COWAL GOLD OPERATIONS
BLAST MANAGEMENT PLAN

June 2023

Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DPE Approval Date
All	BLMP-01-H Document No. 72681	Original	DECCW, DoP	August 2003
Figure 2	Addendum (dated April 2009) Document No. 273650	Amendment to reflect new location of blast monitoring site "BM04 - Bird Breeding".	DECCW, DoP	15 May 2009
All	BLMP01-J (May 2010) Document No. 338450	Revised to reflect Development Consent modified on 10 March 2010.	DECCW, DoP	A revised BLMP incorporating DECCW comments was submitted to the DP&I on11 June 2010. DP&I provided comments on 14 August 2012.
All	BLMP01-K (December 2012) Document No. 685110	Revised to reflect DP&I comments dated 14 August 2012.	DPIE	Approval of the BLMP remained pending up until the NSW Minister for Planning granted approval of the CGM's modified Development Consent on 22 July 2014.
All	BLMP01-L (January 2015) Document No. 642384	Revised to reflect Development Consent as modified on 22 July 2014.	EPA, DPIE	10 December 2015
All	BLMP dated June 2022	BLMP revised to reflect outcomes of approval of Mod16 to DA 14/98 and SSD 10367 for the Underground Development approved by DPE on 30 September 2021.	DPE	13 June 2023
All	BLMP dated June 2023	Minor updates in accordance with DA14/98 Condition 9.1(c)(i).	EPA, DPE	13 November 2023

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1 INTRODUCTION

The Cowal Gold Operations (CGO) is located approximately 38 kilometres (km) north-east of West Wyalong in New South Wales (NSW) (Figure 1). Evolution Mining (Cowal) Pty Limited (Evolution) is the owner and operator of the CGO. All mining activity occurs within Mining Lease (ML) 1535 and ML 1791.

Development Consent no. 14/98 (DA 14/98) for the CGO (including the Bland Creek Palaeochannel Borefield water supply pipeline) was granted by the Minister for Urban Affairs and Planning under Part 4 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) on 26 February 1999. Development Consent (DA 2011/64) for the operation of the Eastern Saline Borefield was granted by the Forbes Shire Council on 20 December 2010.

The Minister for Planning granted approval for the *Cowal Gold Operations Underground Development Project as* State-significant Development No. 10367 (SSD 10367) under Section 4.38(2) of the EP&A Act on 30 September 2021 and to modify DA 14/98 through *Modification No.16* (herein referred to as Mod 16) under Section 4.55(2) of the EP&A Act. SSD 10367 was modified on 7 November 2022, to reflect minor changes in the underground mining method, through Mod 1 (Optimisation Modification).

DA 14/98 generally allows:

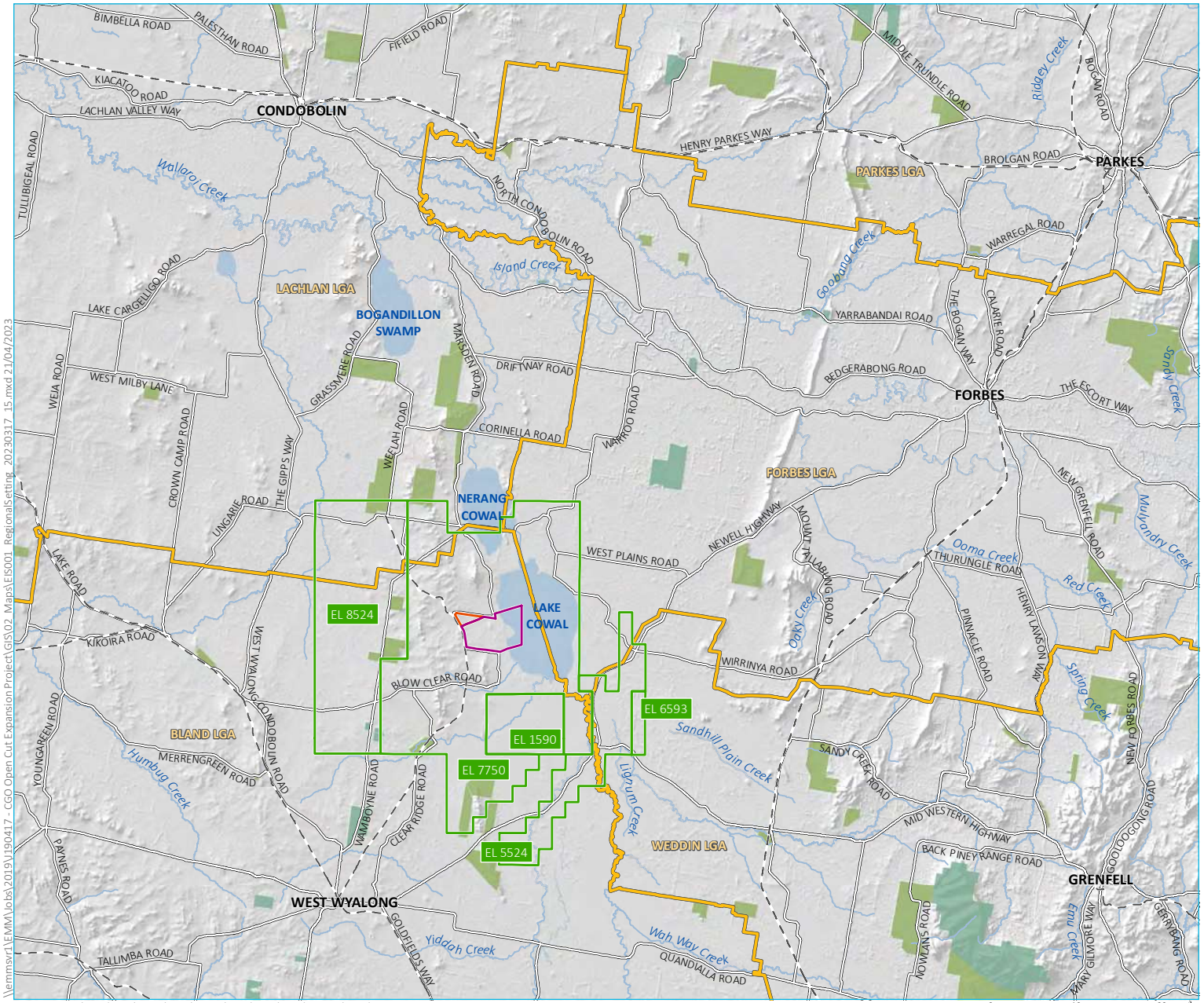
- Mining operations until 2040.
- Ore processing at a rate of 9.8 Mtpa.
- Tailings and waste rock emplacement on site.
- Operation of a range of ancillary mining infrastructure.

SSD 10367 generally allows:

- Underground stope mining until 2040.
- Backfilling the stopes with cemented paste made from tailings.
- Development of ancillary infrastructure including a box-cut to the underground mine and a paste fill plant.

The general arrangement of the approved CGO is provided in Figure 2.

This revised Blast Management Plan (BLMP) has been prepared to reflect the conditions of DA 14/98 and SSD 10367, as approved on 30 September 2021 and 7 November 2022, respectively, and supersedes all former versions of the BLMP. Copies of the approved development consents are available on Evolution's website (www.evolutionmining.com.au).



