Procedure

Noise Management

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1 Purpose

The purpose of this document is to provide the procedure and roles and responsibilities for implementing operational noise controls and the noise management system at Bulga Open Cut. This procedure supplements the Bulga Coal Noise Management Plan.

2 Scope

This procedure applies to mining activities within the Bulga Open Cut project boundary. The requirements of this procedure are to be implemented by employees and contractors working for or on behalf of Bulga Coal at Bulga Open Cut.

3 Noise Management Strategies

3.1 Mine Planning

Technical Services

- Develop overburden emplacement strategies to minimise noise impacts and meet relevant noise criteria, including the provision of shielded tipping locations for night time dumping and different day time and night time dumping scenarios.
- Design hauls to out of pit emplacement areas such as the Noise and Visual Bund (refer **Figure 3-1**) strategically to obtain beneficial topographical shielding from already constructed emplacement areas.
- Plan for haul road bunds to a height of 3m above road level, where safe and practicable, in strategic locations on the exposed side of long-term haul roads.

3.2 Operational Controls

Mining Open Cut Examiner

- Undertake works on the outer face of the Noise and Visual Bund along Charlton Road between 7am and 7pm only.
- Construct haul road bunds to a height of 3m above road level, where safe and practicable, in strategic locations on the exposed side of long-term haul roads.
- Refer unusually noisy equipment to the maintenance department and stop or relocate equipment (lower in pit) if necessary.
- Implement the Noise Management System detailed in **Section 3.4**.

3.3 Maintenance Controls

- Undertake regular sound power screening that will assist in managing equipment sound power levels, and identify plant items requiring maintenance to noise attenuation packages.

3.4 Noise Management System

3.4.1 Continuous Noise Monitoring Network

Bulga Coal operates a network of continuous monitors to assess noise impacts from Bulga Coal in real-time and proactively manage noise levels.

This system consists of four continuous noise monitors at strategic locations in the local communities of Bulga, Broke and Milbrodale, as shown in ***Figure 3-2***. Monitoring locations are representative of a cluster of privately owned properties outside of the noise acquisition and noise management zone.

These monitors continuously monitor:

- LAeq – A weighted equivalent noise level (average). Commonly referred to as the total noise level.
- LAeqLF – Commonly referred to as the LF or low frequency result limited to the band pass of 20-630 Hz.
- L90LF – The 90th percentile result limited to the band pass of 20-630 Hz.
- LA1, 1 minute – Peak La1 result derived from a random period in the night, when the noise analyser changes from its default 15 minute integration time to a 1 minute integration period for 15 minutes. This descriptor is used to assess potential sleep disturbance events.

The monitor at Bulga (refer ***Figure 3-2)*** is also a directional noise monitor, which can discern the noise level attributable to Bulga Coal from other mining and non-mining sources. The directional noise monitor uses an algorithm that uses time distance of arrival to determine the direction of discrete noise sources, and calculate total noise levels from a particular direction of interest.

Noise data is sent in near real-time to a web based interface. Alarms have been established to provide a trigger to operational personnel to minimise noise levels and maintain noise levels from Bulga Coal below relevant Development Consent criteria. Alarms are defined as:

- Level 1 Alarm (7pm-9am) – six consecutive 5 minute LF LAeq measurements above 34dB at SX63 (Hill St, Broke), SX65 (Milbrodale Rd), SX64 (Blaxland St, Broke) and SX62 (Bulga). This is 1 dB below the nearest night time Development Consent criterion at each location.
- Level 2 Alarm (7pm-9am) – six consecutive 5 minute LF LAeq measurements above 35dB at SX63 (Hill St, Broke), SX65 (Milbrodale Rd), and SX64 (Blaxland St, Broke) and SX62 (Bulga). This is the nearest night time Development Consent criterion at each monitoring location. Alarms are not triggered when wind speeds are measured above 3m/s or rain is recorded at the monitor.

