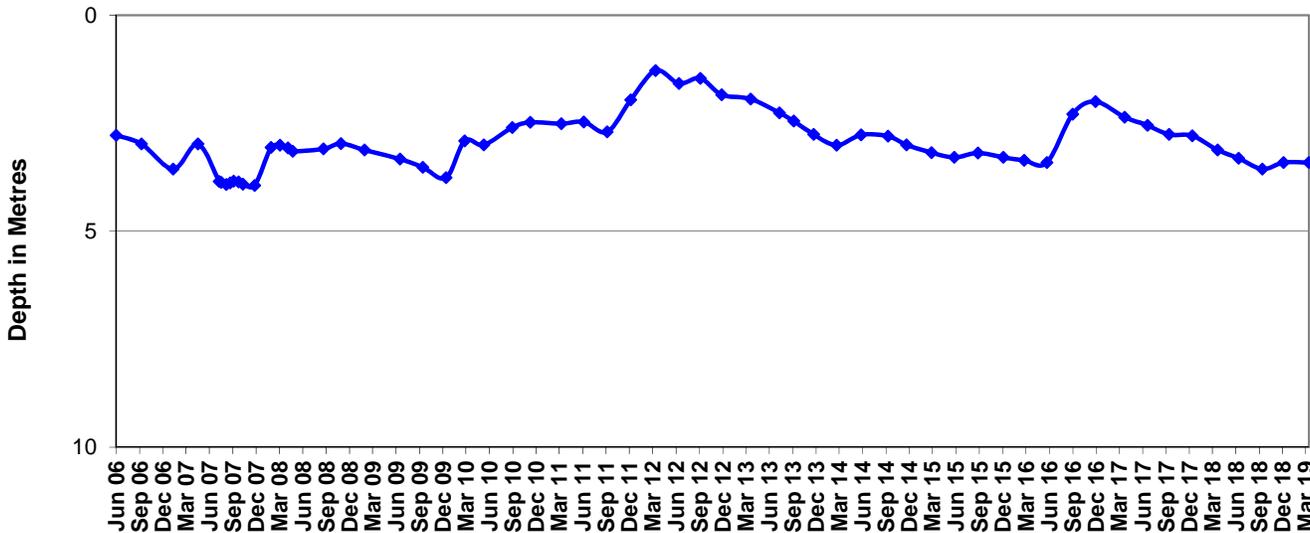
Appendix D



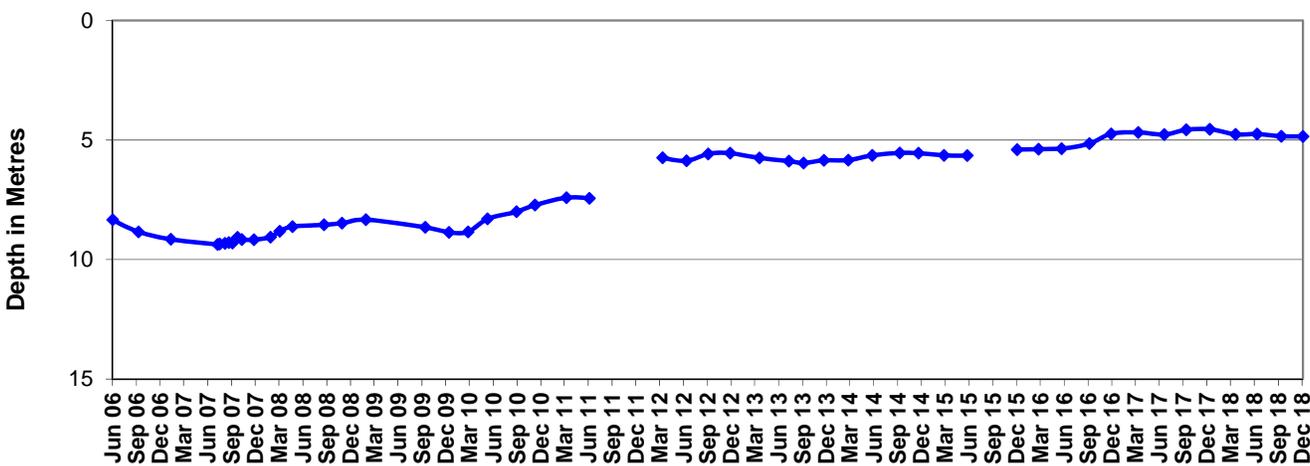
Standing Water Level - MW4