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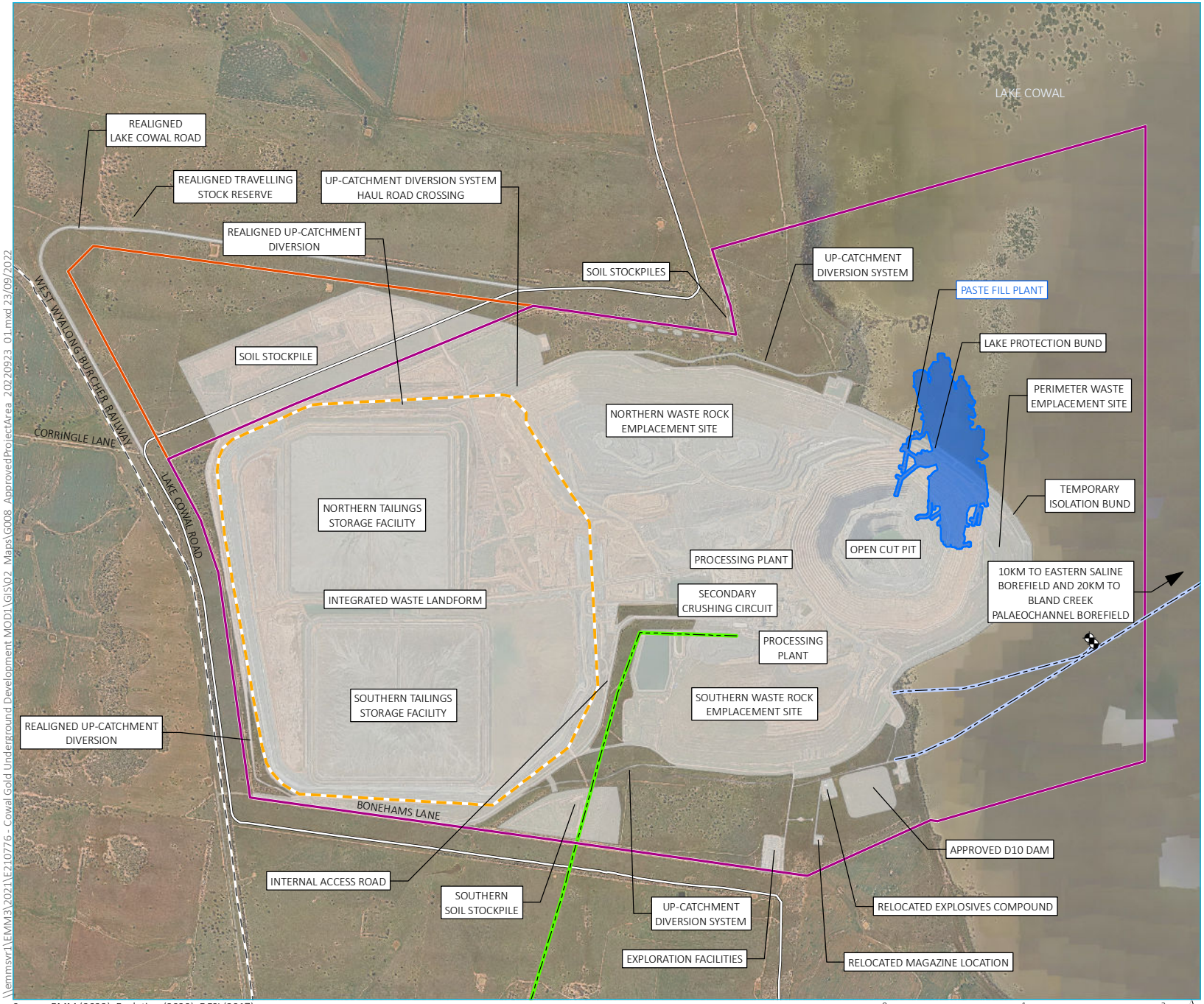
Source: EMM (2023); Evolution (2023); DFSI (2017); GA (2011); ASGC (2006)

Evolution Mining Cowal

BLAST MANAGEMENT PLAN

CGO Locality

Figure 1



KEY

- Approved underground development
- Mining lease (ML1535)
- Mining lease (ML1791)
- DA14/98 approved surface disturbance
- Indicative integrated waste landform perimeter
- Electricity transmission line
- Water supply pipeline
- Rail line
- Main road
- xxx Approved underground development elements
- xxx Approved surface elements

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Source: EMM (2022); Evolution (2020); DFSI (2017)

0 1 2 km

GDA 1994 MGA Zone 55

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Evolution Mining Cowal

BLAST MANAGEMENT PLAN
General Arrangement of Approved CGO

Figure 2

1.1 OBJECTIVES

The primary objective of the BLMP is to establish safe blast management practices at the CGO and ensure compliance with the development consent conditions.

1.2 SCOPE

This BLMP addresses both the ground vibration and noise effects emanating from blasting at the CGO including open pit and underground operations (development and production blasts). Noise effects associated with blasting are measured as overpressure, which is the measurable effect of a blast on air pressure, including measurement of generated energy which is below the limit of human hearing.

Impacts on other environmental attributes such as noise and air quality are addressed herein however, where changes in those attributes are unrelated to blasting they are addressed separately in other management plans. For example, non-blasting impacts of:

- noise at the CGO are addressed in the Noise Management Plan (NMP).
- dust emissions at the CGO are addressed in the Air Quality Management Plan (AQMP).

The remainder of this BLMP has the following structure:

Section 2 Presents the statutory requirements relating to blast emissions from the CGO .

Section 3 Discusses the blast impact assessment criteria and other relevant blast emissions criteria.

Section 4 Discusses the predicted blast impacts associated with the CGO, the blast design and control measures that may be implemented to achieve best management practice and outlines the CGO's blasting schedule.

Section 5 Describes management measures that will be implemented in the event of an exceedance of the blast impact assessment criteria .

Section 6 Details provisions for the implementation of best management practice to protect the safety of people, public and private infrastructure/property and livestock .

Section 7 Describes the Blast Monitoring Programme to be undertaken to assess compliance with the blast impact assessment criteria and to evaluate and investigate the effectiveness of blast emission reduction measures implemented.

Section 8 Details the incident investigation procedures in the event of an exceedance of the blast impact assessment criteria .

Section 9 Details complaint recording and reporting procedures .

Section 10 Outlines the independent review process in the event that a landowner considers blast levels are in exceedance of the blast impact assessment criteria .

Section 11 Presents community consultation requirements including the Community Environmental Monitoring and Consultative Committee which provides opportunities for landholders or community members to discuss specific issues of concern.

Section 12 Details the Independent Environmental Audit (IEA) requirements and the Independent Monitoring Panel (IMP) review procedures.

Section 13 Presents the Annual Review reporting requirements and the requirements for review of this BLMP.

Section 14 References.

Section 15 Glossary.

Appendix.

2 REGULATORY REQUIREMENTS

This BLMP has been prepared in response to the requirements of various conditions of approval under State legislation. Other relevant policies and guidelines are also outlined in the sections below.

2.1 LEGISLATION

2.1.1 EXPLOSIVES ACT 2003

The *Explosives Act 2003* regulates and controls the transport and handling of explosives and explosive precursors in NSW and the licensing of their use. For the CGO, the key issue is the required licensing of staff and contractors involved in the transport, storage, handling and use of explosives on site.

2.1.2 EXPLOSIVES REGULATION 2013

Section 65 of the regulations imposes a duty on those who carry out activities to which the code or standard applies must carry out that activity in compliance with those codes or standards. For CGO, this relates to Australian Standards and ANZEC guidelines discussed in Section 2.2 below.

2.1.3 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

2.1.3.1 DA 14/98

This BLMP has been prepared in accordance with the requirements of DA 14/98 condition 6.3. It and other conditions relevant to this BLMP are outlined below.

Condition 6.3(a) Impact Assessment Criteria

Table 1
Impact Assessment Criteria

Location & Time	*Airblast overpressure (dB(Lin Peak))*	*Ground Vibration (mm/s)*	*Allowable exceedence*
Residence on privately-owned land – Anytime	*120*	*10*	*0%*
Residence on privately-owned land – Monday to Saturday during day	*115*	*5*	*5% of the total number of blasts over a period of 12 months*
Residence on privately-owned land – Monday to Saturday during evening	*105*	*2*	*5% of the total number of blasts over a period of 12 months*
Residence on privately-owned land – Monday to Saturday at night, Sundays and public holidays	*95*	*1*	*5% of the total number of blasts over a period of 12 months*

This has been addressed in Section 3.1 of this plan.

Condition 6.3(b) Blasting Frequency

The Applicant may carry out a maximum of 1 blast a day for the Open Cut Operations on site. This condition does not apply to blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

This has been addressed in sections 3.1 and 4.3.

Condition 6.3(c) Property Investigations

If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, and the Planning Secretary agrees an independent investigation of the claim is warranted, then within 2 months of receiving this claim the Applicant shall:

(i) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
(ii) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damage to the satisfaction of the Planning Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution.

This has been addressed in Section 6.2 of this plan.

Condition 6.3(d) Operating Conditions

The Applicant shall:
(i) implement best management practice to:
• protect the safety of people and livestock in the areas surrounding blasting operations;
• protect public or private infrastructure/property in the surrounding area from damage from blasting operations; and
• minimise the dust and fume emissions of any blasting;
(ii) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site; and
(iii) carry out regular monitoring to determine whether the development is complying with the relevant conditions of this consent,

…to the satisfaction of the Planning Secretary.

This has been addressed in Section 6 of this plan.

Condition 6.3 (e) Blast Management Plan

The Applicant shall prepare and implement a Blast Management Plan for the Cowal Gold Operations to the satisfaction of the Planning Secretary. This plan must:
(i) be prepared in consultation with the EPA;
(ii) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this consent; and
(iii) include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this consent.

This has been addressed by the preparation of this plan in consultation with the EPA.