Noise alarms do not operate between 9am and 7pm. This is because it is difficult to quantify the mine only contribution over this period due to the frequent occurrence of extraneous noise sources (traffic, wildlife, farm machinery, wind etc). The night period is also typically worst case for noise impacts.

The Trigger Action Response Procedure is outlined in ***Table 3-1*** and ***Figure 3-3***.

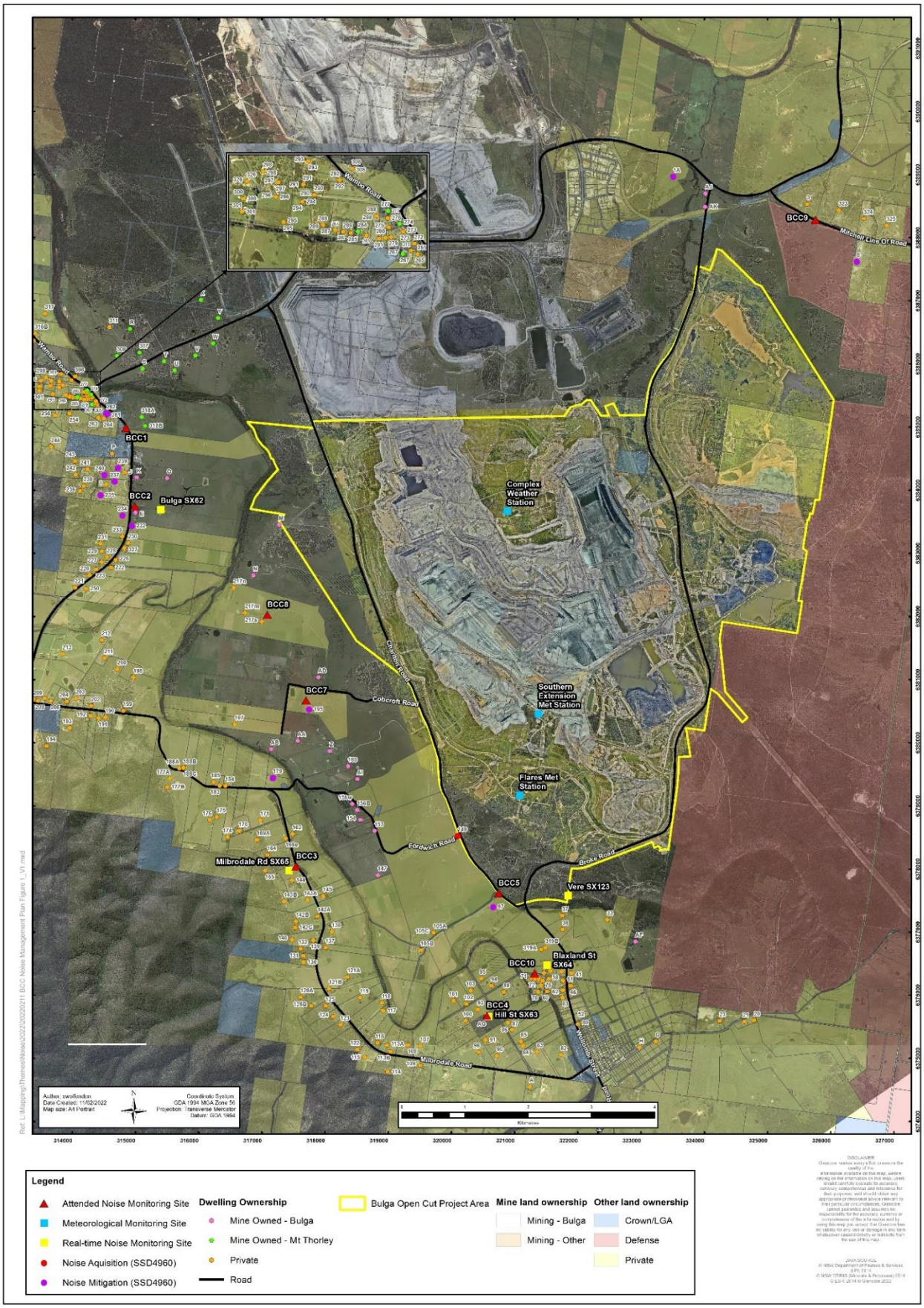


Figure 3-2 –Bulga Coal Noise Monitoring Network

Table 3-1 – Noise Management Trigger Action Response Procedure

Trigger	Action	Response	Responsible
Level 1 Alarm (7pm to 9am) (LF LAeq >34dB for six consecutive 5 minute periods) received from continuous noise monitor. *Note: SX62 (Bulga) Level 1 alarm is triggered at >34dB from AOI1 (BOC).*	Determine noise source/s (e.g. mining (trucks, dozer) or non-mining (traffic, birds, harvester) by streaming audio from monitor in Sentinex.	Log details of review undertaken and noise source/s identified in Sentinex Alarms Tab (See **Appendix 1**). Notify OCE (12.6) of details of alarm and discuss options for modifying/ceasing activities to reduce noise if a Level 2 alarm is triggered. Continue to monitor for alarms.	Dispatch (7pm-7am Monday to Sunday, 7am-9am Saturday to Sunday). Environment and Community Coordinator/Officer (7am-9am Monday to Friday)
Level 2 Alarm (7pm to 9am) (LF LAeq >35dB for six consecutive 5 minute periods). *Note: SX62 (Bulga) Level 2 alarm is triggered at >35dB from AOI1 (BOC).*	Determine noise source/s by streaming audio from monitor in Sentinex. Inspect general location of noise monitor and measure noise level using hand held monitor in accordance with Procedure.	Log details of review undertaken and noise source/s identified in Sentinex Alarms Tab. Continue to monitor noise levels to assess the effectiveness of changes made.	Dispatch
