



**AUSTRALIAN
ZIRCONIA LTD**

(A wholly owned subsidiary of Alkane Resources Ltd)

ABN 51 091 489 511

Dubbo Zirconia Project

Blast Management Plan



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TABLE OF REVISIONS

Revision Number	Revision Date	Prepared By	Approved by	Comments
1.0	3/9/2015	A. Irwin (RWC)	N. Earner (AZL)	For Stage 1 – Construction (EPL Application)
2.0	21/3/2016	A. Irwin (RWC)	M. Sutherland (AZL)	Submitted for Secretary's approval following EPL 20702
2.1	26/8/2016	A. Irwin (RWC)	N. Earner (AZL)	Resubmitted for Secretary's approval
2.1	6/10/2016	A. Irwin (RWC)	C. Preshaw (DPE)	Approved following minor revisions - refer to Appendix 4



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R.W. CORKERY & CO. PTY. LIMITED

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FOREWORD

This Blast Management Plan (“the Plan”) for the Dubbo Zirconia Project (DZP) has been prepared by R.W. Corkery & Co. Pty. Limited (RWC) on behalf of Australian Zirconia Limited (AZL), a subsidiary of Alkane Resources Ltd (Alkane). The DZP, approved as SSD-5251 by the NSW Planning Assessment Commission (PAC) on 28 May 2015, comprises a small scale open cut mine supplying ore containing rare metals (zirconium, niobium, hafnium and tantalum) and rare earth elements (REEs) to a processing plant near the village of Toongi, approximately 25km south of Dubbo. Waste residues produced by the processing operations will be managed in residue storage facilities, designed to contained and encapsulate these residues.

The DZP also includes the construction of a water pipeline between the processing plant and the Macquarie River, a pipeline to carry natural gas between Dubbo and the DZP Site, and the upgrades of the following linear infrastructure;

- *Toongi Road;*
- *Obley Road; and*
- *the Toongi-Dubbo section of the currently disused Dubbo-Molong Rail Line.*

Collectively, these are referred to as the DZP linear infrastructure.



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1. SCOPE

The Dubbo Zirconia Project (DZP) Blast Management Plan (“the Plan”) has been prepared as a tool to give consideration to and to manage blasting during the construction and operation of the DZP. It will be used by Australian Zirconia Limited (AZL) personnel as the first point of reference for blast-related issues.

This plan synthesises the recommendations made during the preparation of an Environmental Impact Statement (EIS) for the DZP, and subsequent assessment and approval of SSD-5251. It is a practical guide for management of blasting on site.

Blasting will be undertaken in two stages, to reflect the initial construction activities on the DZP Site (Stage 1), and ongoing construction and operations following commencement of mining operations (Stage 2).

Stage 1: Construction

- The DZP Processing Plant Area.
- A basalt quarry¹ in the footprint of the Waste Rock Emplacement Area.

Stage 2: Operations

- The open cut extraction area.

The specific locations of blasting with respect to other activities on the DZP Site (as defined by Mining Lease 1724) and the local setting are identified on **Figure 1**.

This document has been prepared for the management of blasting during both stages, however will be reviewed and updated as required following the completion of construction and commencement of operations.

2. CONSULTATION

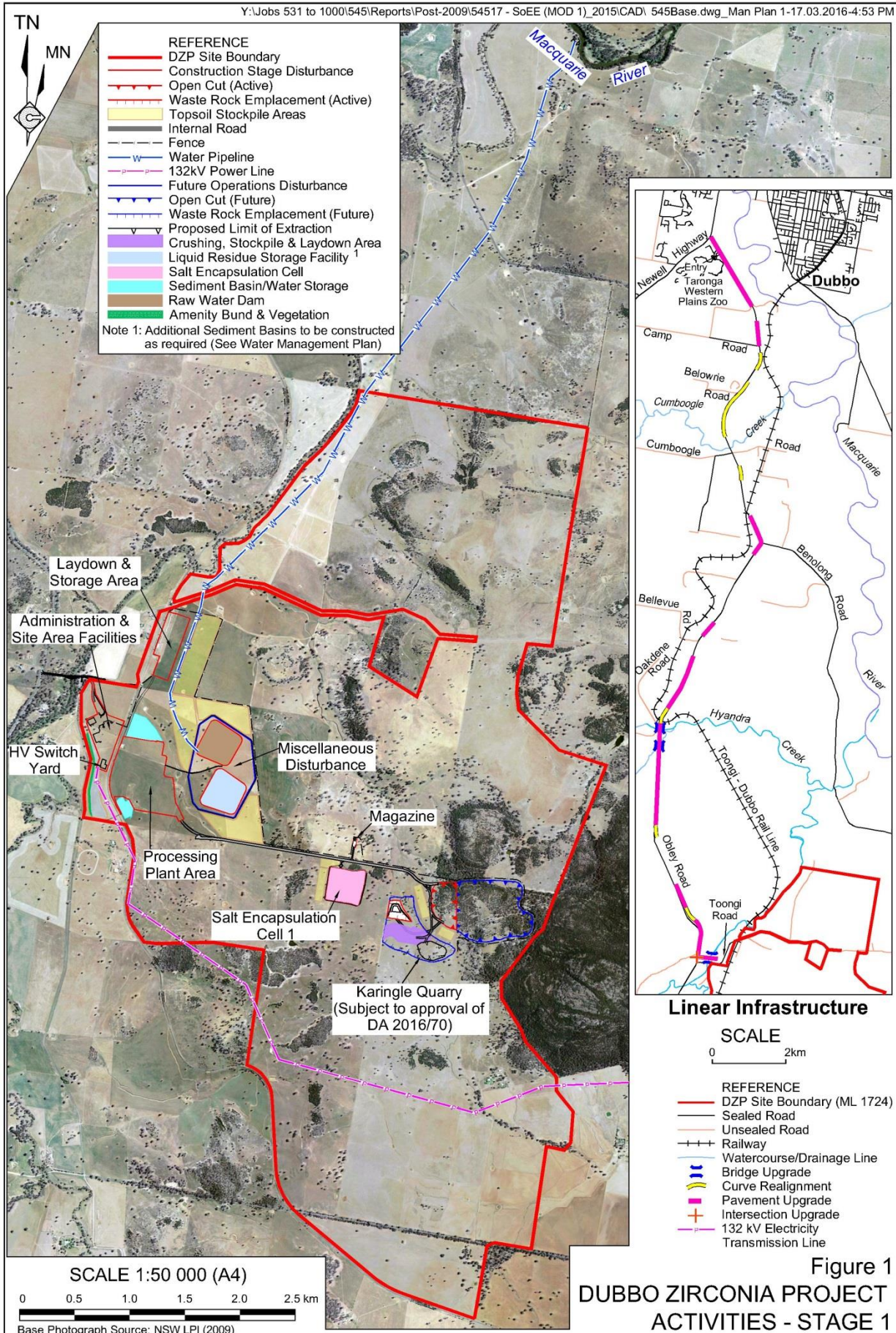
2.1 GOVERNMENT CONSULTATION

NSW Environment Protection Authority

Condition 16(a) of Schedule 3 of SSD-5251 requires the NSW Environment Protection Authority (EPA) be consulted in the preparation of the Plan.

A meeting between AZL (Mr Mike Sutherland, General Manager) and the EPA (Mr Bradley Tanswell, Acting Head Far West Operations) was held on 29 May 2015. The objective of this meeting, also attended by RWC (Mr Alex Irwin, Senior Environmental Consultant), was to confirm the EPA’s requirements for various management plans and discuss the application for Environmental Protection Licence (EPL) generally.

¹ Approved as ‘Karingle Quarry’ by the Joint Regional Planning Panel (D2105-70)



At the 29 May 2015 meeting, it was confirmed that a blast management identifying noise and ground vibration criteria, management measures and a monitoring program for compliance assessment should be prepared.