In addition to DA 14/98 condition 6.3 above, other development consent conditions relevant to this plan include:

- DA 14/98 condition 8.1(b)(i) outlines the notification requirements in the event of an exceedance of the blast impact assessment criteria and is addressed in Section 9.
- DA 14/98 condition 3.2(b)(x) requires the development of a Flora and Fauna Management Plan (FFMP) and monitoring of potential impacts on birdlife in bird breeding areas and is addressed in Section 4.1
- DA 14/98 condition 9.1(d) requires a Community Environmental Monitoring and Consultative Committee (CEMCC) and is addressed in Section 7.1.
- DA 14/98 condition 9.2(a) requires an independent environmental audit. These conditions are discussed in Section 8.4.
- DA 14/98 conditions 9.1(b) and 9.1(c) establish the reporting and review requirements for this BLMP and are reproduced in full and discussed in sections 8 and 9.
- DA 14/98 condition 9.4(a)(v) outlines the requirements for a complaints register. This condition is reproduced in full and discussed in Section 7.2.
- Appendix 8, which defines notification and reporting requirements in the event of an incident.

2.1.3.2 SSD 10367

With its focus primarily on underground activities, SSD 10367 has only a few relevant conditions to this plan mainly relating to administrative matters identical to those of DA 14/98 and not blasting specifically. They are:

- Condition C9, which requires the preparation of an Annual Review and triggers for further review. This condition is addressed in Section 9.1
- Condition C5, which outlines the revision requirements for the CGO's environmental management plans, strategies and programs, including this BLMP. This condition is addressed in Section 8.5.
- Condition A11, which requires the establishment of a Community Environmental Monitoring and Consultative Committee (CEMCC). This condition is addressed in Section 7.1.
- Condition C11, which requires Independent Environmental Audits to be conducted. These conditions are addressed in Section 8.4.
- Conditions C7 and C8 which require incident and non-compliance reporting requirements. These conditions are addressed in Section 9.
- Condition C14(a)(ix), which requires the maintenance of a complaints register. This condition is addressed in Section 7.2.
- Appendix 5, which defines notification and reporting requirements in the event of an incident. This is addressed in Section 9.

2.1.4 MINING ACT 1992

The principal regulatory instrument under the Mining Act 1992 are the conditions of authority on CGO's mining leases; ML 1535 and ML 1791. Those on ML 1535 include requirements relevant to blasting. The conditons of authority for ML 1535 also includes reporting requirements such as preparation of a Mining Operations Plan (MOP) and Annual Review (AR). Relevant conditions of authority for ML 1535 include:

> *27. (a) Ground Vibration*
> *The lease holder must ensure that the ground vibration peak particle velocity generated by any blasting within the lease area does not exceed 10 mm/second and does not exceed 5 mm/second in more than 5% of the total number of blasts over a period of 12 months at any dwelling or occupied premises, not owned by the lease holder or a related corporation, as the case may be, unless determined otherwise by the Environment Protection Authority.*
>
> *(b) Blast Overpressure*
> *The lease holder must ensure that the blast overpressure noise level generated by any blasting within the lease area does not exceed 120 dB (linear) and does not exceed 115 dB (linear) in more than 5% of the total number of blasts over a period of 12 months, at any dwelling or occupied premises, not owned by the lease holder or a related corporation, as the case may be, unless determined otherwise by the Environment Protection Authority.*

This condition of authority is addressed in Section 3 of this BLMP. Condition 27(a) and (b) are consistent with the blast impact assessment criteria of DA 14/98 except for evening periods, Sundays and public holidays during which more stringent criteria apply. See also sections 2.1 and 3.

Condition 25 of ML 1535 relates to the MOP however, it contains no specific requirements in relation to blasting.

2.1.5 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

The *Protection of the Environment Operations Act, 1997* (POEO Act) and the Protection of the Environment Operations (General) Regulation, 2009 set out the general obligations for environmental protection for development in NSW, which is regulated by the Environment Protection Authority (EPA).

The CGO has been issued Environment Protection Licence (EPL) no. 11912 which has a range of conditions:

- Condition L5 which requires the licensee to comply with overpressure and ground vibration criteria. This condition is addressed in Sections 3, 4 and 5.
- Conditions M5 and M6 which require the licensee to provide a telephone complaints line and keep a record of all complaints made in relation to pollutants arising from a licensed activity. These conditions are addressed in Section 7.2.
- Condition M7 which requires the monitoring of airblast overpressure and ground vibration levels at a number of sites in the vicinity of the CGO and for monitoring instruments to meet the requirements of the applicable Australian Standard. This condition is addressed in Section 8.1.
- Condition R2 which requires the licensee to notify the EPA of incidents causing or threatening material harm to the environment. This condition is addressed in Section 9.

2.2 STANDARDS AND GUIDELINES

2.2.1 AUSTRALIAN STANDARDS

Australian Standards are a benchmark of good practice and provide guidance in the appropriate standards of design and operational practices at the CGO.

2.2.1.1 AS 2187

Appendix J of Australian Standard (AS) 2187.2:2006 *Explosives – Storage and Use* provides guidance on blast monitoring and assessing blast-induced ground (and structural) vibration and airblast effects on buildings and their occupants. Compliance with this standard is also considered part of best management practice in accordance with DA 14/98 condition 6.3(d)(i).

Recommended vibration limits for human comfort and structural building damage are generally based on international standards (or studies) as presented in Appendix J Tables J4.5(A) and J4.5(B) respectively of AS 2187.2:2006. Similarly, recommended airblast limits for human comfort and structural damage are presented in Appendix J Tables J5.4(A) and J5.4(B) respectively.

Where applicable, further discussion of the requirements of AS 2187.2:2006 with regard to blast monitoring is provided in the following sections.

2.2.1.2 AS 4326

AS 4326-2008 relates to the storage and handling of oxidising agents and sets out the requirements for storage, handling, operational safety, emergency planning and fire protection for all Division 5.1 dangerous goods. It provides specific storage requirements for hydrogen peroxide and ammonium nitrate.

2.2.2 AUSTRALIAN CODE FOR THE TRANSPORT OF EXPLOSIVES BY ROAD AND RAIL

This code, published in 2009 by Safework Australia relates to the transport of explosives by road and rail. Suppliers of explosives to the CGO are contractually obligated to comply with the code.

2.2.3 AUSTRALIAN AND NEW ZEALAND ENVIRONMENT COUNCIL

The EPA advocates use of the Australian and New Zealand Environment Council (ANZEC) (1990) guidelines entitled *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration for Limiting Potential Residential Annoyance Effects due to Blasting*. Compliance with this guideline is also considered part of best management practice.

ANZEC (1990) recommends:

- a maximum level for ground vibration of 5 millimetres per second (mm/s), peak vector sum (PVS) (Appendix A - Section 2.2.1) with 2 mm/s as the long-term regulatory goal (Appendix A - Section 2.2.3).

- the PVS level of 5 mm/s for ground vibration may be exceeded for up to 5% of the total number of blasts for a period of 12 months. The level should not exceed 10 mm/s at any time (Appendix A – Section 2.2.2).
- the recommended maximum level for airblast overpressure is 115 decibels (dB) (Linear Peak) (Appendix A – Section 2.1.1).
- the airblast overpressure level of 115 dB (Linear Peak) may be exceeded for up to 5% of the total number of blasts for a period of 12 months. The level should not exceed 120 dB (Linear Peak) at any time (Appendix A – Section 2.1.2).
- blasting should generally only be carried out during the hours of 9.00 am to 5.00 pm Monday to Saturday and can take Sundays or Public Holidays with blasts that risk exciding the lower compliance threshold avoided (Appendix A – Section 2.3.1).
- blasting should generally take place no more than once per day (Appendix A – Section 2.3.2).

Note that as a development consent condition, DA 14/98 condition 6.3(b) relating to the frequency of blasting, has precedence over ANZEC's recommendation in the last dot point.

3 BLASTING CRITERIA

3.1 BLAST IMPACT COMPLIANCE CRITERIA

DA 14/98 condition 6.3(a)(i) requires Evolution to comply with the blast impact criteria in Table 2. Meeting this criteria is considered part of implementing best management practice; a requirement of DA 14/98 condition 6.3(d)(i).

Table 2
Blast Impact Assessment Criteria

Location & Time	*Airblast overpressure (dB(Lin Peak))*	*Ground Vibration (mm/s)*	*Allowable exceedance*
Residence on privately-owned land – Anytime	120	10	0%
Residence on privately-owned land – Monday to Saturday during day	115	5	5% of the total number of blasts over a period of 12 months
Residence on privately-owned land – Monday to Saturday during evening	105	2	5% of the total number of blasts over a period of 12 months
Residence on privately-owned land – Monday to Saturday at night, Sundays and public holidays	95	1	5% of the total number of blasts over a period of 12 months

dB (Lin Peak) – decibels (Linear Peak). mm/s – millimeters per second.
Day – the period from 0700 to 1800.
Evening – the period from 1800 to 2200.
Night – the period from 2200 to 0700.

However, as provided in DA 14/98 condition 6.3(a), these criteria do not apply if Evolution has a written agreement with the relevant private landowner to exceed the limits in Table 2 (see Appendix C), and has advised the Department of Planning and Environment (DPE) in writing of the terms of this agreement.