Hand held noise monitor (LAeq) result attributable to Bulga Open Cut greater than 35dB.	Nominate the start of the 75 minute period and track. **Modify or cease mining activities** to reduce noise below criteria as soon as practicable (**within 75 minutes**). Consider location of dominant noise sources identified during inspection to determine highest priority change to reduce noise. (e.g. reassign dumping locations to more sheltered dumps, shut down equipment).	Log details of inspection, measured noise level, noise source/s identified, start of 75 minute period and operational changes made, in Sentinex Alarms Tab/shift report. Continue to monitor noise levels to assess the effectiveness of changes made.	OCE (12:6) /Dispatch OCE (12:6) /Dispatch

Trigger	Action	Response	Responsible
9am	If shut down due to morning noise alarms, progressively start up after 9am while monitoring the real time noise levels, carefully assessing the non-mine noise contribution.	Log details in Sentinex Alarms Tab/shift report.	OCE (12:6) /Dispatch
Hand held noise monitor (LAeq) result attributable to Bulga Open Cut greater than 35dB; **and** **G stability class**, or **F stability class** and **wind speed >2m/s** (Bulga Complex Weather Station). (Note Southern Extension Weather Station will be used as a back up if no data available from Complex Weather Station).	Nominate the start of the 75 minute period and track. Minimise noise by shutting down mining equipment working at elevated locations (operate in sheltered locations only).	Log details of inspection, measured noise level, noise source/s identified, start of 75 minute period and operational changes made, in Sentinex Alarms Tab/shift report. Continue to monitor noise levels to assess the effectiveness of changes made.	OCE (12:6) /Dispatch
Hand held noise monitor result attributable to Bulga Open Cut less than 35dB.	No action required.	Log details of inspection, measured noise level and noise source/s identified in Sentinex Alarms Tab.	Dispatch
Return to Work Alarm Level 2 noise alarm, and LAeq LF noise level <35dB , and wind speed>1m/s (Bulga Complex Weather Station), and wind direction >180<360.	Progressively start equipment back up and switch back to original operating scenario, if required.	Continue to monitor noise levels.	OCE (12:6) /Dispatch