A copy of the Blast Management Plan was submitted to the EPA on 9 September 2015 for review. The EPA responded on 30 October 2015 declining to comment on the document.

Dubbo City Council

On 7 July 2015, AZL (Mr Mike Sutherland and Mr Nic Earner, Chief Operations Officer) met with representatives of Dubbo City Council ("Council") to discuss progress and likely scheduling of tasks associated with the DZP. The concept for one or more small basalt quarries, of scale below the designated development threshold of the EP&A Act, was also raised with Council. Blasting would be required for the extraction of basalt, however, the size and frequency of blasts would be of smaller scale than proposed and approved for the open cut of the DZP. Council raised no initial objections to this proposal, with a development application to be assessed on merit once received.

Council requested that the Front End Engineering Design (FEED) drawings of road upgrades and other infrastructure prepared by Hatch be forwarded to Steve Clayton at Council for consideration and comment.

2.2 COMMUNITY CONSULTATION

2.2.1 Property Inspections and Investigations

On receipt of written request from an owner of privately-owned land within 2km of planned blasting activities, AZL will commission a property inspection to establish the existing condition of any buildings or structures on the property. The inspection will be completed prior to the commencement of blasting. A report will be prepared (within 2 months) which will identify whether specific measures may be required to protect against damage to these structures by air blast overpressure or ground vibration. A copy of the report will be provided to the land owner.

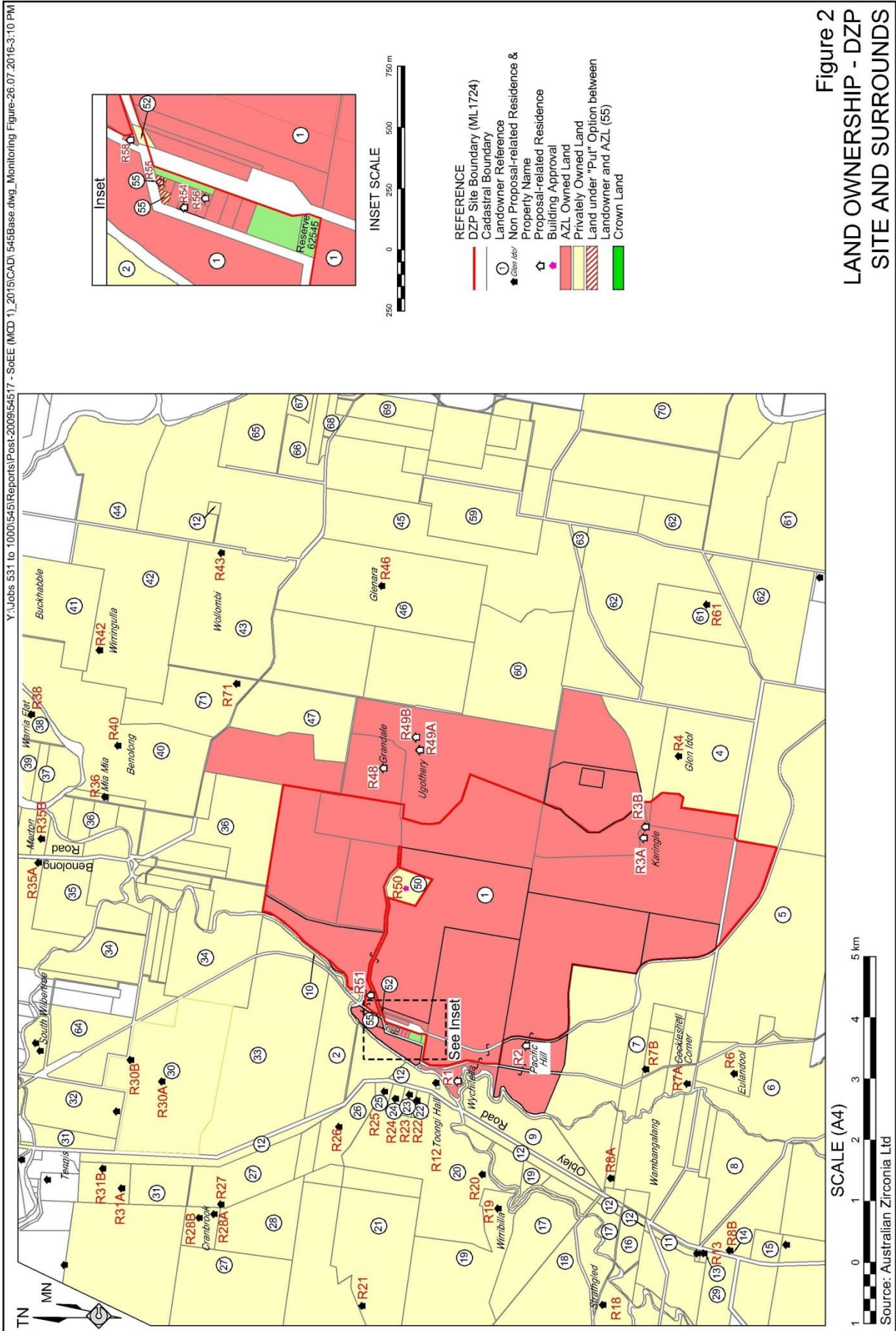
Figure 2 identifies the properties which occur within 2km of possible blasting activities. No requests have yet been received for property inspection.

2.2.2 Ongoing Consultation

A Community Consultative Community (CCC) was established in November 2015 and provides a forum for open discussion between AZL, the community, Council and other stakeholders on issues directly relating to the mine's operations, environmental performance and community relations, and to keep the community informed on these matters.

The representatives of the CCC comprise an independent chair, AZL representative(s), community, Council and Aboriginal community representatives. The contact details of the CCC representatives are published (with the permission of each) on Alkane's website such that each may be contacted to present concerns of others in the community. The CCC meets quarterly (the first meeting being 14 November 2015) and provides an opportunity for issues of concern related to management of air quality to be raised and solutions identified and discussed.





AZL will continue to publish a community newsletter that will inform the local community of relevant developments which may impact on the local air quality environment. AZL has and will continue to operate an open door policy to those wishing to raise and discuss issues of concern.

AZL publishes a community newsletter on an approximately quarterly basis and distributes this to neighbouring property owners and others who have requested regular updates of the DZP. The community newsletter, which is also maintained on Alkane's website, inform the local community of relevant developments which may impact on the local environment. AZL has and will continue to operate an open door policy to those wishing to raise and discuss issues of concern.

3. LEGAL AND OTHER REGULATORY REQUIREMENTS

3.1 DEVELOPMENT CONSENT SSD-5251

The DZP is State Significant Development and an Environmental Impact Statement (RWC, 2013) was completed in accordance with Schedule 2, Part 3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to assess the environmental impacts (including blasting) of the DZP.

Development Consent SSD-5251 was granted by the NSW Planning Assessment Commission (PAC) on 28 May 2015, with *Condition 16* (of Schedule 3) requiring the preparation of a Blast Management Plan. More general requirements for the preparation of management plans are also provided by *Condition 3* of Schedule 5. **Table 1** identifies the conditional requirements of both conditions and identified where in the Plan individual requirements have been addressed.

Table 1
Conditional Requirements of SSD-5251 for a Blast Management Plan

Page 1 of 2

Condition	Section
Schedule 3	
16. The Applicant shall prepare and implement a Blast Management Plan for the development 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 any development under this consent, unless the Secretary agrees otherwise;	2.1
(b) describe the measures that would be implemented to ensure compliance with the blasting criteria and operating conditions of this consent;	8 & 10
(c) propose and justify any alternative ground vibration limits for any public infrastructure or other structures in the vicinity of the site (if relevant); and	8.4
(d) include a monitoring program for evaluating the performance of the development, including:	9
<ul style="list-style-type: none"> • compliance with the applicable criteria; and • minimising the fume emissions from the site. 	