In accordance with DA 14/98 condition 6.3(b), Evolution is able to carry out a maximum of one blast a day for open pit mining. This condition does not apply to blasts required to underground mining or to ensure the safety of the mine or its workers. DA 14/98 condition 6.3(b) makes clear that 'a blast' refers to a single firing of multiple charged blastholes.

In accordance with DA 14/98 condition 6.3(e)(iii), Evolution has implemented the monitoring programme described in Section 7 to evaluate blasting impacts and demonstrate compliance with the above blast impact assessment criteria.

Blast monitoring data is assessed on an ongoing basis (Sections 4 and 8) and blast design and control measures modified as required in order to achieve continued compliance with the blast impact compliance criteria (Section 3).

The results of the blast monitoring programme are reported in the Annual Review and published on Evolution's website (Section 9.1).

4 BLAST MANAGEMENT

4.1 BLAST EMISSION PREDICTIONS

Predictions of the level of CGO blast emissions at the nearest potentially affected residences were conducted by SLR Consulting (2013). The predictions were based on a maximum instantaneous charge (MIC) of 172 kilograms (kg) and a typical CGO blast design (SLR Consulting, 2013).

A typical CGO blast design is summarised in Table 3.

Table 3
Typical Blast Design Details

Blast Design Parameter	Typical Dimension	Range
Number of Holes	350	200 to 500
Number of Rows	9	3 to 12
Hole Diameter	165 mm	115 to 200 mm
Hole Inclination (to vertical)	0	0 to 20°
Bench Height	9 m	5 to 18 m
Burden	4.4 m	3 to 6 m
Spacing	5.3 m	4 to 7 m
Subdrill	1.3 m	0.6 to 1.8 m
Stemming Depth	3.6 m	3 to 4.5 m
Delay Timing	NONEL,Electronic	N/A
Column Explosive	Emulsion	ANFO/Slurry/Emulsion
Powder Factor	0.82 kg/bcm	0.60 to 1.00 kg/bcm
MIC	172 kg	50 to 350 kg

Source: SLR (2013)
ANFO = ammonium nitrate fuel oil.
° = degree.
MIC = maximum instantaneous charge.
m = metres.

The assessment found the following (SLR Consulting, 2013):

> *With a blast MIC of 350 kg, the predicted ground vibration and airblast levels are below the most stringent structural damage criterion of 12.5 mm/s and 120 dBLpk (decibels linear peak) at all privately owned receivers. Similarly, with a blast MIC of 350 kg, the predicted 5% exceedance ground vibration and airblast levels are below the daytime (exclusive of Sundays/Public Holidays) human comfort criteria of 5 mm/s and 115 dBLpk at all privately owned receivers.*
>
> *Furthermore, with a blast MIC of 50 kg, the predicted 5% exceedance ground vibration and airblast levels are below the daytime Sundays/Public Holidays human comfort criteria of 1 mm/s and 95 dBLpk at all privately owned receivers, except at Coniston. The predicted airblast level at Coniston of 98 dBLpk is moderately (3 dB) above the criterion. However as discussed in Section 2.3, the existing CGO airblast monitoring results show that the (actual) measured airblast levels (on Sundays/Public Holidays) are below human comfort criterion of 95 dBLpk at Coniston.*
>
> *Evolution Mining would continue to conduct blasting on a Sunday/Public Holidays only in accordance with relevant blast criteria. Blast monitoring would continue at Coniston to confirm that compliance with blast criteria is maintained. Should blast monitoring indicate that blast overpressure is approaching the criteria of 95 dBLpk, blast sizes would be modified (eg MIC would be reduced).*

The noise and vibration impact assessment (NVIA) was prepared by EMM (2020) for the Underground Development project. Their assessment found the following:

> *The assessment shows that during the underground mine operation, no strict control of MIC values is required to achieve the relevant 95% peak particle velocity (PPV) ground vibration limits at the nearest residences. achieve the relevant 95% peak particle velocity (PPV) ground vibration limits at the nearest residences.*
>
> *The allowable MIC calculations indicate that there are no significant restrictions to the MIC of blasts to achieve the existing ground vibration limits for the proposed underground mine operation.*
>
> *By maintaining the current approach to blast design and blast emission management, it is anticipated that the blasting emission limits will continue to be met throughout the life of the Project.*

4.1.1 Bird Behaviour Monitoring

The "*Cowal Gold Project 2005 Annual Environmental Management Report*" (Barrick, 2006) includes a summary of bird observations during the first 10 blasts at the CGO. The observation was overseen by Dr Peter Gell from the Geographical and Environmental Studies Department of the University of Adelaide. Dr Peter Gell has been involved in monitoring and reporting on waterbird populations and breeding activities at Lake Cowal since 1992. The four fauna specialists who conducted the monitoring found that there was no abrupt change in the behaviour of any bird species to any blast and no evidence that any bird perceived any blast (Gell, 2005). Further observations by Dr Gell in 2011 during a blast event identified no discernible reaction to the noise (or other effects) associated with the blast (Gell, 2011).

Predictions of the level of blast emissions near bird breeding areas were conducted by SLR Consulting (2013), which found:

> *The predicted results indicate that the maximum airblast level at the closest monitored bird breeding area (Bird Breeding Area South [NO3]) would be 110 dB. Given the proposed continuation of blast and bird behaviour monitoring in accordance with the "Cowal Gold Operations Flora and Fauna Management Plan" (Evolution Mining 2020), as well as the contingency measures in place in the event that assessment and monitoring results indicate that adverse impacts are occurring on fauna, Modification blasting would be unlikely to significantly impact any fauna species.*
>
> *Similarly, the predicted results indicate that the maximum airblast level would remain below the lowest livestock behaviour reaction noise level of 125 dB at distances of 750 m or greater from the blast site.*

Potential impacts on waterbird breeding from the Underground Project were predicted by EMM (2020), finding:

> *Potential impacts from blasting at the waterbird bird breeding areas at locations N03 and N04 has been considered. Bird behaviour monitoring is currently undertaken at CGO to monitor change in behaviour of birds in the area. The bird behaviour monitoring has not found any noticeable change in the behaviour of birds due to CGO blast emissions. The bird behaviour monitoring is expected to continue during the Project in accordance with the CGO Flora and Fauna Management Plan and hence no significant noise impact is anticipated as a result of blasting for the Project.*

In accordance with DA 14/98 condition 3.2(b), monitoring of bird breeding behaviour will continue to be conducted and the contingency measures outlined in the FFMP implemented should impacts be identified.

4.2 BLAST DESIGN AND CONTROL MEASURES

Blast design is an iterative process where the monitoring data from previous blasts (Section 4) is used to refine future blast designs.

Non-electric (NONEL) or similar blast initiation systems (including electronic) are used where practicable to minimise the probability of exceedances of the blast impact assessment criteria outlined in Table 2. Column explosives will be primarily emulsion (Table 3).

AS 2187.2:2006 details general operating practices that blast operators will conform with and provides guidance of the various options available for controlling ground vibration and airblast. The CGO's Blasting Standard Operating Procedure 'Blasting MIN-SOP-35' (Blasting SOP) has been prepared in consideration of the AS 2187.2:2006 general operating practices.

These controls will be adopted to comply with the blast impact assessment criteria (Table 2) and are summarised in Table 4.

Consistent with AS 2187.2:2006, data from the on-site meteorological station will be used to determine whether conditions are suitable for blasting, as outlined in Section 4.3.

Table 4
Ground Vibration and Airblast
Controls

Variables	Ground Vibration			Airblast		
	Influence on ground motion			Influence on overpressure		
	Significant	Moderately Significant	Insignificant	Significant	Moderately Significant	Insignificant
1. Within the Control of Blasting Operators						
Charge mass per delay (MIC)	X			X		
Delay interval	X			X		
Burden and spacing		X		X		
Stemming: amount			X	X		
Stemming: type			X	X		
Charge length and diameter			X		X	
Angle of blast hole			X			X
Direction of initiation		X		X		
Charge mass per blast			X			X
Charge depth			X	X		
Covering of detonating cord			X	X		
Charge confinement	X			X		
Blast hole deviation	X					
2. Not in Control of Blasting Operators						
General surface			X		X	
Type and depth of overburden	X			X		
Wind and weather conditions			X	X		

Source: AS 2187.2-2006 – Table J2

Further detail on these blast controls is provided in AS 2187.2:2006.

4.3 WEATHER CONDITIONS AND BLAST MANAGEMENT

4.3.1 Meteorological Monitoring

The CGO weather station will be maintained for the life of the mine to:

- assist in the prediction of noise, dust and blasting impacts; and
- to provide data at the time of each blast as part of the iterative blast design process.