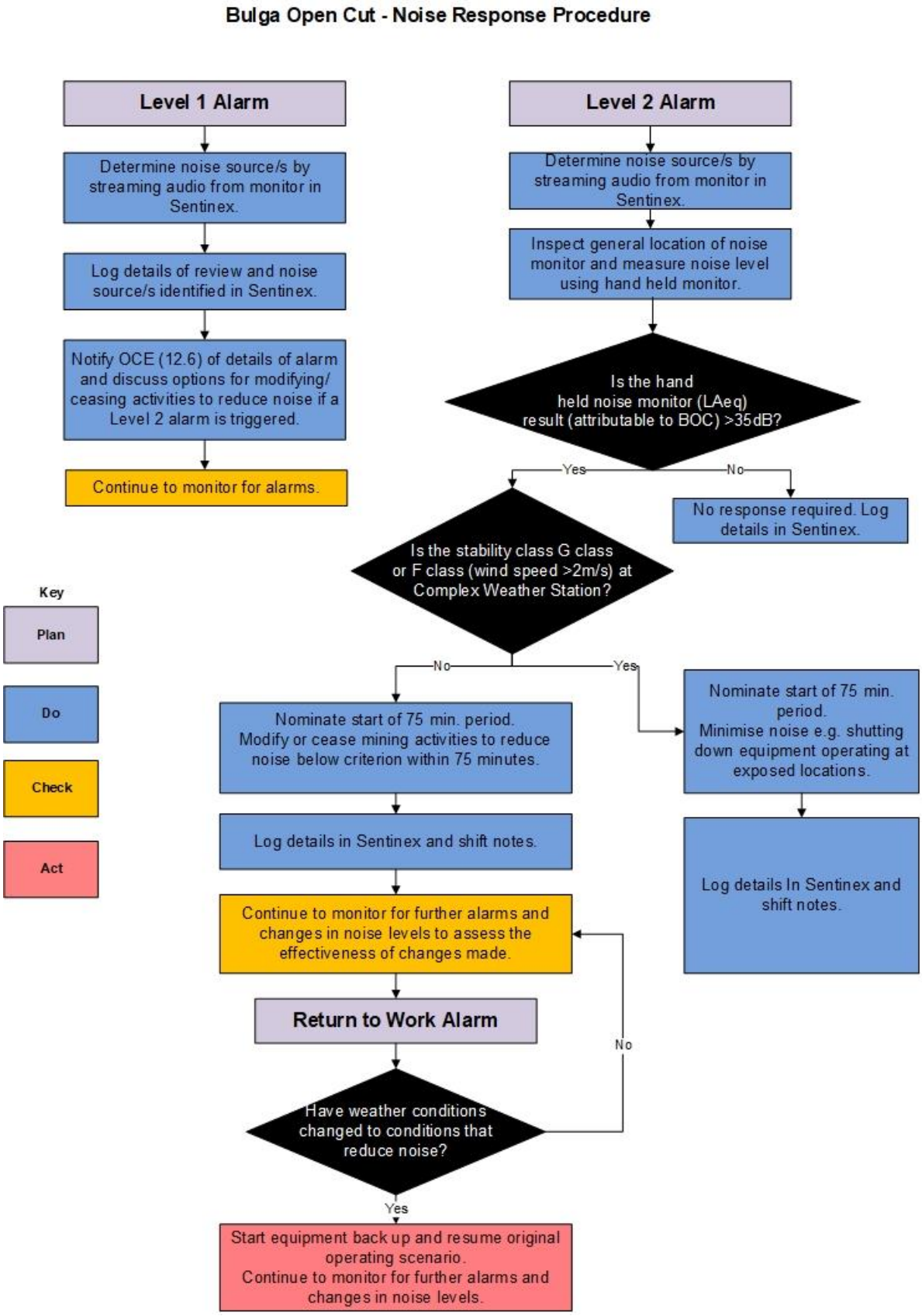


Figure 3-3 – Noise Response Procedure

3.4.2 Predictive Meteorological Forecasting

Daily meteorological forecasts are provided to Open Cut Examiners and Dispatchers to assist in managing noise levels from the operation below the criteria at privately owned properties. An example of a daily forecast in provided in ***Figure 3-4*** below. Mining Open Cut Examiners and Dispatchers are to review daily weather forecasts, which include a review of the potential noise risk at sensitive receivers, to consider the most appropriate operational response/s to reduce noise should noise levels from the operation approach or exceed relevant noise criteria.