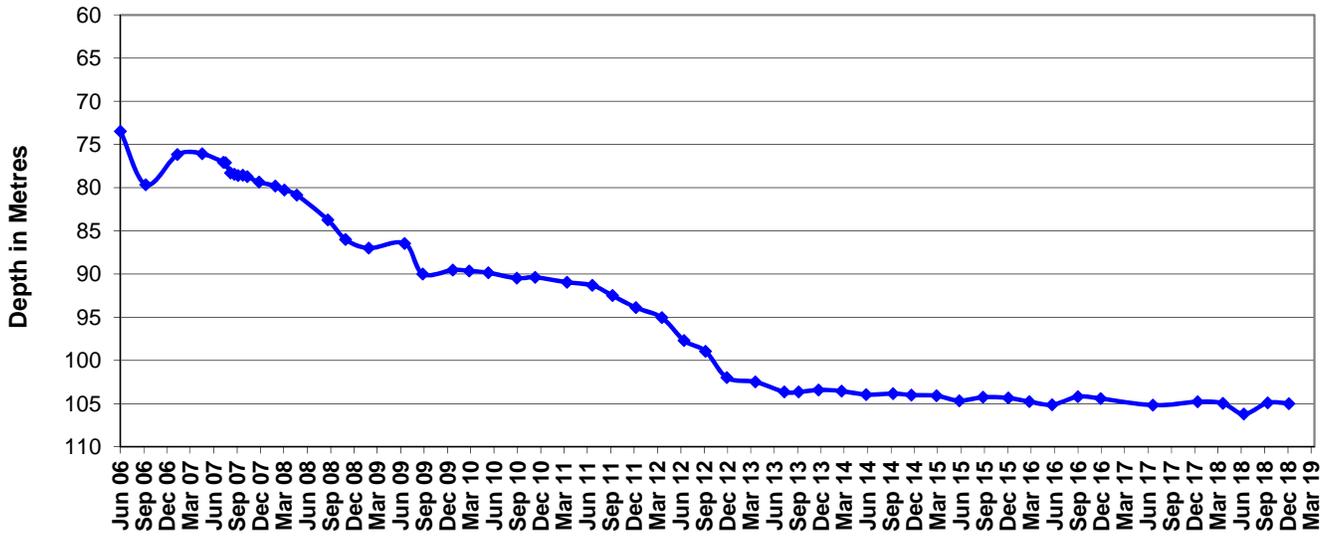
Standing Water Level - MW5



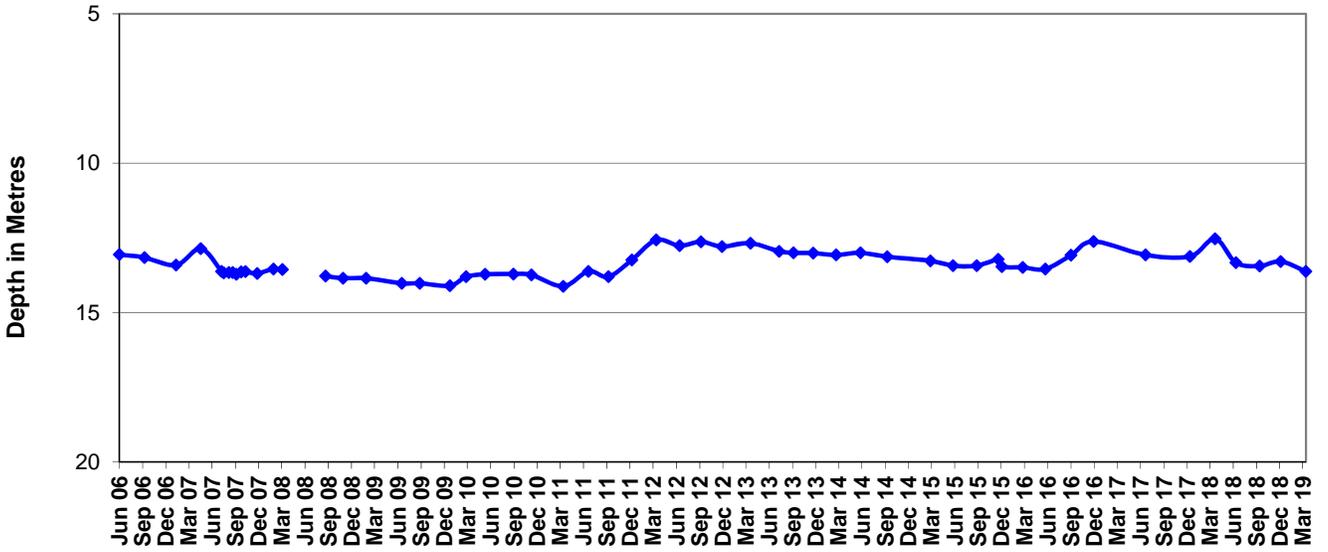