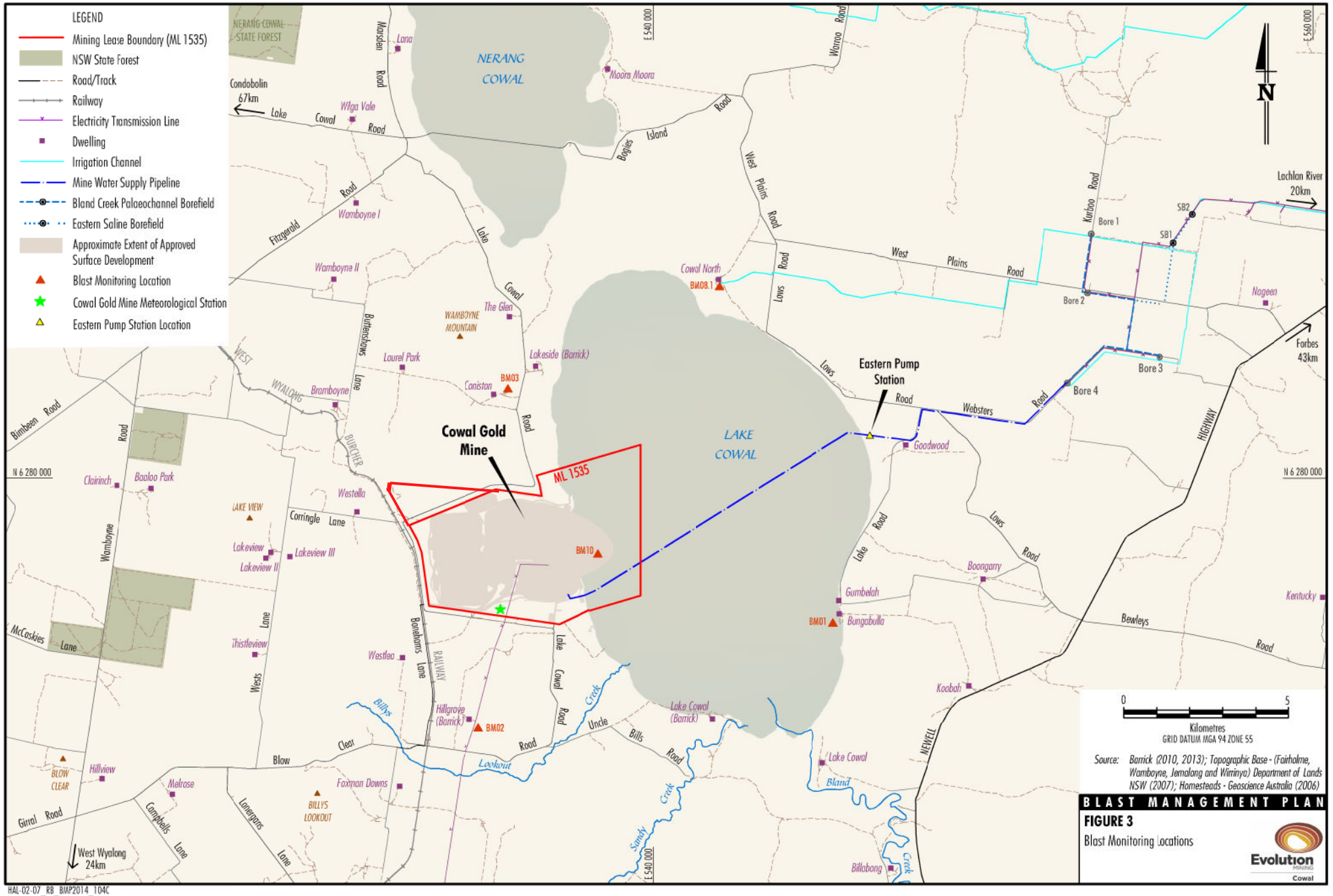
Data from the on-site weather station is used to determine whether conditions are suitable for the scheduled blasts at the CGO.

4.3.2 Weather and Blast Correlation

Data from the on-site weather station is used to determine where correlations exist between weather conditions and blast monitoring results as a means of refining blasting practices at the CGO. Weather conditions are recorded for each blast (Section 4.3.1).

4.3.2.1 Prior to Blasting

Where practicable, weather conditions are examined prior to blasting and a prediction made as to whether air blast overpressure levels (and dust and/or fume emissions) outside of the CGO area (i.e. at non-company owned residences and other blast monitoring locations shown on Figure 3)



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are likely to be adversely affected to the extent that the blast configuration should be altered, delayed or cancelled. An example of this is the presence of a temperature inversion.

4.4 BLAST SCHEDULE

In accordance with DA 14/98 condition 6.3(b) and as discussed in Section 3.1, Evolution carries out a maximum of one blast event in the open pit per day. However, this condition does not apply to blasts required to ensure the safety of the mine or its workers or in the underground mine.

The daily blast event in the open pit is restricted to within the hours of 9.00 am to 5.00 pm in accordance with the ANZEC (1990) guideline and is scheduled and designed to comply with the requirements outlined in DA 14/98 condition 6.3(a) (Table 2). However, blast timing is subject to production scheduling requirements and/or weather restrictions.

5 BLAST MITIGATION MEASURES

All blasts at the CGO are designed to comply with the blast impact assessment criteria defined in Section 3. In the event that monitoring indicates exceedance of the blast criteria, the management measures described in this section will be reviewed and revised as necessary to achieve compliance with those criteria. Should it be necessary, the blast operations may also be rescheduled or redesigned to achieve compliance.

5.1 AIRBLAST OVERPRESSURE

The airblast overpressure management measures that would be implemented (as necessary) are largely sourced from AS 2187.2-2006 and are summarised in Table 5.

Table 5
Airblast Overpressure Management Measures

Management Measure	Summary Description of Effect
Reduce the MIC or charge mass per delay, to the lowest possible level.	The level of airblast is inversely proportional to the MIC; the lower the MIC the lower the airblast.
Keep face heights to a practical minimum.	As the face height determines the blast hole depth and therefore in turn the MIC, reducing the bench height consequently reduces the MIC.
Ensure stemming type and length is adequate.	Use a stemming length of no less than the burden dimension and use aggregate of an appropriate size which “locks” in the blast hole to prevent the escape of the gases from the explosives.
Eliminate exposed detonating cord. Investigate alternative initiation methods.	Detonating cord has a very high velocity of detonation generating high airblast levels. NONEL initiation “burns internally” and does not contribute to the airblast level from blasting.
Eliminate secondary blasting (instead of popping, use rock breaker or drop hammer).	Secondary blasting of oversize rock should be minimised as the explosives are less confined which may result in high airblast levels.
Reduce the need for toe shots (e.g. better control of drill patterns).	Drill the blast holes below the level of the bench floor (subdrill) so that no rock is left at the base of the blast bench (toe).
Orientate faces where possible so that they do not face directly towards residences.	The forward movement of the blast face generates the major component of airblast so orientate the face away from receivers where possible.
Ensure that all delays are designed to eliminate wave front reinforcement.	Design the detonator delay sequence to provide at least 8 ms between the blast holes on a given delay time to avoid overlap.
Vary the direction of initiation.	Airblast levels are reinforced in the direction of initiation of the detonators. Orientate initiation direction away from receivers.
Exercise strict control over the burden, spacing and orientation of all blast drill holes.	Less than design burden and spacing (i.e. reduced rock cover) facilitates “blow outs” resulting in high airblast levels.
Take particular care where the face is already broken or where it is strongly jointed, sheared, or faulted.	This requires either “lighter” charging or “decking” with an inert material across the respective zones in order to avoid blowouts resulting in high airblast levels.
Consider deck loading where appropriate to avoid broken ground or cavities in the face (e.g. from back break).	Decking refers to separating explosives within a blast hole using an inert material, usually stemming (see above).

After: AS 2187.2; EPA (pers. comm., 5 May, 2003)

Due to the technical complexities and interrelationships of variables associated with blasting (including geology, weather and production requirements), it is not appropriate to specify in a BLMP which blast overpressure management measure to implement under a particular exceedance scenario. It will remain the responsibility of the Mining Manager, in co-operation with the Sustainability Manager and consultation with the EPA, to determine the appropriate overpressure management measure (or combination of measures) that should be applied to address an exceedance.

Evolution will implement adaptive management of blasting at the CGO. Following the implementation of any management measures, continued blast monitoring will provide feedback on the effectiveness of the management measures and to determine whether any additional management measures are required.

5.2 DUST AND FUME

Blasting activities have the potential to result in dust and fume emissions. Dust emissions from blasting are controlled by adequate stemming of the blast and are covered in the AQMP.

Blast fumes are typically associated with using ANFO and wet holes. ANFO will react with water and produce fumes, however this is more prevalent for a blast design that uses ANFO alone.