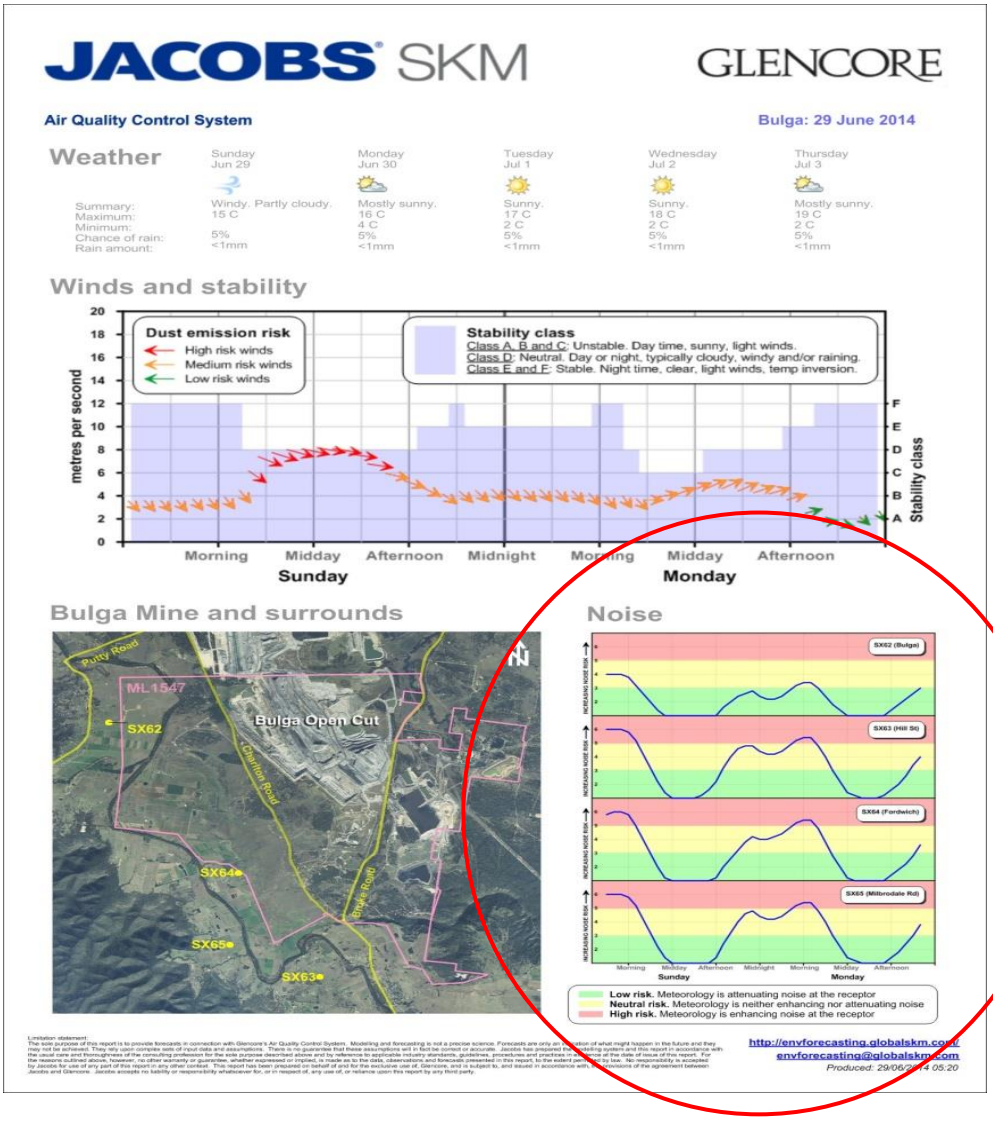


Figure 3-4 – Example of Bulga Open Cut Daily Meteorological and Noise Risk Forecast