Table 1 (Cont'd)
Conditional Requirements of SSD-5251 for a Blast Management Plan

Condition	Section
Schedule 5	
3. The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
(a) detailed baseline data;	5
(b) a description of:	
• the relevant statutory requirements (including any relevant approval, licence or lease conditions);	3
• any relevant limits or performance measures/criteria;	6
• the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	
(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	8 & 10
(d) a program to monitor and report on the:	9
• impacts and environmental performance of the development;	
• effectiveness of any management measures (see c above);	
(e) a contingency plan to manage any unpredicted impacts and their consequences;	10.3
(f) a program to investigate and implement ways to improve the environmental performance of the development over time;	14.3
(g) a protocol for managing and reporting any:	
• incidents;	12
• complaints;	11
• non-compliances with statutory requirements; and	12.2.2
• exceedances of the impact assessment criteria and/or performance criteria; and	12.2.2
(h) a protocol for periodic review of the plan.	14.3

3.2 ENVIRONMENT PROTECTION LICENCE (POEO ACT)

This version of the Plan supports an application for an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act). It is anticipated the licence will provide for standard conditions which place limits on air blast overpressure and ground vibration, and restrictions on the number and hours between which blasts may be initiated. These limits are reflected in Section 5.

4. OBJECTIVES AND OUTCOMES

Table 2 details the objectives and outcomes with respect to blast management of the DZP.

Table 2
Objectives and Outcomes

Objectives	Outcomes
(a) To manage all community concerns in a timely and effective manner.	(i) Community concerns (if any) recorded and responded to in an appropriate manner.
(b) Establish a blast monitoring system to assess the blast and vibration impact on surrounding receivers.	(ii) Appropriate monitoring undertaken in accordance with the Plan.
(c) To maintain blast air blast overpressure and ground vibration levels below the criteria of SSD-5251, Environmental Protection Licence and within reasonable community expectations.	(iii) Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
(d) To implement an appropriate complaints handling and response protocol.	(iv) Complaints (if any) handled and responded to in an appropriate manner. (v) All complaints recorded and reported in accordance with annual reporting requirements.
(e) To implement appropriate corrective and preventative actions, if required.	(vi) Corrective and preventative actions implemented, if required.
(f) To implement an appropriate incident reporting program, if required.	(vii) Incidents (if any) reported in an appropriate manner.

5. LOCAL SETTING

5.1 CLIMATIC CONDITIONS

The climatic conditions of the DZP Site are presented in *Section 4.1.3* of RWC (2013). A summary of the climatic conditions is presented in this subsection.

Temperature and Humidity

January is typically the warmest month of the year with a mean daily maximum temperature of 33.4°C and mean daily minimum temperature of 18.2°C. The coolest month of the year is typically July with the lowest mean daily maximum temperature of 15.4°C and minimum mean minimum temperature of 3.1°C.

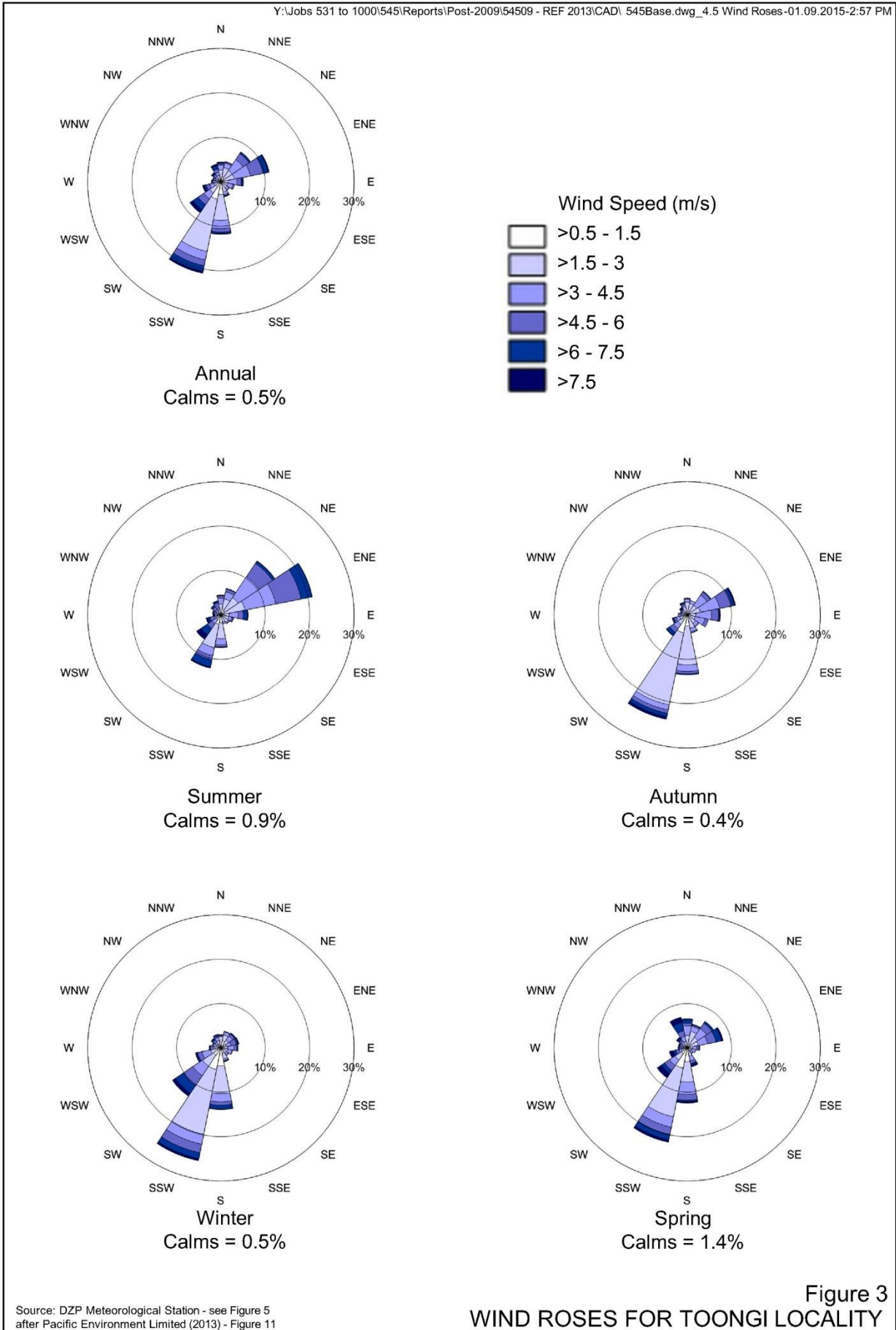
The highest humidity is experienced in June, and the least humid month is December.

Rainfall

On average, 647.3mm of rain is recorded each year, with that rainfall spread relatively evenly throughout the year. January is typically the wettest month (66.4mm) and September is the driest month (42.7mm).

Wind Speed and Direction

Wind distribution patterns at the DZP Site are dominated by winds from the south-southwest in autumn, winter and spring, with northeasterly winds dominating in summer. **Figure 3** presents the wind roses from 2008, selected as a year representative of the prevailing annual conditions of the local setting.



5.2 AMBIENT (BACKGROUND) CONDITIONS

5.2.1 Noise

The ambient (background) noise levels surrounding the DZP Site are described in detail in *Section 4.2.2* of the EIS (RWC, 2013). In summary, the ambient noise levels are influenced by the following sources.

- Traffic on local roads, particularly Obley Road. Traffic on the Newell Highway is also a significant contributor to ambient noise levels at the northern end of Obley Road and the Zoo.
- Rural noises such as agricultural equipment, stock, birds and insects.
- Wind generated noises such as wind in trees.