Blasting activities at the CGO will be undertaken in accordance with CGO Blasting SOP which includes control procedures for priming, loading and stemming operations to minimise blast emissions. These procedures involve conducting a review by the Blasting Supervisor of risk factors prior to blasting including meteorological conditions (e.g. prevailing winds or heavy rain) and ground conditions (e.g. presence of heavily rain affected ground).

Where particular conditions or risk factors are known to increase the likelihood of a blast producing unacceptable dust or fume emissions, the blast design (Section 4.2) will be modified, and management measures described in this section will be implemented to minimise blast emissions, where practicable.

6 SAFETY

6.1 PROTECTION OF PUBLIC INFRASTRUCTURE

There is no public infrastructure within 400 m of the active open cut mining area that could potentially be affected by blasting activities. Blasting activities within the pit are located approximately 1.15 km from the on-site electricity transmission line substation, approximately 5 km from the West Wyalong Burcher Railway and approximately 2.25 km away from Lake Cowal Road.

6.2 PROTECTION OF PRIVATE INFRASTRUCTURE/PROPERTY

6.2.1 Property Investigations

In accordance with DA 14/98 condition 6.3(c), if the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting at the CGO and the Planning Secretary of the DPE agrees an independent investigation of the claim is warranted, then within two months of receiving this claim, Evolution will:

- commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
- give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then Evolution will repair the damage to the satisfaction of the Planning Secretary of the DPE.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or Evolution or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary of the DPE for resolution.

The blast design and control measures described in Section 4 will be used to minimise blast emission impacts to private infrastructure and property. The blast monitoring procedures and response and management measures that will be implemented in the event of an exceedance of the blast impact assessment criteria are discussed in Sections 5, 8 and 9.

6.3 PROTECTION OF LIVESTOCK

Blasting operations at the CGO are restricted to within the open pit and underground operations. There is no livestock grazing permitted within ML 1535. The perimeter Travelling Stock Reserve is at its closest proximity, located approximately 2 km from blasting activity within the open pit. No livestock have been threatened by flyrock to date and this is not expected to change.

Furthermore, any livestock agisted on mine-owned land (outside ML 1535 and 1791) adjacent to the open pit (i.e. when lake conditions permit) is unlikely to be affected by flyrock given the intervening distance to available grazing land.

6.4 PROTECTION OF PERSONS DURING BLASTING

The CGO Blasting Standard Operating Procedure (SOP) details the procedures that will be undertaken to control personal safety during blasting. The Blasting SOP includes implementation of a minimum 400 m exclusion zone for all blasts in addition to personal protective equipment requirements and emergency and evacuation procedures.

7 CONSULTATION AND COMPLAINTS

7.1 COMMUNITY ENVIRONMENTAL MONITORING AND CONSULTATIVE COMMITTEE

A CEMCC has been set up for the CGO in accordance with DA 14/98 condition 9.1(d) and SSD 10367 condition A11. Condition 9.1(d) is reproduced below:

> ***9.1 Environmental Management***
>
> *(d) Community Environmental Monitoring and Consultative Committee*
>
> *(i) The Applicant shall establish and operate a Community Environmental Monitoring and Consultative Committee (CEMCC) for the Coal Gold Operations to the satisfaction of the Planning Secretary. This CEMCC must:*
>
> - *be comprised of an independent chair and at least 2 representatives of the Applicant, 1 representative of BSC, 1 representative of the Lake Cowal Environmental Trust (but not a Trust representative of the Applicant), 4 community representatives (including one member of the Lake Cowal Landholders Association);*
> - *be operated in general accordance with the Department's Community Consultative Committee Guidelines: State Significant Projects (2019 or its latest version); and*
> - *monitor compliance with conditions of this consent and other matters relevant to the operation of the Cowal Gold Operations during the term of the consent.*
>
> *Note: The CEMCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.*
>
> *(ii) The Applicant shall establish a trust fund to be managed by the Chair of the CEMCC to facilitate the functioning of the CEMCC, and pay $2000 per annum to the fund for the duration of gold processing operations. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be made by the date of the first Committee meeting. The Applicant shall also contribute to the Trust Fund reasonable funds for payment of the independent Chairperson, to the satisfaction of the Planning Secretary*

As required by DA 14/98 condition 9.1(d)(i), the CEMCC comprises an independent chair and representatives of the BSC, Forbes Shire Council, Lachlan Shire Council, Lake Cowal Foundation, the Wiradjuri Condobolin Corporation, two Evolution representatives and four community representatives including one from the Lake Cowal Landholders Association.

The CEMCC provides opportunities for members of the community to attend CEMCC meetings to discuss specific issues relevant to them, including any concerns relating to erosion and sediment control. A landholder can make a request to the CEMCC regarding a particular issue, or the landowner can register a complaint in the complaints register. Landowners who register complaints may be invited to join in discussion of the issue at the next CEMCC meeting.

Items of discussion at these meetings will include mine progress, reporting on environmental monitoring, complaints, rehabilitation activities and any environmental assessments undertaken.

The CEMCC meets quarterly and the minutes from CEMCC meetings are provided on Evolution's website (www.evolutionmining.com.au).

7.2 LANDHOLDER NOTIFICATION

In alignment with CGO Environmental and consultation procedure, all CGO employees and contractors are to notify the occupier when attending any land for the purposes of their work (leased, licensed or other) before attending the site and receive positive communication from the occupier allowing access. If access in not granted by the occupier the employee or contractor must not access the land and report back to appropriate supervisor. CGO may then further discuss with the occupier in accordance with the dispute resolution process.

7.3 COMPLAINTS REGISTER

A process for the handling of complaints is provided below in accordance with the requirements of CGO's EPL and DA 14/98 conditions and to facilitate prompt and comprehensive responses to any community concerns.

As required by EPL Condition M6.1, a dedicated Community Complaints Line has been established (via phone [02] 6975 3454 or email community.cowal@evolutionmining.com.au) that is available 24 hours, seven days a week for community members who have enquiries or who wish to lodge complaints in relation to Evolution's activities at the CGO. Its availability is advertised in relevant local newspapers on a quarterly basis.

A complaints register is maintained by the Sustainability Manager (or relevant equivalent) in accordance with EPL condition M5 and is available on Evolution's website in accordance with DA 14/98 condition 9.4(a)(v).

Information recorded in the complaints register with respect to each complaint will include:

- the date and time of the complaint;
- the method by which the complaint was made;
- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by Evolution in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by Evolution, the reasons why no action was taken.

The record of a complaint will be kept for at least four years after the complaint was made. The record will be available for inspection by the EPA.

7.4 DISPUTE RESOLUTION

In the event that dispute resolution is necessary or where blasting levels are subsequently demonstrated to be below the relevant criteria (Section 3), the resolution process will be one of informed discussion involving the complainant and Evolution. Evolution may also refer the dispute (with the complainant's agreement) to the CGO CEMCC for mediation (Section 7.1). In the event that the complainant is still dissatisfied, the matter may be referred to the DPE for consideration of further measures. Every effort will be made to ensure that concerns are addressed in a manner that results in a mutually acceptable outcome.

DA 14/98 condition 6.3(c) also has specific requirements dispute resolution in relation to property:

Property Investigations

If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, and the Planning Secretary agrees an independent investigation of the claim is warranted, then within 2 months of receiving this claim the Applicant shall:

(i) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
(ii) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damage to the satisfaction of the Planning Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Applicant or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Planning Secretary for resolution.

8 AUDITING AND REVIEW

8.1 BLAST MONITORING

In accordance with DA 14/98 condition 6.3(e)(iii), Evolution will implement the following monitoring programme to evaluate blasting impacts and demonstrate compliance with the blast impact assessment criteria.

The following monitoring locations will be used to evaluate blast emissions from the CGO (Figure 3):

- BM01 – 'Gumbelah' residence;
- BM02 – 'Hillgrove' (Evolution Mining-owned) residence;
- BM03 – 'Coniston' (Evolution Mining-owned) residence;
- BM08.1 – 'Cowal North' residence; and
- BM10 – CGO open pit (reference).

The monitoring locations listed above have been developed in consideration of the requirements of DA 14/98 condition 6.3 and those properties which are afforded acquisition rights (Westella).

The measurements at residences will be taken within 30 m of the building in accordance with ANZEC (1990) guidelines (Appendix A – Section 3.3).

Blast monitoring will record the following for each blast:

- location of blast monitoring site;
- time and date of monitoring;
- blast number and location of blast;
- peak vector sum (PVS - mm/s);
- wave form trace; and
- air overpressure peak (dB [Linear Peak]).

Each monitoring unit is fitted with suitable equipment to monitor all blasts. As required by EPL Condition M7.1(b), blast monitoring units/instrumentation must comply with the requirements of AS 2187.2/2006.

Detailed climatic and atmospheric conditions including temperature and wind speed and direction at the time of blasting is monitored at the CGO meteorological station (Figure 3) and recorded for each blast. Periodic calibration of all monitoring units including the meteorological station is undertaken in accordance with the manufacturer's specifications.