4 Accountabilities

Role	Accountabilities for this document
Operations Manager	Provide resources for the implementation of the requirements of this procedure.
Mine Manager	Provide resources for the implementation of the requirements of this procedure.
Maintenance Superintendent	Develop and implement the sound power screening program in accordance with Section 3.3.
Technical Services Manager	Develop a mine plan that incorporates the noise controls in Section 3.1.
Production Supervisor (O/C)	Implement operational noise controls in the Mining area in accordance with Section 3.2.
Dispatcher	Implement the real-time noise management system in accordance with Section 3.4.
Environment & Community Officer	Review the effectiveness of noise controls and the real-time noise management system in achieving the objectives of the Noise Management Plan. Provide education and training to personnel with responsibilities under this procedure.

5 Document Information

5.1 Related Documents

Number	Title
BULCX-2103827161-3527	Bulga Complex Noise Management Plan
BULCX-2103827161-1516	Bulga Complex Environmental Management Strategy
GCAA-625378177-10238	Noise Management
GCAA-625378177-10263	Real Time Monitoring

Table 5-1 – Related documents

5.2 Reference Information

Reference	Title
NSW Department of Planning	NSW Draft Guideline: Mining. Noise Monitoring Application Note.

Table 5-2 – Reference information

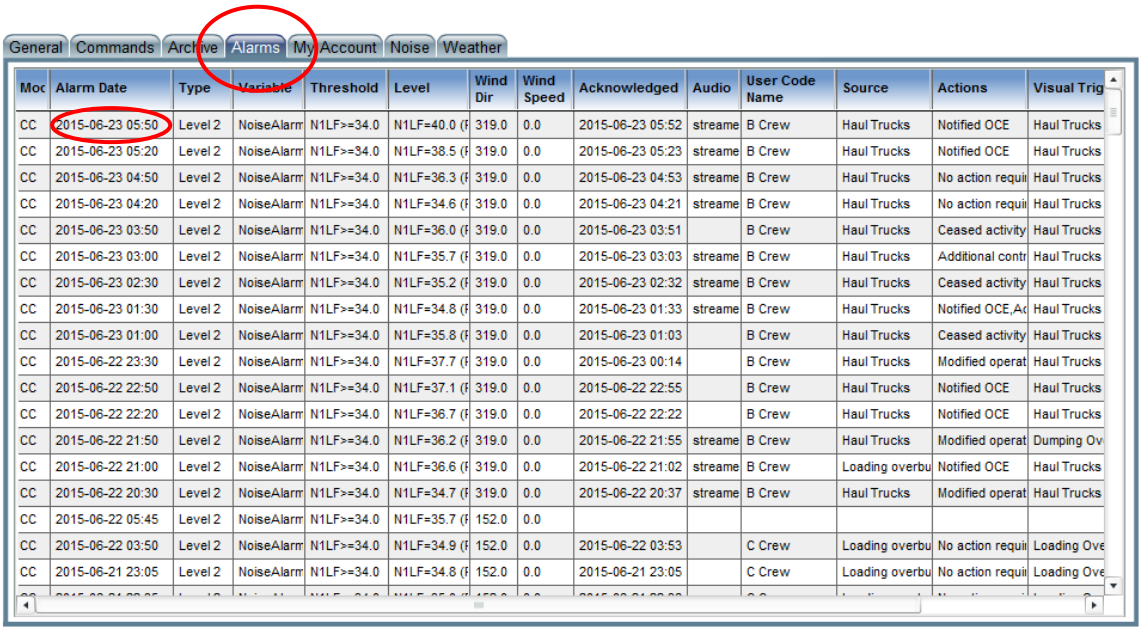
5.3 Change Information

Version	Date	Change Summary