Standing Water Level - MW6



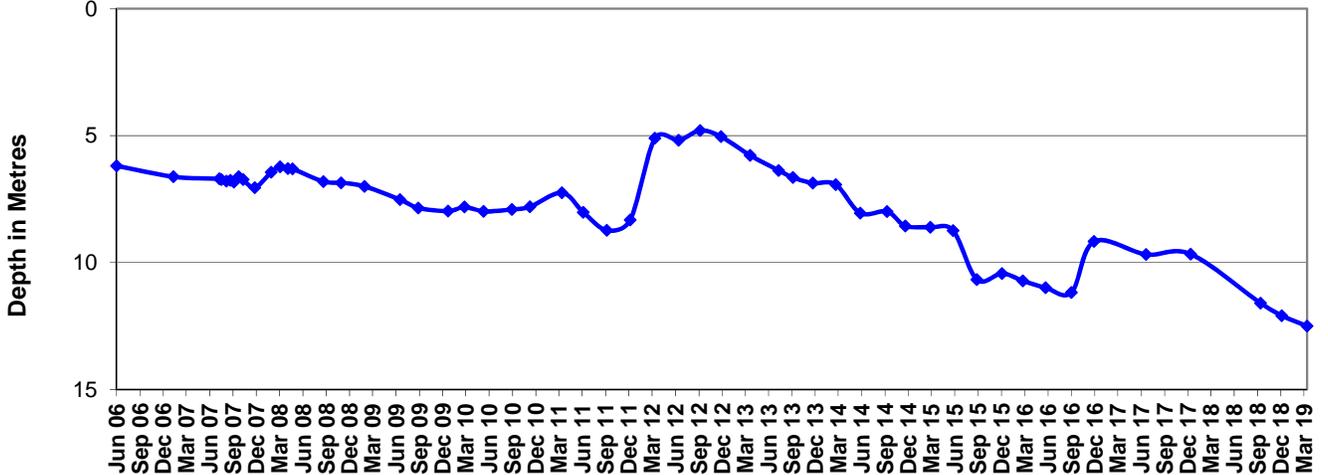
Standing Water Level - MW7