In order to characterise the local variation in noise levels, EMM (2013) undertook a review of a noise monitoring program previously undertaken by Richard Heggie & Associates Pty Ltd in 2001. Based on the noise monitoring programs, and in accordance with the requirements of the NSW Industrial Noise Policy, noise levels remained below 30dB(A) for greater than 90% of the time (L_{A90} noise level). This is indicative of a typically quiet rural setting.

5.2.2 Vibration

There are no sources of significant ground vibration in the local setting.

5.3 LOCAL LAND OWNERSHIP AND RESIDENCES

The land ownership within and surrounding the DZP Site is presented in **Figure 2**.

AZL owns 12 homesteads and cottages within and surrounding the DZP Site (R1, R2, R3A, R3B, R48, R49A, R49B, R51, R54, R55, R56 (derelict) and R58). Only R3A, R3B and R51 are within the DZP Site. All residences within the village of Toongi are either owned, or under contract for purchase by AZL.

The closest residential receivers to the DZP Site, not owned by or under contract to AZL, are the four houses on smaller lifestyle blocks to the west of Obley Road (approximately 600m to 1000m from the entrance to the DZP Site). Other notable receivers surrounding the DZP Site include the Toongi Hall (R12), approximately 600m to the southwest of the DZP Site entrance and 800m west of the processing plant, "Glen Idol" Homestead (R4) approximately 1 000m from the open cut, the cottage of "Cockleshell Corner" (R7B) approximately 2 400m from the processing plant and the Wambangalang Environmental Education Centre (R13), approximately 4.8km to the southwest of the processing plant.

As identified on **Figure 2**, 11 properties (not owned by AZL) are located within 2km of planned blasting activities. The owners of these properties are entitled to a property inspection prior to the commencement of blasting activities (see Section 2.2.1).

6. BLASTING CRITERIA AND LIMITS

6.1 BLASTING CRITERIA

In accordance with *Condition 9* of Schedule 3 of SSD-5251, the criteria for all on-site blasting activities are presented in **Table 3**.

Table 3
Blasting Criteria

Location	Air Blast 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 other public infrastructure	-	50	0%

It is noted the criteria of **Table 3** do not apply if the AZL has a written agreement with the owner of a residence for alternative criteria. Currently, no such agreements are held, with the Department of Planning and Environment to be advised in writing of the terms of any agreement, as negotiated.

6.2 OTHER LIMITS

6.2.1 Hours of Operation

AZL will only carry out blasting on site between 9am and 5pm Monday to Saturday. No blasting is allowed on Sundays, public holidays or at any other time without the written approval of the Secretary of the Department of Planning and Environment.

6.2.2 Blasting Frequency

Will carry out a maximum of:

- two blasts a day; and
- five blasts a week, averaged over a calendar year.

6.2.3 Location of Blasting

Without written agreement from the roads authority or land owner, AZL will not undertake blasting within 500m of a public road or land no owned or under contract for purchase by AZL. Of the public roads surrounding the DZP Site, Toongi Road and The Springs Road (for which Dubbo City Council is the road authority) may fall within 500m of blasting (if required for site preparatory activities of the Processing Plant Site). Eulandool Road, Obley Road and Bennelong Roads are all in excess of 1km from blasting activity.

If blasting at proximity of less than 500m from Toongi or The Springs Road is required, AZL will:

- obtain written agreement from the roads authority (Dubbo City Council) or land owner for the initiation of blasting;
- advise DPE in writing as to terms of this agreement;
- demonstrate to the satisfaction of the Secretary (of DPE) that the blasting will not compromise the safety of people of livestock , or damage buildings or structures; and
- update this Plan with the terms of any agreement and specific measures to be implemented to minimise impacts.

7. RISK ASSESSMENT

The management of blasting activities has considered the risk of impact to the surrounding environment associated with these activities. **Table 4** provides the results of a risk assessment completed to assess the likelihood and consequence of blasting related impacts, firstly with no management measures considered, and then again on consideration of the management measures included in the Plan.

The controls referenced are further discussed and described in Section 7.

8. OPERATIONAL MANAGEMENT

8.1 INTRODUCTION

AZL operates in accordance with a “safety first” principle. This principle aims to protect personnel on site, as well as external mine site stakeholders and members of the public.

The mitigation measures outlined in the following subsections have been derived from the risk assessment presented in Section 6 in accordance with this principle.

8.2 BLAST NOTIFICATION SYSTEMS

A site blast notification board will be in place to inform all site personnel of blast activity on site. Blast notifications include blast time, location and contact information and will be the responsibility of the blast supervisor and/or the shot firer.

A blast notification board, nominating the blast time, location and contact information, will also be provided for the community at the following location.

- On the Toongi Road approach to the DZP Site.

Unless required for safety management reasons, blast notifications will be issued 24 hours prior to any blast.



**Table 4
Review of Risks Associated with Blasting Operations**

Hazard Type	Likelihood	Consequence	Risk Rating	Controls	Likelihood	Consequence	Risk Rating
Air blast overpressure affecting nearby residents or affecting livestock	Unlikely	Major	Medium	DZP Blast Management Plan. Weather forecast monitoring. Noise monitoring. Community Liaison. Blast design standards.	Rare	Moderate	Medium
Ground vibration exceeding limits at nearby residences or affecting livestock	Unlikely	Major	Medium	DZP Blast Management Plan. Weather forecast monitoring. Noise monitoring. Community involvement. Blast design standards.	Rare	Minor	Low
Dust impact on nearby residents and livestock	Unlikely	Major	Medium	DZP Blast Management Plan. Weather forecast monitoring. Dust monitoring. Community involvement.	Rare	Minor	Low
Fume impact on nearby residents and livestock	Unlikely	Major	Medium	DZP Blast Management Plan. Weather forecast monitoring. Visual monitoring for fumes. Community involvement.	Rare	Minor	Low
Fly rock received at nearby residences, public roads or affecting livestock	Unlikely	Major	Medium	DZP Blast Management Plan. Exclusion zones. Quality Stemming Systems. Controlled exclusion zones. Blast guards/Sentries. Warning signs and notifications.	Rare	Moderate	Medium
Theft, un- authorised access to Explosives and SSDS	Unlikely	Major	Medium	DZP Blast Management Plan. Security Plan. Licenced Authorisations. Secured licenced Storage.	Rare	Major	Medium



8.3 PUBLIC INFRASTRUCTURE OR STRUCTURES

The only public infrastructure or structure that could conceivably be affected by ground vibration from blasting is the Dubbo-Molong Rail Line. This infrastructure is currently not in use.

Should re-opening of the rail line occur, to service the DZP, AZL will provide for inspection by a suitably qualified engineer such that any necessary alternative ground vibration limits for public infrastructure or structures surrounding the DZP are suitably proposed and justified. AZL will subsequently provide for an annual inspection of the rail line to confirm the structural stability of the infrastructure and suitability of alternative criteria established.

In the event that this alternative ground vibration limit is exceeded, the rail line will be inspected immediately by DZP staff. Transport for NSW and the EPA will be notified immediately and arrangements will be made to have the infrastructure or structure inspected by an engineer within 48 hours.

8.4 BLAST AREA SECURITY

Adequately located Blast Guards/Sentries will be located in designated positions to restrict all access. All Blast Guards will have completed relevant AZL training.

Pre-blast security clearance system will be implemented including blast zone clearance checks, staff ID tag board check and access areas blocked by guards/sentries.

8.5 DUST EMISSIONS

The risk of excessive dust emissions from blasting are considered low (refer to Section 7 and **Table 4**) given the geology of the rock (hard with low fines content), relative isolation of the site and small to moderate blast size (<50 000t).

