

# Blast Management Plan

**Risk Statement: High**

This document will be reviewed on a yearly basis, unless a process change occurs earlier than this period. The information in this document relates to management, monitoring and associated reporting required by Development Consent 11\_0060 and Mining Lease 1247, 1367, 1641 and 1743.

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## Revision Summary

First Issue	Issue Date	Implementation Requirements	Approved By
1	Feb 03	Document created	L O Larsen

Version No.	Revision Date	Summary of Revision Details	Approved By
2	May 14	Review and Updated by Bharath Ramakrishnappa – changes made to comply with Project Approval 11_0600	
3	Oct 15	Revised upon comments from DPI	
4	Oct 17	Annual Review	
5	31 Oct 18	Review and updated to new format, updated risk rating to “low” and minor amendments	
6	18 Feb 20	Updated to new DCS	M Row
7	30 May 2020	Annual review of document, update MOP reference and include open cut blasting recommencement in the next review period.	D Shaw
8	02 Sep 2020	Review by Department of Planning & Environment	
8.01	30 Jun 2021	Annual review	C Higgins
8.02	June 2022	Update post IEA and preparations for mining E31's Review by Department of Planning & Environment.	C Higgins
9	August 2022	Approved by Department of Planning & Environment	C Higgins
9.01	January 2024	Annual Review	C Higgins

Consultation Required	Public Copy Locations
EPA & DPE for technical and significant changes	Northparkes Website

Associated Documents to be Reviewed
Not Applicable

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## 1. OVERVIEW

### 1.1 Background

Northparkes Mining Services Pty Limited (Northparkes) is the manager of the Northparkes Joint Venture, an unincorporated joint venture between Evolution Mining (Northparkes) Pty Ltd (80%); Sumitomo Metal Mining Oceania Pty Ltd (13.3%) and SC Mineral Resources (6.7%). Northparkes is a copper-gold operation in Goonumbra, situated 27 kilometres north-west of the town of Parkes.

Construction of the ore processing plant and associated facilities began in 1993. Open cut mining commenced on the E22 and E27 ore bodies in late 1993. Development of the E26 lift 1 block cave underground mine began in 1994, with full scale production commencing in 1997.

### 1.2 Mining Context

Operations at Northparkes primarily comprises underground mining from multiple ore sources that feed a processing plant with a capacity of 8 million tonnes per annum (Mtpa). The majority of the ore is sourced from the underground mine which is accessed via a decline ramp from the surface for people and materials with ore transported to the surface via inclined conveyors and a hoisting shaft, with a nominal capacity of 7.2 Mtpa. Northparkes utilises low cost block and sub-level cave mining and exploits industry leading technology, such as semi-autonomous loaders and various cave monitoring systems.

Supplementary ore feed is able to be supplied from surface stockpiles and a range of open cut operations.

The ore processing operation consists of four stages: crushing, grinding, flotation and thickening / filtering. In addition to producing concentrate, the ore processing team also manages tailings disposal. The concentrator was constructed in two modules. Each module consists of its own grinding circuit with a single flotation circuit, concentrate thickener and filter. After extracting the copper and gold bearing minerals, the tailings are combined in a single tailings thickener before being deposited in the active tailings storage facility.

Northparkes' copper concentrate is transported to a rail siding at Goonumbra where it is then transported by rail to Port, for shipping to overseas customers.

### 1.3 Blast Management

This Blast Management Plan applies to all open cut and underground mining activities undertaken by Northparkes and describes the measures to be undertaken or implemented to manage impacts from blasting in the open cuts.

Open cut mining is approved for the campaign mining of 5 open cut resources including E26, E31, E31N, E28 and E28NE. Open cut mining has commenced in E31 and E31N.

The Blast Management Plan addresses the specific issues associated with the relevant components of schedule 3 conditions 6 – 13 of the Development Consent (DC11\_0060). These conditions are outlined in the table below.