8.2 BLAST MONITORING REPORT

Blast monitoring results are reviewed continuously and an annual Blast Monitoring Report will be prepared by an independent specialist, which includes a summary of the annual monitoring results and a review and analysis of the results against the blast impact assessment criteria. Results are also reviewed on a monthly basis during the preparation of the monthly Published Monitoring Data required by EPL 11912. A summary of the annual blast monitoring data will be included in the Annual Review (Section 9.1) and made available on Evolution's website.

If blast monitoring results indicate an exceedance of the blast impact assessment criteria at the relevant blast monitoring locations, the incident investigation procedures will be implemented (Section 9.2).

8.3 COMPLIANCE ASSESSMENT PROTOCOL

DA 14/98 defines an incident as

A set of circumstances that causes or threatens to cause material harm to the environment.

Accordingly, a blast that resulted in a non-compliance with the blast impact compliance criteria (Section 3.1) and is confirmed as attributable to the CGO based on the outcome of the compliance assessment protocol is regarded as an incident.

The results of blast monitoring are compared against the relevant blast impact compliance criteria. The blast impact compliance criteria (Section 3.1) require that blasting must not:

- exceed 120 dB(L) or 10 mm/s at any residence on privately-owned land at any time;
- exceed 115 dB(L) or 5 mm/s at any residence on privately-owned land Monday to Saturday during the day for more than 5% of the total number of blasts over a period of 12 months;
- exceed 105 dB(L) or 2 mm/s at any residence on privately-owned land Monday to Saturday during the evening for more than 5% of the total number of blasts over a period of 12 months; or
- exceed 95 dB(L) or 1 mm/s at any residence on privately-owned land Monday to Saturday at night and on Sundays and public holidays for more than 5% of the total number of blasts over a period of 12 months.

In the event of an exceedance of the above criteria, an assessment will be conducted to:

- confirm the timing of the exceedance.
- confirm the location of the exceedance.
- exclude non-mine related or external factors (e.g. can the exceedance be attributed directly to the CGO). This will include consideration of the meteorological conditions recorded at the time of the blast.
- confirm if the airblast overpressure or ground vibration limits during the relevant day, evening and night time periods have been exceeded for more than 5% of the total number of blasts over a period of 12 months.
- confirm if Evolution has an agreement with the relevant owner of the residence on privately-owned land to exceed the blast impact assessment criteria.

If this assessment determines that Evolution is in non-compliance with the blast criteria, then management measures detailed in Section 5 will be implemented to prevent or mitigate against any further non-compliances. The notification protocol for reporting a blast incident is provided in Section 8.2 below.

8.4 INDEPENDENT ENVIRONMENTAL AUDIT

An independent environmental audit will be conducted in accordance with DA 14/98 condition 9.2(a) and SSD 10367 condition C11. Condition 9.2(a)(i) is reproduced below:

(a) Independent Environmental Audit

i By the end of July 2016, and every 3 years thereafter, unless the Planning Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the Cowal Gold Operations. This audit must:

• be prepared in accordance with the *Independent Audit Post Approval Requirements* (2020 or as amended from time to time);

• be led and conducted by a suitably qualified, experienced and independent team of experts (including ecology and rehabilitation experts, and in field's specified by the Planning Secretary) whose appointment has been endorsed by the Secretary;

• be carried out in consultation with the relevant agencies, BSC and the CEMCC;

• assess whether the development complies with the relevant requirements in this consent, and any strategy, plan or program required under this consent; and

• recommend appropriate measures or actions to improve the environmental performance of the development and any strategy, plan or program required under this consent.

8.5 REVISION OF THIS PLAN

In accordance with Condition 9.1(c) of the DA 14/98, this BLMP will be reviewed, within 3 months of:

(i) the submission of an annual review under condition 9.1(b) above;
(ii) the submission of a non-compliance or incident notification under condition 9.3(a) or 9.3(b) below;
(iii) the submission of an audit under condition 9.2 (a) below;
(iv) the approval of any modification to the conditions of this consent; or
(v) a direction of the Planning Secretary under condition 1.1(b) of this consent;

the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.

If necessary, to either improve the environmental performance of the development or cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

9 REPORTING

9.1 ANNUAL REVIEW

In accordance with condition 9.1(b) of DA 14/98 and condition C9 of SSD 10367, Evolution prepares an Annual Review to report on the environmental performance of the CGO by the end of March each year, or other timing as may be agreed by the Planning Secretary of the DPE. DA 14/98 condition 9.1 is reproduced below:

> *By the end of March each year, or as otherwise agreed with the Planning Secretary, the Applicant shall review the environmental performance of the Cowal Gold Operations to the satisfaction of the Planning Secretary. This review must:*
>
> *(i) describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;*
>
> *(ii) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the:*
>
> - *the relevant statutory requirements, limits or performance measures/criteria;*
> - *the monitoring results of previous years; and*
> - *the relevant predictions in the EIS;*
>
> *(iii) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;*
>
> *(iv) identify any trends in the monitoring data over the life of the development, including the ongoing interaction between the Cowal Gold Mine and Lake Cowal;*
>
> *(v) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and*
>
> *(vi) describe what measures will be implemented*

The Annual Review is made publicly available on Evolution's website (www.evolutionmining.com.au) in accordance with DA 14/98 condition 9.4(a)(vii). The Annual Review also addresses the Annual Review requirements of ML 1535 Condition of Authority 26.

Condition 26 of the Conditions of Authority for ML 1535 also has requirements for Annual Review (formerly the AEMR) reporting which are generally consistent with the requirements of DA 14/98 condition 9.1(b). The requirements of Condition 26 are detailed below.

1. *Within 12 months of the commencement of mining operations and thereafter annually or, at such other times as may be allowed by the Director-General, the lease holder must lodge an Annual Environmental Management Report (AEMR) with the Director-General.*
2. *The AEMR must be prepared in accordance with the Director-General's guidelines current at the time of reporting and contain a review and forecast of performance for the preceding and ensuing twelve months in terms of:*
   a) *the accepted Mining Operations Plan;*
   b) *development consent requirements and conditions;*
   c) *Environment Protection Authority and Department of Land and Water Conservation licences and approvals;*
   d) *any other statutory environmental requirements;*
   e) *details of any variations to environmental approvals applicable to the lease area; and*
   f) *where relevant, progress towards final rehabilitation objectives.*
3. *After considering an AEMR the Director-General may, by notice in writing, direct the lease holder to undertake operations, remedial actions or supplementary studies in the manner and within the period specified in the notice to ensure that operations on the lease area are conducted in accordance with sound mining and environmental practice.*
4. *The lease holder shall, as and when directed by the Minister, cooperate with the Director-General to conduct and facilitate review of the AEMR involving other government agencies and the local council.*

The Annual Review will report on the following blasting related issues:

- a summary of all blast monitoring results;
- measures employed to minimise/prevent excessive blast emissions;
- blasting related complaints and amelioration measures undertaken in the event of any confirmed exceedances of blast criteria;
- review of the performance of blast control measures and the monitoring program by a suitably qualified person; and
- CEMCC decisions relating to CGO blast issues.

In addition, amendments to the *Protection of the Environment Operations Act, 1997* (POEO Act) that commenced on 31 March 2012 requires licencees to publish pollutant monitoring data that has been collected as a result of a licence condition, in accordance with section 66(6) of the POEO Act and written requirements issued by the EPA.

In accordance with the above requirements, blast monitoring data collected in accordance with condition M7 of the EPL will be made publicly available on Evolution's website on a monthly basis.

9.2 INCIDENT REPORTING

Incidents are defined in DA 14/98 as:

> *A set of circumstances that causes or threatens to cause material harm to the environment.*

In accordance with DA 14/98 condition 9.3(a), DA 14/98 Appendix 8 and SSD 10367 Appendix 5, Evolution will notify the DPE in writing via the Major Projects website, immediately after becoming aware of an incident. Evolution will provide the relevant agencies with a detailed report on the incident, and any further reports that may be requested. These reports will outline as a minimum, the development (including the development application number), the location and the nature of the incident which has occurred.

In addition, in accordance with EPL 11912 Condition R2, Evolution will notify the EPA (and all other relevant authorities) of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident. Evolution will provide written details of the notification to the EPA within seven days of the date on which the incident occurred.

Evolution will maintain a record of and report on any incidents. The Evolution Incident Report Form will be completed when recording incidents at the site.

9.3 NON-COMPLIANCE REPORTING

A non-compliance is defined within DA 14/98 as:

> *An occurrence, set of circumstances, or development, that is a breach of this consent but is not an incident.*

In accordance with DA 14/98 condition 9.3(b), Evolution will notify the DPE in writing via the Major Project website within seven days after becoming aware of any non-compliance. Evolution will provide in writing to the DPE a detailed report of the non-compliance which identifies, the development application number for the condition with which the CGO is non-compliant, the way in which the CGO does not comply and the reason for the non-compliance. The CGO will also provide details around any actions which have been or will be taken, to address the non-compliance.