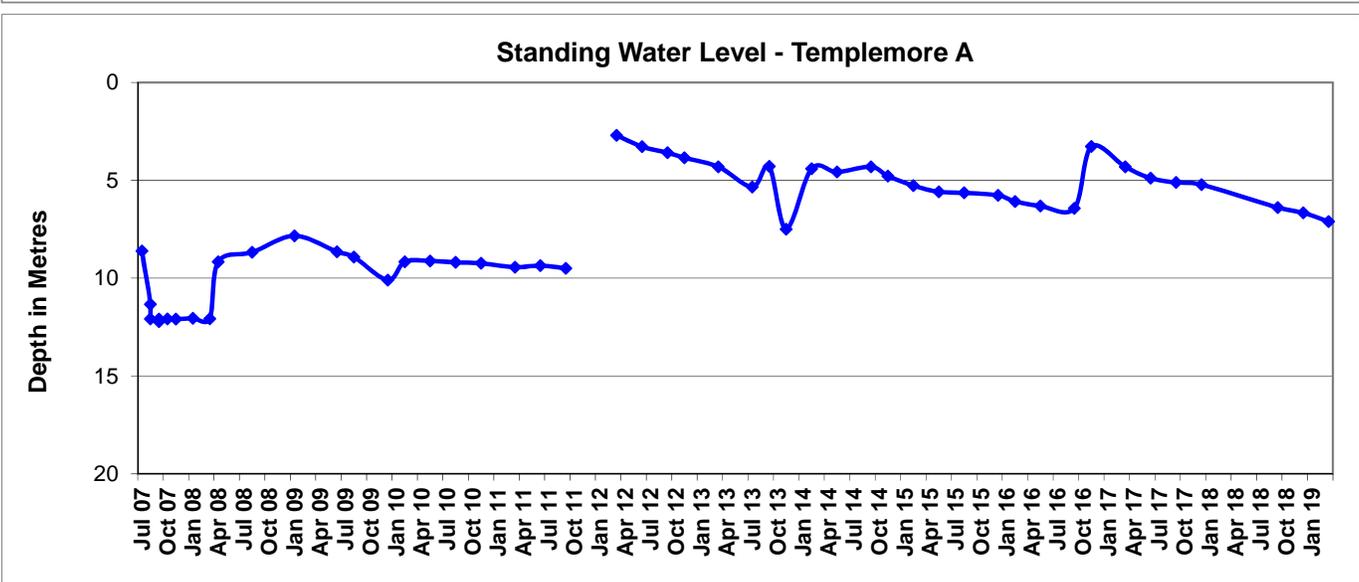
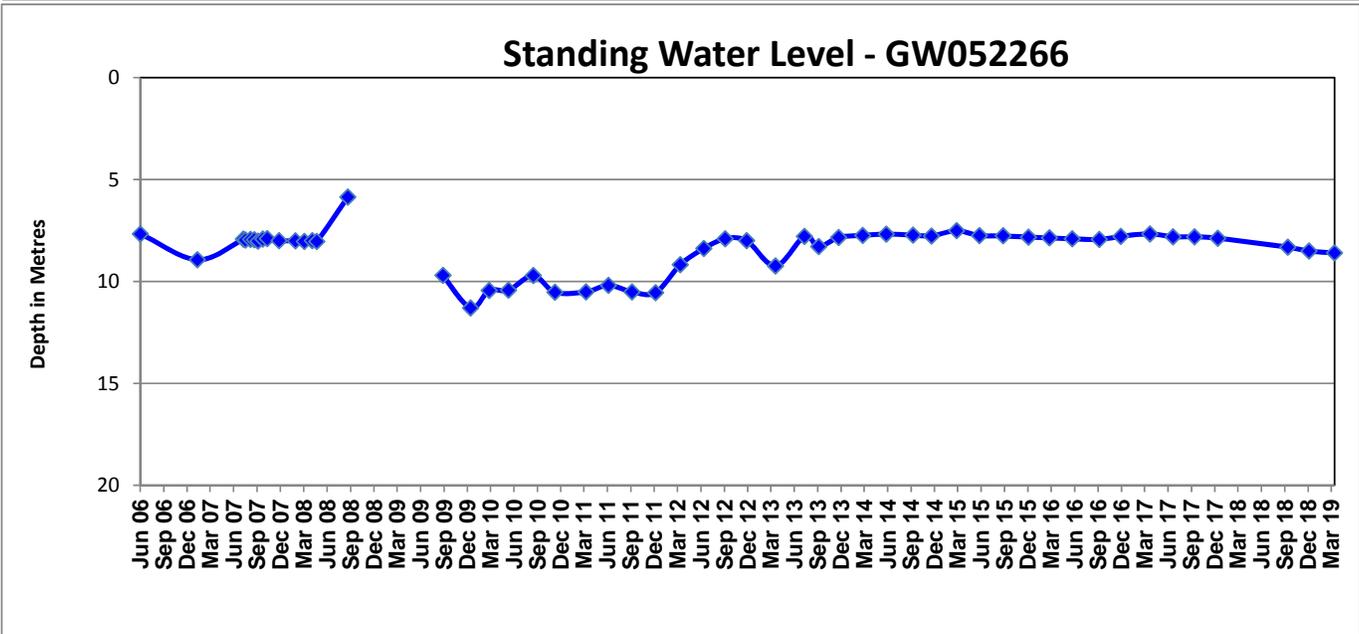
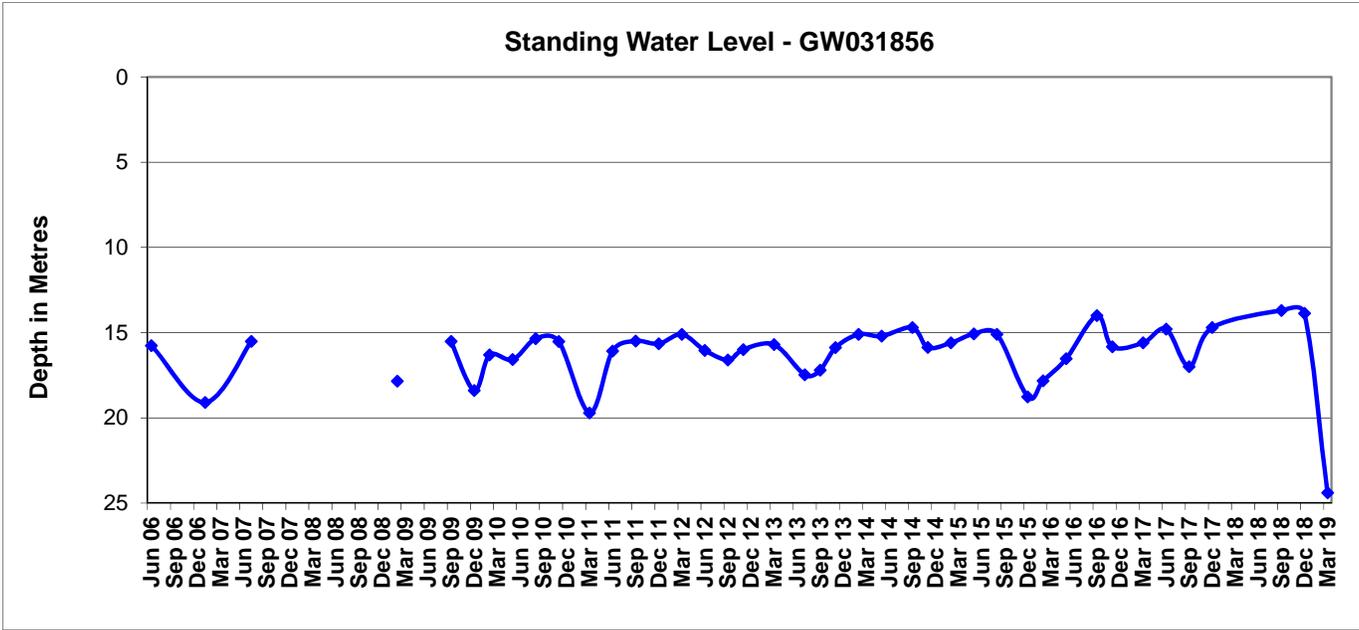


Standing Water Level - MW8



Standing Water Level - GW044997





Standing Water Level - Templemore B