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**Table 1:** Development Consent 11\_0060 conditions

Condition				Section in BMP
<b>Blasting Criteria</b>				
<b>Schedule 3</b>				
<b>6. The Proponent must ensure that blasting on site does not cause exceedances of criteria in Table below</b>				Section 5.2
<b>Location</b>	<b>Airblast Overpressure (dB(Lin Peak))</b>	<b>Ground Vibration (mm/s)</b>	<b>Allowable Exceedance</b>	
Residence on privately owned land	120	10	0%	
	115	5	5 % of the total number of blasts over a period of 12 months	
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%	
<p><b>Note:</b> To interpret the land referred to in Table 1 see the applicable figures in Appendix 4. However, these criteria do not apply if the Proponent has a written agreement with the relevant owner to exceed these criteria, and has advised Planning &amp; Infrastructure in writing of the terms of this agreement</p>				
<b>Blasting Hours</b>				
7.	The Proponent must only carry out surface blasting on site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary			Section 5.3
<b>Blasting Frequency</b>				
8.	The Proponent must only carry out 1 blast per day on site. This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or blasts required to ensure the safety of the mine or its workers. <b>Note:</b> 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.			Section 5.4
<b>Property Inspections</b>				
9.	<p>If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent must:</p> <p>a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:</p> <ul style="list-style-type: none"> <li>• establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report</li> <li>• identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures</li> </ul> <p>b) give the landowner a copy of the new or updated property inspection report</p> <p>If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.</p>			Section 5.6
<b>Property Investigations</b>				
10.	<p>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, then within 2 months of receiving this claim the Proponent must:</p> <ul style="list-style-type: none"> <li>• commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim</li> <li>• give the landowner a copy of the property investigation report</li> </ul> <p>If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent must repair the damage to the satisfaction of the Secretary.</p>			Section 5.6

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Condition	Section in BMP
If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.	
<b>Operating Conditions</b>	
11. The Proponent must: a) implement best management practice to: <ul style="list-style-type: none"> <li>• protect the safety of people and livestock in the surrounding area;</li> <li>• protect public or private infrastructure/property in the surrounding area from any damage</li> <li>• minimise the dust and fume emissions of any blasting</li> </ul> b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site, to the satisfaction of the Secretary.	Whole document
12. The Proponent must not undertake blasting on site within 500 metres of: a) any public road; b) any land outside the site not owned by the Proponent, unless the Proponent has: <ul style="list-style-type: none"> <li>• demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and</li> <li>• updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or</li> <li>• a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised Planning &amp; Infrastructure in writing of the terms of this agreement</li> </ul>	Section 5.5
<b>Blast Management Plan</b>	
13. The Proponent must prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must: a) be prepared in consultation with the EPA, and submitted to the Secretary for approval prior to conducting any blasting on site; b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval; c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this approval	Whole document
13A. The Proponent must implement the Blast Management Plan as approved by the Secretary.	
<b>Schedule 5</b>	
1. Within 1 month of this approval, the Proponent must: a) Notify in writing the owners of: <ul style="list-style-type: none"> <li>• Any privately-owned land within 2 kilometres of the approved open cut mining pits that they are entitled to ask for an inspection to establish baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated;</li> </ul>	Section 5.6

## 2. SCOPE

This document applies to all activities undertaken by Northparkes related to open cut and underground blasting.

## 3. OBJECTIVES

The objectives of the Blast Management Plan (BMP) are to:

- ensure that vibration and overpressure impacts from blasting activities are minimised and appropriately controlled
- ensure that impacts on surrounding residents are minimised
- keep the local community and regulators informed of activities where required and respond quickly and effectively to issues or complaints; protect the safety of people and livestock in the surrounding area

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- protect public or private infrastructure/property in the surrounding area from any damage and
- minimise the dust and fume emissions of any blasting.

## 4. RESPONSIBILITIES

General role responsibilities are outlined in the Health, Safety and Environment Responsibilities and Accountabilities Procedure (PRO-0080). Personnel carrying out work under this document must be familiar with and comply with it in full. The following persons have specific responsibility:

**Table 2:** Responsibilities

Role	Responsibility
All workers	<ul style="list-style-type: none"> <li>– have a duty of care to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other persons</li> <li>– are responsible for identifying hazards with this document and initiating management of change to correct those deficiencies</li> <li>– are responsible for complying with all associated processes, procedures and instructions that support this document</li> </ul>
Team Leaders	<ul style="list-style-type: none"> <li>– ensure relevant employees and contractors under their direction are trained and comply with this Management Plan</li> </ul>
Environment Team	<ul style="list-style-type: none"> <li>– maintain and co-ordinate reporting for the monitoring program</li> <li>– maintain equipment through appropriate Australian Standard</li> <li>– investigate potential exceedances of licences criteria and regulatory approvals</li> <li>– provide advice on effective and efficient blast management controls</li> <li>– communicate blast noise monitoring results at relevant community forums</li> </ul>
Environment and Farms Superintendent	<ul style="list-style-type: none"> <li>– report against performance criteria in the Annual Review</li> <li>– report complaints and outcomes of investigations in the Annual Review</li> <li>– manage activities on site in accordance with this management plan</li> </ul>
Manager Operations	<ul style="list-style-type: none"> <li>– ensure blast program is in accordance with blast design</li> </ul>
Manger – Technical Services	<ul style="list-style-type: none"> <li>– ensure blast design is implemented</li> </ul>
Department Managers	<ul style="list-style-type: none"> <li>– ensure relevant personnel and contractors within their responsibility are aware of and comply with this Management Plan</li> <li>– monitor the implementation and use of this Management Plan in their department and implement corrective action for any deviations found</li> </ul>
PSE Manager	<ul style="list-style-type: none"> <li>– ensure that the system and this Management Plan are consistent with company Standards, the site HSEQMS and meets the requirements of relevant legal obligations</li> </ul>
Managing Director	<ul style="list-style-type: none"> <li>– be familiar with and comply with this Management Plan</li> <li>– assess blast requirements</li> </ul>

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## 5. KEY ISSUES

### 5.1 Blast Impacts

Potential blast impacts to surrounding receivers is from ground vibrations and air blast overpressure from blasting in open cut mining operations.

Monitoring conducted during the mining of the E22 open cut from 2008 to 2012 indicated that no air blasts exceeded the maximum 120 linear decibels or the 5mm/s vibration criteria.

Blasts are designed to maximumise efficiency in terms of explosives used. Emissions are minimised when efficiency is maximised. The blasting contractor shall record the blast parameters for each blast and include the location co-ordinates (East, North, RL) of the blast site and the Maximum Instantaneous Charge (MIC).

Previous monitoring has established that current and future underground blasts would be unlikely to be detected at any of the four surrounding residences. Underground monitoring of vibration continues to occur, primarily for monitoring if blast timing occurs to design. If vibration is felt at any residences, this data can be used to determine if the source is mine related.

### 5.2 Blast Impacts Criteria

The assessment criteria for blast impacts at Northparkes are based on the ANZECC Guideline "Technical Basis for Guidelines to minimise annoyance due to Blasting Overpressure and Ground Vibration" (ANZECC 1990). These guidelines are based on human comfort levels and are much more stringent than those based on the potential for damage to structures. Table 2 below shows the blast impact criteria as set out in the DC11\_0060.

**Table 3:** Blasting criteria

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately owned land	120	10	0%
	115	5	5 % of the total number of blasts over a period of 12 months
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%

However, these criteria do not apply if the Proponent has a written agreement with the relevant owner to exceed these criteria, and has advised the Department in writing of the terms of this agreement.

### 5.3 Blasting Hours

Northparkes must only carry out surface blasting on site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

### 5.4 Proposed Frequency

Blasting practices will be consistent with blasting activities associated with previous open cut mining at Northparkes. Accordingly, it is proposed that the frequency of onsite blasting will be typically one blast per day, multiple days per week. This does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or blasts required to ensure the safety of the mine or its workers.



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## 5.5 Blasting Adjacent Roads

Where blasting operations are undertaken within 500m of a public road, the following blast management practices will be implemented in consultation with the Parkes Shire Council (PSC).

### 5.5.1 Temporary Road Closures

Prior to undertaking any blasting within 500m of a public road, Northparkes will have a written agreement with the PSC which would include the temporary closure of affected parts of the roads. Public roads would temporarily be closed whenever blasting was undertaken within 500m as a precautionary measure for public safety. These closures would be typically less than 15 minutes to minimise interference with traffic flow along the road. Consultation will also be undertaken with the local community to work around times such as school bus times and harvest operations, which see peak road usage for short periods of time. All traffic control and controllers will be Roads and Maritime Services (RMS) and or PSC approved.

### 5.5.2 Notification of Road Closures

The notification of blast related road closures would be done in consultation with the PSC. Notifications of road closures would be undertaken via the current community notifications that are in place or the systems in place at the time of blasting. These may include text messages and updates at neighbours' meetings.

Hard barrier notifications that would be implemented will include signage along the affected roads which notify of current or weekly proposed blasting times to give advance notice to road users. On the day of blasting signage will be placed out as part of the road closure notifying of blasting times and expected delays.