The risk will be reduced further by ensuring that blasts are not undertaken under conditions likely to enhance the dispersion of dust, i.e. dry windy conditions. Weather forecast monitoring for excessive wind conditions and adverse wind direction (towards Toongi and residential receivers) will be undertaken prior to each blast. If risk of elevated dust emissions is identified as medium or high (based on the risk matrix of **Table 4** – refer to Section 7), blasting will be postponed to a time with favourable weather conditions.

Generation of dust from blasting will be continually reviewed and if necessary additional dust suppression systems may be trialled.

8.6 BLAST FUMES

Section 7 (and Table 4) identifies the risk of fume generation from blasting at the DZP to be low. The primary risk factors for fume generation identified in *Australian Explosives Industry and Safety Group (AEISG) Code of Good Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting, Edition 2, 2011* (“the Code”), are identified below along with the measures to be implemented to reduce these risks.



Explosive Formulation and Quality Assurance

- AZL will purchase explosives from a reputable and experience supplier.
- Monitoring and calibration of the explosive manufacturing unit will be undertaken to ensure explosive mixing is in the correct proportions will be undertaken.

Geological Conditions

- Blasting will be restricted to confined and hard formations of the Toongi trachyte and basalt which presents reduced potential for seepage of explosives into cracks.
- These geological conditions are far less likely to result in energy dissipation through the rock (and incomplete explosion reaction) as weak, clayey and/or unconfined geology.

Groundwater

- Blasting will occur above the groundwater table limiting the potential for water to affect the explosives and detonation.

Blast design

- The depth of blast holes will be less than 20m and therefore desensitisation of the explosive at depth is unlikely.
- AZL will employ an experienced blasting engineer to review conditions and design each blast.
- AZL will commence with conservative assumptions regarding conditions and blast performance.

Explosive product selection

- ANFO is an appropriate explosive for dry holes in hard confined geology.
- Under wet conditions, such as following prolonged or heavy rainfall which prevents complete dewatering of blast holes, emulsion based explosives may be used.

On bench practices

- Blast zones will be maintained free of loose rock and fine materials which could contaminate blast holes and affect explosion.
- Blast holes will be dewatered if subject to heavy rainfall.
- Inspections of blasts before initiation will ensure drilling has been completed as per design.

Contamination of explosives in blast holes

- Blasting will be above the groundwater table, with dewatering undertaken to remove surface runoff from holes. This will reduce the potential for contamination by water or mud.
- AZL will minimise the time between drilling and charging of blast holes and avoid sleeping blasts to further reduce the potential for contamination.

Each blast will be monitored for evidence of fume (orange or red coloured dust). Should fume emissions be observed, AZL will implement a review and implement additional mitigation measures in accordance with the Code.

8.7 MANAGEMENT OF FLY ROCK

The generation of fly rock is managed by incorporating the appropriate controls in blast designs. These controls include:

- maintaining adequate burden, which is the distance from a charge to a free face to minimise the risk of face bursting;
- design of stemming lengths and use of appropriate stemming materials, to minimise the potential for ejection of these materials; and
- use of appropriate aggregate graded stemming to improve stemming confinement.

AZL will employ an appropriately qualified and experience blast design team to provide these controls. AZL will initially initiate smaller blast using conservative assumptions, with information gathered from early blasts used to generate site law for future larger blasts.

An initial exclusion zone of 500m for people, equipment and vehicles, and 250m for livestock will be maintained from blasts. These exclusion zones will be reviewed and reduced over time in response to information gathered by inspections following each blast.

An inspection will be undertaken following each blast and the size, distribution and distance of any fly rock noted and provided to the blast design team for review. This information will be used to continually re-access the adequacy of blast design controls in reducing the generation of fly rock. The information will also be used to reassess the size of the safety exclusion zone in the vicinity of a blast.

8.8 EXPLOSIVES SECURITY

All explosives and Security Sensitive Dangerous Substances (SSDS) will be handled, transported and stored in appropriately licensed equipment and by competent personnel as required by legislation and the relevant governing bodies.

All explosives and SSDS's will be stored in specialised storage facilities within an explosive magazine². The magazine is a compounded area that is restricted to access by authorised personnel only.

8.9 UNFAVOURABLE WEATHER CONDITIONS

During or immediately following heavy rain, which could increase the risk of fume generation, or during hot, dry and/or windy conditions, which could increase the potential for increased dust emissions, blasting will be postponed (unless necessary for safety reasons).

² The location of the explosives magazine is not identified on Plan figures for security reasons.

9. MONITORING

9.1 METEOROLOGICAL MONITORING

A meteorological station is operated adjacent to the DZP Site (see **Figure 4**). The weather data collected, units of measure, frequency, averaging period and method is include in **Table 5**.

Table 5
Meteorological Monitoring

Parameter	Units of Measure	Frequency	Averaging Period
Rainfall	Mm/hr	Continuous	1 hour
Sigma theta	°C	Continuous	10 minute
Temperature at 2m	Kelvin	Continuous	10 minute
Temperature at 10m	Kelvin	Continuous	10 minute
Relative Humidity	%	Continuous	10 minute
Total solar radiation	W/m ²	Continuous	10 minute
Wind Direction at 10m	°C	Continuous	10 minute
Wind Speed at 10m	m/s	Continuous	10 minute

For all blasts, AZL will have the ability to review a quantitative record of weather conditions at the time of blasting. This data may be used to correlate environmental conditions with air blast overpressure levels and derive a relationship between the two factors.

9.2 BLAST MONITORING LOCATIONS

Air blast overpressure and ground vibration monitoring will be undertaken at the following receiver locations (refer to **Figure 4**).

Processing Plant Area Blasts

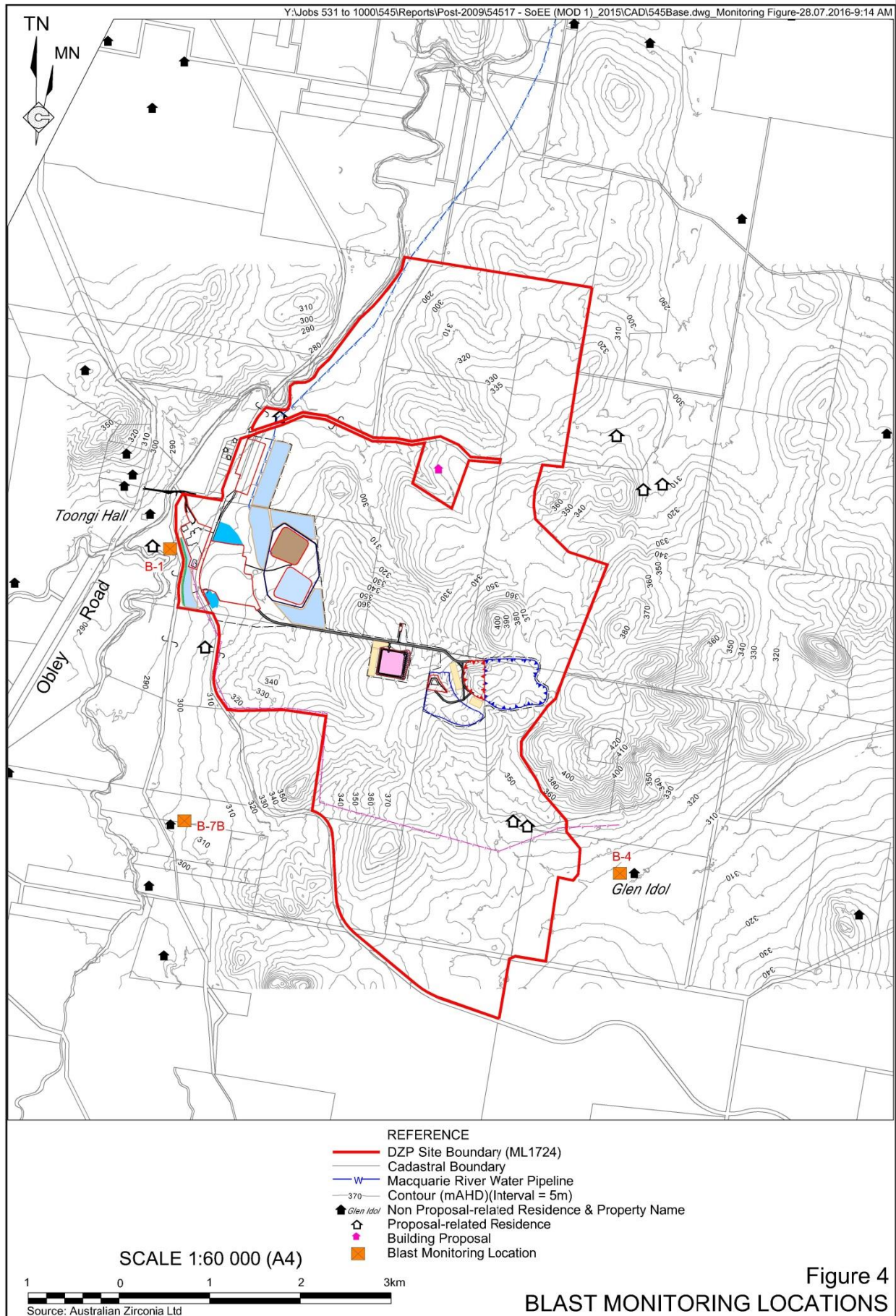
- B-1 (Whychitella).