4.0	17 August 2015	Updated to include requirements of Bulga Optimisation Project Development Consent and GCAA Noise Monitoring and Management Protocols.
5.0	13 March 2017	Included daytime noise Trigger Action Response Procedure and updated monitoring figure. Updated Sharepoint Document ID's per Sharepoint Migration.
6.0	28.02.2017	SharePoint Migration 2017
7.0	28.03.2017	Changed Document Owner to Office - Environment and Community as requested by Scott Wolfenden.
8.0	16.05.2018	Revised Map pictures with improved resolution on figures/words. Revised the real time monitoring network. Updated the Table 3-1 in line with current on site practices.
9.0	01.05.2019	Removal of daytime noise monitoring alarms from trigger action response procedure and reference to minimising noise during adverse weather conditions. Approved by DPE on 24th of June 2019.
10.0	15.07.2021	Inclusion of return to work alarms and daytime noise alarms (7am to 9am). Removal of SX64 real-time monitor. Inclusion of requirement to minimise noise during strong temperature inversions. Change to Level 1 alarm criterion at SX62 (Bulga) from 35dB(A) to 34dB(A) in response to changed noise criteria in SSD4960. Change to Level 2 alarm criterion at SX62 (Bulga) from 36dB(A) to 35dB(A) in response to changed noise criteria in SSD4960.
11.0	15.02.2022	SX64 real-time monitor moved from Fordwich to Blaxland St. Change alarm period from two 15 minute measurements to six 5 minute measurements.

Table 5-3 – Change information summary

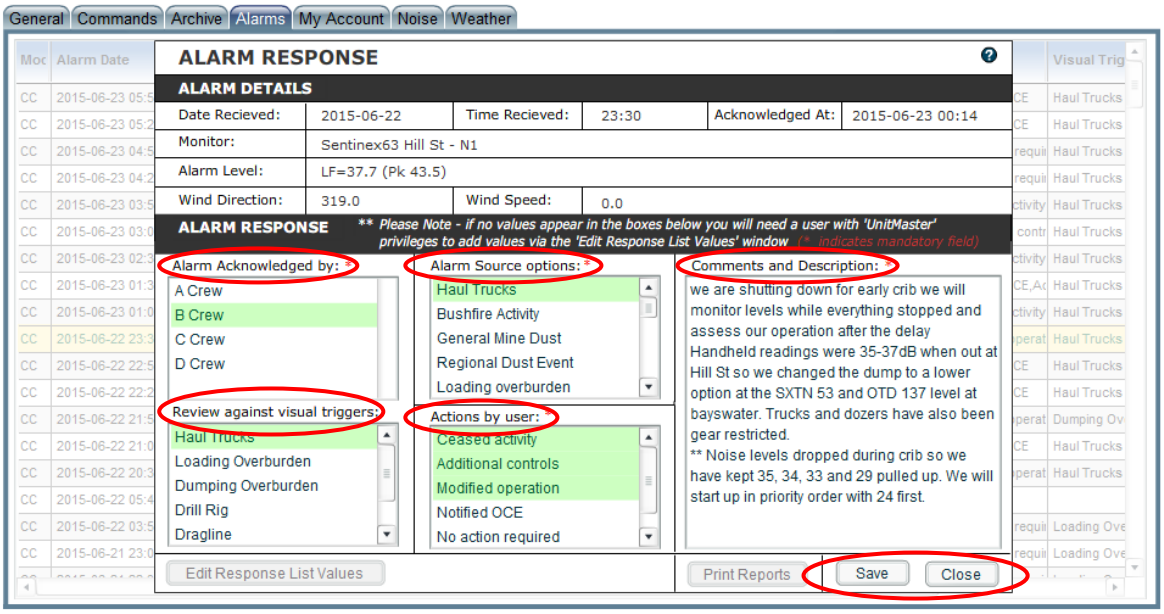
Appendix A - Sentinex Guide

Select “Alarms” tab in Sentinex. Click on the alarm.