### 5.5.3 Flyrock Removal and Road Maintenance

After blasting, the roads will be visually inspected and cleared of any flyrock if necessary prior to being reopened to public traffic.

Road maintenance or repair works that may be required due to any blast activities will be completed in consultation with the PSC and using contractors or PSC equipment as required.

## 5.6 Property Inspections/Property Investigations

### 5.6.1 Inspections

Northparkes has a proactive approach with the community which includes bi-annual neighbour meetings and text message notifications for predicted disturbances. Northparkes will write to neighbours with property within the 2km radius of any proposed blasting to notify them of these conditions and their entitlement to undertake pre-blasting inspections.

If Northparkes receives a written request from any neighbour within the 2km radius for a property inspection Northparkes will within 2 months:

- a) Commission a suitable qualified, experienced and independent person, whose appointment is acceptable to both parties to:
  - Establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report, and;
  - Identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or other structures; and;
- b) Give the neighbour a copy of the new or updated property inspection report.

### 5.6.2 Investigations

If a claim is made by any neighbour that buildings and/or structures have been damaged on their property as a result of blasting on the site, Northparkes will within 2 months:

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- a) Commission a suitable qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim, and;
- b) Give the neighbour a copy of the investigation report.

## 5.7 Risk Assessments

Multiple surface blasting techniques may be utilised at Northparkes during the development and mining of open pits. Risk assessments for various blasting techniques will be undertaken before works commence.

Northparkes will investigate opportunities to refine blast designs to ensure compliance with all relevant air blast impact assessment criteria.

## 5.8 Non-compliance and Exemptions

If there is an exceedance of the blast criteria shown in Table 3, Northparkes will investigate and notify the Secretary of the incident as soon as practicable after the incident.

Within 7 days of the date of the incident, Northparkes is to provide the Secretary with a detailed report on the incident.

## 6. MONITORING

The blast monitoring program will be implemented using blast units which measure ground vibration and air overpressure at the residences on the four closest privately owned properties. The program is designed to measure the effectiveness of control measures and ensure compliance with consent and licence conditions, relevant standards and corporate requirements.

All over pressure and vibration monitoring instrumentation employed shall be designed to comply with the requirements of AS 2187.2-2006 and carry current NATA (or similar) or manufacturer calibration certificates. All instrumentation should be programmed to record continuously overpressure (dBL) and vibration (mm/s) over the period of the open cut program.

Monitoring is undertaken in accordance with the following procedures:

- Measuring and Monitoring Procedure (PRO-0150)
- Environmental Monitoring and Measuring Schedule (REG-0008)
- Work Instruction Blast and Vibration Monitoring (WKI-0179)

Results of the monitoring program are communicated to relevant personnel and external stakeholders, where required. The monitoring results are used to:

- verify compliance with legal and other requirements
- review and verify impacts to the environment and
- alert personnel of the need to modify operations accordingly.

The locations for blast monitoring required under DC11\_0060 are outlined in Table 4 below. An additional vibration monitor has been located between E31N and Rosedale TSF as part of the Northparkes-4 conditions from Dam Safety NSW.

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**Table 4:** Blast monitoring locations

Location Name	Easting	Northing	Monitoring
			Real Time 24/7
Hubberstone	600753	6360891	Yes
Adavale	593866	6357095	Yes
Milpose	595120	6352783	Yes
Hillview	603066	6353353	Yes

## 7. CHECKING AND CORRECTIVE ACTIONS

### 7.1 Non-Conformance, Corrective and Preventative Action

Non-compliances may be identified by a range of mechanisms including:

- Review of monitoring results and trigger exceedances
- Complaints
- Site inspections
- Audits; and
- Incident reports.

Incidents and near misses at Northparkes are reported internally through the RMSS system.

Incident investigations and corrective actions are conducted and authorised by designated personnel. The degree of involvement of the environmental function depends on the nature and scale of the incident.

Environmental incidents contain corrective or preventative actions prior to close out of the incident within RMSS.

Any non-compliance against Northparkes operating licence conditions is reported internally and externally. Incident reporting will be in accordance with Condition 7, Schedule 6 of Development Consent (DC11\_0060). Non-compliance incidents that are reportable to government departments are also reported to the company and Joint Venture partners as they may have the potential to impact upon the business.

The frequency and severity of incidents and non-conformances are used in the Management Review process for determining the effectiveness of the HSEMS.