Open Cut and Karingle Quarry Blasts

- B-7B (Cockleshell Corner).
- B-4 (Glen Idol).

The 'B' prefix references the monitoring is for the purpose of 'Blasting', with the number referencing the property reference number used for previous assessments of the DZP (for ease of comparison to predictive assessments). The locations have been chosen as these reflect the closest to blasting activities and compliance will indicate compliance at other locations further away.

AZL will also undertake monitoring at other receivers on request to confirm compliance with blasting criteria.



9.3 METHODOLOGY

Prior to blasting, the monitors will be tested and functionality confirmed.

All monitoring instrumentation and procedures will be undertaken in accordance with AS 2187.2-2006, and microphones used for airblast overpressure monitoring must have a lower cut-off frequency of 2Hz or less.

Monitoring will be used to capture and record all blast events. The following information will be recorded as part of the monitoring procedure.

- Blast noise overpressure (dBL_{peak}) and peak particle velocity (ppv) (mm/s) in a radial, vertical and transverse direction.
- The time and duration of monitoring for each location.
- License limits, where appropriate.
- Wind speed and direction.
- The type of monitoring being undertaken.
- The monitoring location.

Electronic records shall be filed in the Blasting Vibration and Overpressure Log and summarised on the Blasting Vibration and Overpressure Record Sheet (**Appendix 3**).

The results of all blasts will be entered into an environmental database managed by the Environment and Community Manager.

Records will be maintained for a minimum of four years.

9.4 RECORDING AND REPORTING

The Mine Engineer (or equivalent position during construction – refer to Section 14) will confirm the monitoring results to the Environment and Community Manager. As noted in Section 9.4, the results of all blasts will be logged, filed and entered into an environmental database.

In the event of a complaint and/or any exceedance of criteria, the Environment and Community Manager will report to the Operations Manager and instigate response and corrective actions (refer to Section 10.3.2), incident notification, investigation and management procedures (refer to Section 12).

10. BLAST MANAGEMENT SYSTEM

10.1 INTRODUCTION

As nominated in Section 4, an objective of AZL with respect to blast management is to maintain blast air blast overpressure and ground vibration levels below the criteria of SSD-5251, the Environmental Protection Licence (on issue) and within reasonable community expectations.

The following identifies the proactive and reactive measures that will be implemented as part of a Blast Management System to reduce the potential for exceedances of blasting criteria.

10.2 PROACTIVE MANAGEMENT

10.2.1 Meteorological Forecasting

Three day forecasts are available for the Dubbo Airport Weather Station (AWS) operated by the Bureau of Meteorology (BoM). These data will be reviewed daily by the managing AZL personnel who will check weather conditions for coming blast events and plan accordingly for adverse weather.

Adverse weather in terms of blasting impacts relates to either:

- winds in the direction of the closest sensitive receivers, i.e. from the northwest to southwest quadrants; or
- conditions likely to be indicative of temperature inversion, i.e. fog or frost conditions.

Considering the local wind data collected from the weather station operated by AZL, winds from the northwest to southwest quadrants are most prevalent in summer, with frosts and fogs most likely during the cooler months between May and August. Seasonal conditions will be reviewed annually with a view to modifying long-term forecasting and planning of blasts on the Site.

10.2.2 Proactive Mitigation Measures

Measures that will be undertaken to minimise the potential for non-compliant blasting emissions will include the following.

- Long-term (annual) scheduling of activities to limit blasting activities during the daily periods when adverse conditions are most likely to occur.
- Short-term modification of blasting generating activities in response to forecasting of adverse conditions in the short-term (based on 3-day forecasts from the Dubbo AWS).

10.3 REACTIVE MANAGEMENT

10.3.1 Triggers

Two triggers for reactive management will be applied.

- a) Blast Complaint. Any complaint received, either directly or via Council, EPA or other regulatory agency, will trigger the implementation of the response and corrective action measures described in Section 10.3.2.1.
- b) Exceedance of blasting criteria established through monitoring. Any record of blasting exceeding the criteria nominated in Section 6.1 will trigger the response and corrective action measures described in Section 10.3.2.2.



10.3.2 Response and Corrective Action

10.3.2.1 Blasting Complaint

In the event a complaint referencing blasting is received, the following response and action plan will be implemented.

1. The complaint will be logged with the person attending the “Duty Phone”.
2. The person attending the “Duty Phone” will log the details of the complaint and immediately notify the manager responsible for the specific activity (this could be an AZL manager or manager of contracted construction company) (“the Manager”) and the Environment and Community Manager, of the complaint.
3. The Manager will immediately investigate the complaint and if necessary make arrangements to alter the schedule of blasting.
4. The Manager will inform the Environment and Community Manager when site operations have been altered.
5. The Environment and Community Manager will review operations, air blast overpressure and ground vibration levels before contacting the complainant.
6. Section 12 of the Plan and *Section 15 of the Environmental Management Strategy* will be followed as it details the procedure for the recording, investigating, communicating and reporting of all complaints.

10.3.2.2 Blasting Monitoring Exceedance

If monitoring indicates that air blast overpressure or ground vibration as a result of blasting exceeds criteria, the following response and action plan will be implemented.

1. Immediately after obtaining exceedance information, the Environment and Community Manager (or delegated representative) will contact the Manager and inform them of the recorded levels and the location of the exceedance.
2. Notification procedures (of community and government agencies) will be commenced in accordance with Section 12.
3. The Manager will immediately review the monitoring results and if necessary make arrangements to alter the blasting schedule so that the airblast overpressure or ground vibration levels are reduced.
4. The Manager will inform the Environment and Community Manager (or delegated representative) when site operations have been altered.
5. A Non-Conformance and Corrective Action Report will be produced for the exceedance.
6. Within two weeks of obtaining any data showing an exceedance of blasting criteria, AZL will notify in writing any affected landowners or tenants. If AZL is unable to reduce the air blast overpressure or ground vibration levels to within the blasting criteria then AZL will advise the affected resident(s) of measures being undertaken to limit air blast overpressure and ground vibration levels and discuss possible solutions.

11. COMPLAINTS HANDLING AND RESPONSE

In order to receive, record and respond to any complaints in a timely manner, the Company has established the following.

- Telephone via a 24-hour, 7 day per week Community Information Line.
- A dedicated email address (dzp@alkane.com.au).
- Registration of complaint portal on the Company web site (www.alkane.com.au).