10 REFERENCES

Australian and New Zealand Environment Council (1990) *Technical Basis for Guidance to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*.

Australian Explosives Industry and Safety Group Inc. (2011) *Code of Good Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting.*

Gell, P.A. (2005) *Lake Cowal Waterbird Monitoring Survey: Progress Report – October 2005.*

Gell, P.A. and Peake, P. (2011) *Lake Cowal Waterbird Monitoring Survey: Progress Report January 2011*.

Independent Monitoring Panel (2007) *Third Annual Report of the Independent Monitoring Panel for the Cowal Gold Project.*

SLR Consulting (2013) *Cowal Gold Mine Extension Modification Noise and Blasting Impact Assessment.*

APPENDIX A

TECHNICAL BASIS FOR GUIDELINES TO MINIMISE ANNOYANCE DUE TO BLASTING OVERPRESSURE AND GROUND VIBRATION (ANZECC, 1990)

Australian and New Zealand Environment Council

TECHNICAL BASIS FOR GUIDELINES TO MINIMISE ANNOYANCE DUE TO BLASTING OVERPRESSURE AND GROUND VIBRATION

September 1990

AUSTRALIAN AND NEW ZEALAND ENVIRONMENT COUNCIL

TECHNICAL BASIS FOR GUIDELINES TO MINIMISE ANNOYANCE DUE TO BLASTING OVERPRESSURE AND GROUND VIBRATION

To promote uniform environmental standards throughout Australia, the Council has released a number of Technical Bases relating to noise and other factors. The Technical Bases are intended to be used as the basis for State and Territory environmental control strategies.

Published Technical Bases relating to noise are listed at the back of this document. These documents recommend acceptability criteria for noise and vibration and, where appropriate, describe measurement procedures to be followed.

This document has been prepared by the Environmental Noise Control Committee, which is one of a number of specialist committees established to provide advice to ANZEC, through Standing Committee, on specific areas of environmental concern.

Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration

1. SCOPE

1.1 This document specifies recommended comfort criteria for:

- airblast overpressure level;
- ground vibration peak particle velocity;
- time of blasting; and
- frequency of blasting.

The intent of these criteria is to minimize annoyance and discomfort to persons at noise sensitive sites (e.g. residences, hospitals, schools etc) caused by blasting.

1.2 The recommended criteria apply to mining, quarrying, construction and all other operations which involve the use of explosives for fragmenting rock.

1.3 The recommended criteria apply only to the minimisation of annoyance and discomfort arising from blasting. The control of damage from blasting is the responsibility of State/Territory mines authorities and reference should be made to these bodies to ascertain recommended damage criteria

1.4 The recommended criteria are for guidance only and may be varied if necessary to suit local site conditions.

2. RECOMMENDED CRITERIA

2.1 Airblast Overpressure

2.1.1 The recommended maximum level for airblast overpressure is 115 dB(Lin Peak).

2.1.2 The level of 115 dB may be exceeded on up to 5% of the total number of blasts over a period of 12 months. However, the level should not exceed 120 dB(Lin Peak) at any time.

2.1.3 The airblast overpressure values referred to in 2.1.1 and 2.1.2 apply when the measurements are performed with equipment having a lower cut-off frequency of 2 Hz or less. If the instrumentation has a higher cut off frequency then a correction of 5dB should be added to the measured value.

Equipment with a lower cut-off frequency exceeding 10 Hz should not be used for the purpose of measuring airblast overpressure.

2.2 Ground Vibration

2.2.1 The recommended maximum level for ground vibration is 5 mm/sec (peak particle velocity (ppv).

2.2.2 The ppv level of 5 mm/sec may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 10 mm/sec at any time.

2.2.3 Experience has shown that for almost all sites a ppv of less than 1 mm/sec is generally achieved. It is recognised that it is not practicable to achieve a ppv of this level at all sites and hence a recommended maximum level of 5 mm/sec has been selected. However, it is recommended that a level of 2 mm/sec (ppv) be considered as the long term regulatory goal for the control of ground vibration.

2.3 Times and Frequency of Blasting

2.3.1 Blasting should generally only be permitted during the hours of 9.00 am - 5.00 pm Monday to Saturday. Blasting should not take place on Sundays or Public Holidays.

2.3.2 Blasting should generally take place no more than once per day. (This requirement would not apply to minor blasts such as for clearing crushers, feed chutes, etc).

2.3.3 The restrictions on times and frequency of blasting referred to in 2.3.1 and 2.3.2 do not apply to:

- those premises where the effects of the blasting are not perceived at noise sensitive sites; and
- major underground metalliferous mining operations.

2.4 Acceptable Variations

It is recognised that under some circumstances or at certain mines blasting that cannot comply with the criteria referred to in 2.1, 2.2 and 2.3 will have to be carried out. Environmental authorities should apply controls for such blasting with appropriate consideration to the circumstances applying.

3. DETERMINATION OF AIRBLAST OVERPRESSURE LEVEL AND PEAK PARTICLE VELOCITY

3.1 Instrumentation

3.1.1 An Australian Standard laying down specifications for blast monitoring instrumentation is in the process of being prepared. Until this document is published individual environmental authorities will assess and, where appropriate, approve monitoring procedures proposed to be used in their State/Territory.

3.1.2 The monitoring equipment should have been calibrated within two years prior to the date of any test.

3.2 Test Procedure

3.2.1 An Australian Standard laying down specifications for blast monitoring procedures is in the process of being prepared. Until this document is published individual environmental authorities will assess and, where appropriate, approve monitoring procedures proposed to be used in their State/Territory.

3.2.2 It is particularly important in respect of ground vibration measurement that the vibration transducer be coupled to the ground in an approved manner.

3.3 Measurement Location

3.3.1 Measurements should be taken within the grounds of, 'noise sensitive sites' (e.g. residences, hospitals, schools, etc). For the purposes of this document 'noise sensitive sites' includes the land within 30 metres of any building.

3.3.2 Airblast overpressure levels may be measured at any point on, 'noise sensitive sites' which is located at least 3.5m away from any building or structure.

3.3.3 Ground vibration levels may be measured at any point on 'noise sensitive sites' which is located at least the longest dimension of the foundations of a building or structure away from such building or structure.

4. WEATHER EFFECTS

4.1 When temperature inversion is known to exist blasting should be avoided, if practicable.

ANZEC TECHNICAL BASES RELATING TO NOISE

TITLE	DATE
Technical basis for regulations for the control of noise from new motor vehicles, other than motor vehicles, in Australia	May 1979
Technical basis for regulations for the control of noise from in-service trucks and buses in Australia	Feb 1980
Technical basis for the noise labelling of new air conditioners in Australia	Aug 1980
Technical basis for proposed noise control standard for lawnmowers and edgecutters	June 1981
A comparison of methods for measuring the noise of individual motor vehicles	Jan 1984
Technical basis for the regulation of noise-labelling of new air conditioners in Australia	July 1984
Technical basis for the regulation of noise-labelling of new pavement breakers and mobile air compressors in Australia	May 1985
Technical basis for the tonal adjustment of the measured sound pressure level of environmental noise	Aug 1986
Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration	Sept 1990

APPENDIX B

CONSULTATION WITH THE ENVIRONMENT PROTECTION AUTHORITY

DOC22/218775-2
28 March 2022

Simon Coates
Superintendent - Environment
Cowal Operations
LAKE COWAL NSW 2671

Via Major Projects Planning Portal

EPA Advice on Blast Management Plan

Dear Simon

Thank you for your request to review the blast management plan for the Cowal Operations at Lake Cowal.

The EPA encourages the development of such plans to ensure that proponents and licensees have determined how they will meet their statutory obligations and environmental objectives. However, the EPA does not approve or endorse these plans as our role is to set environmental objectives for environmental management, not to be involved in developing strategies such as this plan to achieve those objectives. We have no further comments on this plan.

It is recommended that you contact us directly should you identify any necessary changes to the premises' Environment Protection Licence that may result from the proposed management plan updates.

If you have any enquiries about this matter please contact Jason Price by telephoning 02 6969 0705 or by electronic mail at info@epa.nsw.gov.au

Yours sincerely

NICK FENELEY
Acting Unit Head
Regulatory Operations Regional
NSW Environment Protection Authority

Phone 131 555
Phone +61 2 9995 5555
(from outside NSW)

TTY 133 677
ABN 43 692 285 758

Locked Bag 5022
Parramatta
NSW 2124 Australia

4 Parramatta Square
12 Darcy St, Parramatta
NSW 2150 Australia

info@epa.nsw.gov.au
www.epa.nsw.gov.au