Moc	Alarm Date	Type	Variable	Threshold	Level	Wind Dir	Wind Speed	Acknowledged	Audio	User Code Name	Source	Actions	Visual Trig
CC	2015-06-23 05:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=40.0 (F	319.0	0.0	2015-06-23 05:52	streame	B Crew	Haul Trucks	Notified OCE	Haul Trucks
CC	2015-06-23 05:20	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=38.5 (F	319.0	0.0	2015-06-23 05:23	streame	B Crew	Haul Trucks	Notified OCE	Haul Trucks
CC	2015-06-23 04:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=36.3 (F	319.0	0.0	2015-06-23 04:53	streame	B Crew	Haul Trucks	No action requi	Haul Trucks
CC	2015-06-23 04:20	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=34.6 (F	319.0	0.0	2015-06-23 04:21	streame	B Crew	Haul Trucks	No action requi	Haul Trucks
CC	2015-06-23 03:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=36.0 (F	319.0	0.0	2015-06-23 03:51		B Crew	Haul Trucks	Ceased activity	Haul Trucks
CC	2015-06-23 03:00	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=35.7 (F	319.0	0.0	2015-06-23 03:03	streame	B Crew	Haul Trucks	Additional contr	Haul Trucks
CC	2015-06-23 02:30	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=35.2 (F	319.0	0.0	2015-06-23 02:32	streame	B Crew	Haul Trucks	Ceased activity	Haul Trucks
CC	2015-06-23 01:30	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=34.8 (F	319.0	0.0	2015-06-23 01:33	streame	B Crew	Haul Trucks	Notified OCE,Ac	Haul Trucks
CC	2015-06-23 01:00	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=35.8 (F	319.0	0.0	2015-06-23 01:03		B Crew	Haul Trucks	Ceased activity	Haul Trucks
CC	2015-06-22 23:30	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=37.7 (F	319.0	0.0	2015-06-23 00:14		B Crew	Haul Trucks	Modified operat	Haul Trucks
CC	2015-06-22 22:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=37.1 (F	319.0	0.0	2015-06-22 22:55		B Crew	Haul Trucks	Notified OCE	Haul Trucks
CC	2015-06-22 22:20	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=36.7 (F	319.0	0.0	2015-06-22 22:22		B Crew	Haul Trucks	Notified OCE	Haul Trucks
CC	2015-06-22 21:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=36.2 (F	319.0	0.0	2015-06-22 21:55	streame	B Crew	Haul Trucks	Modified operat	Dumping Ov
CC	2015-06-22 21:00	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=36.6 (F	319.0	0.0	2015-06-22 21:02	streame	B Crew	Loading overbu	Notified OCE	Haul Trucks
CC	2015-06-22 20:30	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=34.7 (F	319.0	0.0	2015-06-22 20:37	streame	B Crew	Haul Trucks	Modified operat	Haul Trucks
CC	2015-06-22 05:45	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=35.7 (F	152.0	0.0						
CC	2015-06-22 03:50	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=34.9 (F	152.0	0.0	2015-06-22 03:53		C Crew	Loading overbu	No action requi	Loading Ove
CC	2015-06-21 23:05	Level 2	NoiseAlarm	N1LF>=34.0	N1LF=34.8 (F	152.0	0.0	2015-06-21 23:05		C Crew	Loading overbu	No action requi	Loading Ove

Complete the information in the “Alarm Response” popup. This includes Crew, source options, actions undertaken, and a detailed description of actions undertaken (e.g. inspection undertaken, equipment moved/shut down, handheld monitor readings, and planned future action).



Hit “save” and then “close”.

SX62 is a directional noise monitor. When reviewing SX62 (Bulga) click on the "Noise" tab and select "Noise Rose" to see how much noise is coming from Area of Interest 1 (AOI 1), which is the BOC contribution. AOI 2 captures noise from Mt Thorley.