Section 10.1 of the DZP *Environmental Management Strategy* describes the complaints handling procedure and Section 10.2 of the DZP *Environmental Management Strategy* the approach to dispute resolution.

Response measures on receipt of a complaint are described in Section 10.3.2.1. Notification of a complaint will be based on whether it classifies as an incident or not (see Section 12).

12. INCIDENT MANAGEMENT, NOTIFICATION AND REPORTING

12.1 INCIDENT IDENTIFICATION

SSD-5251 defines an incident as “a set of circumstances that:

- causes or threatens to cause material harm to the environment; and/or
- breaches or exceeds the limits or performance measures/criteria.”

In accordance with the definition provided by Section 147 of the POEO Act, harm to the environment is deemed to be material if:

- i) it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or
- ii) it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations); and
- iii) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

An incident which is causes of threatens to cause material harm to the environment (and may or may not result in an exceedance of blasting criteria) is referred to as a **Pollution Incident**.

An incident which is only as a result of an exceedance of blasting criteria, is referred to as a **Non-compliance Incident**.

12.2 INCIDENT MANAGEMENT AND NOTIFICATION

12.2.1 Pollution Incident

With the exception of excessive dust or fume emissions leaving the DZP Site, which is considered unlikely, blasting-related incidents are unlikely to classify as Pollution Incidents. In the unlikely event of a blasting-related incident which is deemed a Pollution Incident, e.g. excessive dust or fume emissions, management (including notification) will be undertaken in accordance with Section 6 of the DZP *Pollution Incident Response Management Plan*.

12.2.2 Non-Compliance Incident

On identification of non-compliant monitoring results, the Manager will be notified and an investigation into the cause of the non-compliant causing emissions commenced.

On identification of the source of the offending blast incident, the Manager, Environment and Community Manager or delegate will implement one or more of the corrective measures identified in the Blast Management System (see Section 10.3.2).

An investigation into the cause of the non-compliant emissions will be undertaken involving the personnel involved, supervisory personnel, relevant Manager and/or Environment Manager. The investigation will review all reasonable and feasible steps which may be taken to:

- correct the activity resulting in non-compliant emissions; and
- prevent recurrence.

At the earliest opportunity³ following the completion of the investigation, a report will be prepared and submitted to the DPE and EPA summarising the investigation and proposed corrective and preventative measures.

If the incident was identified following receipt of complaint, the complainant will be provided with a report confirming the incident, source or cause of the incident, actions taken and ongoing management to prevent subsequent incident at the earliest opportunity (see also Section 11).

12.3 INCIDENT REPORTING

Pollution incidents will be reported in accordance with the *Section 6.5* of the DZP *Pollution Incident Response Management Plan*.

In addition to the reports prepared for notification purposes (see Section 12.2.2), a short report documenting any non-compliance incident, actions taken and results of the corrective actions will be compiled by the Environment Manager, Environmental Superintendent or equivalent position. This report will be provided to the regulatory authorities and/or complainant at the earliest opportunity.

³ Unless justification is provided at the time, earliest opportunity refers to the end of the next business day (from completion of investigation) and within 7 days of the incident.

A summary of all incidents, including dates of occurrence, corrective measures taken and success of these measures will be compiled and reported in the *Annual Environmental Management Report* to the DPE and Annual Return to the EPA.

13. PUBLICATION OF MONITORING INFORMATION AND REPORTING

AZL will include the results of all blast in the Annual Environmental Management Report. That document, once approved by the relevant government agencies, will be published on the Company's website.

In accordance with the requirements of Section 66(6) of the *Protection of the Environment Operations Act 1997*, AZL will make any of the monitoring data that relates to pollution available on AZLs website within 14 days of obtaining the data. In addition, AZL will provide a copy of obtained data (the value of each individual monitoring sample) free of charge to a member of the public when requested. The data will be published in a format that includes raw data values, is comprehensible by the general public and also includes all accompanying necessary information. These requirements are presented in detail in *Requirements for Publishing Pollution Monitoring Data*" (EPA, 2013).

14. PLAN IMPLEMENTATION

14.1 ROLES AND RESPONSIBILITIES

Table 6 outlines the roles and responsibilities of personnel with reference to management of blasts.

Table 6
Roles and Responsibilities

Page 1 of 2

Role	Responsibilities
AZL Chief Operations Officer	Ensure adequate resources are available to enable implementation of the Plan.
General Manager NSW	Ensure community notifications and negotiations are undertaken as nominated in the Plan and in a timely manner.
The Manager (Construction or Mining Operations)	<p>Ensure reviews of meteorological forecasts are completed prior to blast initiation.</p> <p>Ensure Blasting Engineer is aware of criteria and other limitation for blasting.</p> <p>Ensure blast notification boards are in place and updated prior to each blast.</p> <p>Ensure the monitoring of each blast is logged and provided to the Environment and Community Manager.</p> <p>Initiate investigations of blast emissions following a recorded incident.</p> <p>Inform the Environment and Community Manager of identified causes of elevated blast emissions and any alterations to site operations.</p>

**Table 6 (Cont'd)
 Roles and Responsibilities**

Role	Responsibilities
Environment and Community Manager	Ensure the implementation of this Plan. Ensure blast monitoring is undertaken. Review blast monitoring results, as provided by the Manager, and enter into environmental database. Review meteorological conditions during blasts for which exceedance of criteria recorded or complaint received. Assist the Manager in investigations of a recorded incident. Prepare a report to regulatory authorities or neighbours following a recorded incident. Ensure employees are competent through training and awareness programs.
Maintenance Manager	Ensure all equipment used for blast development and initiation is in good working order.
Blasting Engineer	Design all blasts to ensure compliance. Review any reports of anomalous ground conditions or unaccounted for events and postpone the blast, modify the design or liaise with the Manager, as necessary. Review monitoring data (on request by the Manager or Environment and Community Manager) following a blast. Advise the Manager and/or Environment and Community Manager of causes for blasting incidents.
Mobile Equipment / Processing Operators	Ensure all blast preparation is undertaken strictly in accordance with the instruction of the Blasting Engineer. Report any anomalous ground conditions or unaccounted for events to the Blasting Engineer.
All Personnel	Follow any instructions provided by the Blasting Engineer, Environment and Community Manager or Manager. Ensure evacuation to exclusion zone prior to initiation of blast.

14.2 COMPETENCE TRAINING AND AWARENESS

Prior to commencement of work on the DZP Site or specific off-site construction sites, personnel and subcontractors will undertake a DZP Induction. The induction will address occupational health and safety, quality, and environmental issues. *Section 6.3.2* of the DZP *Environmental Management Strategy* describes the overall content of induction to be undertaken. After completing the induction workers will sign a statement of attendance and records of this are kept in the site office.

AZL and contract personnel will also be provided with environmental awareness training. As discussed in *Section 6.3.3* of the DZP *Environmental Management Strategy*, training will be targeted to specific to activities or locations depending on the potential for environmental impact. The training will be prepared and delivered by the Environment Manager (or equivalent position) or delegate, with specific training relevant to air quality management to include the following.

- Pollution Incident Response Management Plan obligations and requirements.

- Blast Management Plan obligations and requirements.
- Operational Blast Management Controls.

14.3 REVIEW (AND CONTINUAL IMPROVEMENT PROTOCOL)

In accordance with *Condition 5*, of Schedule 5, of SSD-5251, the Plan will be reviewed and if necessary advised within 3 months of:

- a) the submission of an Annual Review of operations in accordance with Condition 4, of Schedule 5, of SSD-5251 (to be completed by 30 September each year);
- b) any notifiable incident related to blast emissions;
- c) any internal or external audits undertaken of the DZP; and/or
- d) any significant modifications to operations that may influence blast management.