### 7.2 Adaptive Management

The People, Safety and Environment Manager (or delegate) will review all environmental monitoring results on a regular basis to ensure compliance with all statutory, legislative and approval requirements (project approval, development consents, EPL, mining approvals), and to identify where results or trends indicate a risk of future non-compliance to the development consent criteria or other approval conditions.

Northparkes will assess and manage all project-related risks to ensure that there are no exceedances of the criteria as mentioned in Schedules 3 & 4 of the Development Consent. Should environmental monitoring show that the relevant criteria or threshold has been exceeded, the company will conduct an investigation into the potential sources and/or causes. The investigation will consider any plant operation or other factors that may have resulted in the exceedance. If the company is responsible for the exceedance further actions will be taken to address the matter.

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If the results of environmental monitoring identify that impacts generated by the project are greater than the relevant impact assessment criteria, except where a negotiated agreement has been entered into in relation to that impact, then Northparkes shall, within one week of obtaining the monitoring results, notify the Secretary, the affected landowners and tenants (including tenants of mine owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria.

A report on the exceedance will be provided to the DPI&E or other relevant agency (such as EPA). The report will:

- a) describe the date, time and nature of the exceedance/incident;
- b) identify the cause (or likely cause) of the exceedance/incident;
- c) describe what action has been taken to date; and
- d) describe the proposed measures to address the exceedance/incident.

### 7.3 Implementing Corrective Actions

Corrective and preventative actions will be implemented through the development of an action plan. The plan will provide details on the action required, time frame and responsibilities for completing the action. The implementation of the corrective and preventative actions will be reviewed internally and specific procedures developed for addressing non-conformances with the EMS or subordinate plans and strategies.

## 8. COMPLAINTS

The Stakeholder Communications Management Plan (PLN-0040) and the Community Complaint Notification Form (FRM-0152) specify Northparkes management of and response to complaints.

In accordance with the requirements of EPL 4784, Northparkes must keep a record of any complaint made to Northparkes or any employee or agent of Northparkes in relation to pollution arising from any Northparkes activities. The record of complaint must be kept for at least four years and must include the following details:

- 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 Northparkes in relation to the complaint, including any follow up contact with the complainant.
- If no action was taken by Northparkes, the reasons why no action was taken.

## 9. REPORTING

Open Cut Blast monitoring results will be set up in the environmental database system where notifications will be received when nearing the blasting criteria.

As a minimum, blast monitoring records to be kept should include the following:

- the size of the blast in terms of the number of blast holes and the quantity of explosives
- the method of initiation and the timing sequence to be used in the blast
- the date and time of the blast
- the location of the monitoring equipment
- Instrument trigger levels
- measurement equipment and operator details
- the location of the blast

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- the location of any structures and/or persons who may be affected by the blast
- the measured ground vibration and airblast values including the peak particle velocity values and the peak airblast levels
- weather conditions, especially wind speed, cloud cover and direction and any other notable conditions such as rain
- any subjective information from the shottirer and any persons who may be affected by the blast

The results of the monitoring program and any complaints received are communicated to relevant personnel and externally through the Annual Review, which is uploaded onto the website.

## 10. REVIEW AND CONTINUOUS IMPROVEMENT

The Blast Management Plan will be reviewed and updated on a yearly basis or in the case of a significant operational change. The review will include an assessment of the effectiveness of control measures and performance against the Plan's objectives.

The objectives of a review are:

- to maintain compliance with statutory requirements
- to identify opportunities for improvement in the management plan
- incorporate community considerations

The review will include:

- this Document
- Legislation, Approval, License changes
- changes pending in the mine plan, new mining methods or new ore bodies
- community complaints and enquiries.

## 11. REFERENCE MATERIALS

Reference materials should assist with understanding the hazard or determining how the hazard should be managed. Table 5 contains a list of reference materials, which may include items such as:

- design principles
- engineering and/or technical standards
- legislation (including Codes of Practice, Australian Standards, etc.)
- original equipment manufacturer materials
- external alerts and/or notices received from government officials

**Note:** any internal documents referred to in this document, should be referenced within the document.

**Table 5:** Reference Materials

Document Title
Annual Review
Northparkes Development Consent 11_0600
Environmental Assessment Northparkes – Step Change Project (2013)
Corkery, R.W. (2006) Environmental Assessment Northparkes – E48 Project
Heggies Pty Ltd, 2006. Northparkes – E48 Project Noise and Blasting Assessment