These reviews will consider monitoring data, complaints and management measures to ensure noise and vibration levels are reduced as far as reasonably possible. This will ensure the adequacy of the Plan and allow for opportunities of adaptive management and continual improvement.

15. REFERENCES

Environment Protection Authority (EPA) (1999). *NSW Industrial Noise Policy*.

Australian Standard (AS) 1055.1-1997. *Acoustics – Description and Measurement of Environmental Noise – General Procedures*.

Australian Standard (AS) IEC 61672-2004. *Electroacoustics – Sound Level Meters*.

R.W. Corkery & Co. Pty Limited (RWC) (2013). *Environmental Impact Statement for the Dubbo Zirconia Project, September 2013*. Prepared on behalf of Australian Zirconia Limited.

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Appendix 1

Blast-related Conditions of SSD-5251

Schedule 3, Conditions 9 to 16
Schedule 5, Condition 3

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BLASTING

Blasting Criteria

9. The Applicant shall ensure that blasting on the site does not cause exceedances of the criteria in Table 3.

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 other public infrastructure	-	50	0%

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

Blasting Hours

10. The Applicant shall only carry out 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.

Blasting Frequency

11. The Applicant shall carry out a maximum of:
- 2 blasts a day; and
 - 5 blasts a week, averaged over a calendar year, on the 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, blast misfires or blasts required to ensure the safety of the mine or its workers.

Notes:

- 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.
- For the avoidance of doubt, should an additional blast be required after a blast misfire, this additional blast and the blast misfire are counted as a single blast.
- In circumstances of recurring unfavourable weather conditions (following planned but not completed blast events), to avoid excess explosive sleep times and minimise any potential environmental impacts, the Applicant may seek agreement from the Secretary for additional blasts to be fired on a given day.

Property Inspections

12. If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of the 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 Applicant shall:
- commission a suitably 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 development on these buildings and/or structures; and
 - give the landowner a copy of the new or updated property inspection report.

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 property inspection report, either party may refer the matter to the Secretary for resolution.

Property Investigations

13. 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 Applicant shall:
- (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
 - (b) 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 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 Secretary for resolution.

Operating Conditions

14. During mining operations on site, the Applicant shall:
- (a) implement best management practice to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private infrastructure/property in the surrounding area from any damage; and
 - minimise the dust and fume emissions of any blasting;
 - (b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site and any road closures; and
 - (c) monitor and report on compliance with the relevant blasting conditions in this consent, to the satisfaction of the Secretary.
15. The Applicant shall not undertake blasting on site within 500 metres of:
- (a) any public road; or
 - (b) any land outside the site that is not owned by the Applicant, unless:
 - the Applicant has a written agreement with the applicable roads authority or landowner to allow blasting to be carried out closer to the public road or land, and the Applicant has advised the Department in writing of the terms of this agreement; or
 - the Applicant has:
 - o demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the road or land without compromising the safety of people or livestock, or damaging buildings and/or structures; and
 - o 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 road or land.

Blast Management Plan

16. The Applicant shall prepare and implement a Blast Management Plan for the development 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 undertaking any blasting under this consent;
 - (b) describe the measures that would be implemented to ensure compliance with the blasting criteria and operating conditions of this consent;
 - (c) propose and justify any alternative ground vibration limits for any public infrastructure or other structures in the vicinity of the site (if relevant); and
 - (d) include a monitoring program for evaluating the performance of the development, including:
 - compliance with the applicable criteria; and
 - minimising the fume emissions from the site.

AIR QUALITY

Odour

17. The Applicant shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
 - (a) be submitted to the Secretary for approval prior to the commencement of an activity associated with the development;
 - (b) provide the strategic framework for environmental management of the development;
 - (c) identify the statutory approvals that apply to the development;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this consent; and
 - a clear plan depicting all the monitoring required to be carried out under the conditions of this consent.

Adaptive Management

2. The Applicant shall assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Applicant must, at the earliest opportunity:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.

Management Plan Requirements

3. The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the development;
 - effectiveness of any management measures (see c above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

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Appendix 2

Blast-related Conditions of Environment Protection Licence

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L4 Blasting

- L4.1 The airblast overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L4.2 The airblast overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L4.3 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec at any noise sensitive locations for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L4.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time at any noise sensitive locations. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L4.5 Blasting at the premises may only take place between 9:00am- 5pm Monday to Saturday. Blasting is not permitted on Sundays or Public Holidays.
- L4.6 Blasting outside of the hours specified in L4.5 can only take place with the written approval of the Environment Protection Authority (EPA).
- L4.7 The blasting limits do not apply if the Proponent has a written agreement with the relevant landowner, and has advised the Department of Planning and Environment and EPA in writing of the terms of this agreement.
- L4.8 Blasting at the premises is limited to the following on each day on which blasting is permitted or as otherwise approved in writing by the EPA:
- a) a maximum of 2 blasts per day;
 - b) 5 blasts per week, averaged over a calendar year.

This condition does not apply to blasts that generate ground vibration of 0.5mm/s or less at any residence on privately owned land, or blasts required to ensure the safety of the site or its workers.

5 Monitoring and Recording Conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
- a) in a legible form, or in a form that can readily be reduced to a legible form;
 - b) kept for at least 4 years after the monitoring or event to which they relate took place; and
 - c) produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
- a) the date(s) on which the sample was taken;
 - b) the time(s) at which the sample was collected;
 - c) the point at which the sample was taken; and
 - d) the name of the person who collected the sample.

M3 Recording of pollution complaints

- M3.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M3.2 The record must include details of the following:
- a) the date and time of the complaint;
 - b) the method by which the complaint was made;
 - c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
 - d) the nature of the complaint;
 - e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
 - f) if no action was taken by the licensee, the reasons why no action was taken.
- M3.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M3.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M4 Telephone complaints line

- M4.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M4.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M4.3 The preceding two conditions do not apply until - the date of the issue of this licence.

G2 Signage

- G2.1 The location of each Monitoring and Discharge point must be clearly marked by signs that indicate the point identification number used in this licence and be located as close as practical to the point.

Appendix 3

Blasting Vibration and Overpressure Record Sheet

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Appendix 4

Confirmation of Approval

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Planning Services
Resource Assessments
Contact: Phillipa Duncan
Tel: 9274 6451
Email: phillipa.duncan@planning.nsw.gov.au

Mr Mike Sutherland
General Manager NSW
Alkane Resources
PO Box 910
DUBBO NSW 2830

Dear Mr Sutherland

Dubbo Zirconia Project (SSD-5251)
Environmental Management Plan

I refer to an email dated 20 August 2016 sent by Alex Irwin of RW Corkery & Co Pty Limited on your behalf, seeking approval of the management plans required by conditions 8, 16, 23 and 30 of Schedule 3 and condition 1 of Schedule 5 of the project approval for the Dubbo Zirconia Project.

The Department has reviewed the final versions of the management plans and considers that they meet the requirements of the relevant conditions of approval.

Accordingly, please be advised that the Secretary has approved the following management plans:

- Environmental Management Strategy (Version 2.1 dated 6 October 2016);
- Air Quality Management Plan (Version 1.2 dated 6 October 2016);
- Noise Management Plan (Version 2.1 dated 6 October 2016);
- Water Management Plan (Version 2.1 dated 6 October 2016); and
- Blast Management Plan (Version 2.1 dated 6 October 2016).

I would appreciate if you could make the approved plans available on your website as soon as possible.

If you have any further enquiries about this matter, please contact Phillipa Duncan on the above contact details.

Yours sincerely

A handwritten signature in blue ink that reads 'Preshaw' followed by the date '12/10/16'.

Clay Preshaw
A/Director
Resource Assessments
as nominee of the Secretary

cc: Alex Irwin of RW Corkery & Co Pty Limited

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