

# Noise and Blast Management Plan

Jandra Quarry

Holcim (Australia) Pty Ltd



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## 1. Document Control

Revision	Description	By	Review	Approved for Issue
A	Draft Report	D. Green (Element Environment)	09/08/15	26/08/15
B	Draft Report with Holcim Review	D. Lidbetter (Holcim) & I. Shenton (Holcim)	27/08/15	30/08/15
Final Draft	Final Draft Report	D. Green (Element Environment)	31/08/15	31/08/15
C	Updated Report	A. Nelson (Holcim) M. Neil (Holcim)	30/07/18	30/7/18
D	Minor Modifications for DPE	V. Musgrove (Holcim)	20/08/18	20/08/18

## 2. Introduction

### 2.1 Background

Holcim (Australia) Pty Ltd (Holcim) owns and operates Jandra Quarry, a hard rock quarry located on the Pacific Highway at Possum Brush, approximately 17 kilometres (km) south of Taree on the mid north coast of New South Wales. The quarry has been operating since 1986 and was purchased by Holcim in 1996.

On 13 March 2015, the Jandra Quarry Intensification in Production project was approved by the Department of Planning and Environment under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as Modification 5 of Development Consent DA-231-10-99. A subsequent requirement of the Minister's Conditions of Approval (CoA) was for Jandra Quarry to prepare a Noise and Blast Management Plan (NBMP).

### 2.2 Operations Description

Jandra Quarry operates in accordance with previous approvals and accompanying environmental assessments, Environment Protection Licence (EPL) No. 2796 and the more recent Development Consent (DA 213-10-99 Mod 5) issued for the Jandra Quarry Intensification in Production Project.

This Development Consent (DA-213-10-99 Mod 5) permits Jandra Quarry to extract, produce and transport a maximum of 475,000 tonnes (t) of hard rock per calendar year for a period of 30 years (until 31 March 2045). The intensification in production for Jandra Quarry is crucial for meeting current and future market demand for concrete, roads, bridges and asphalt used in significant infrastructure projects occurring across the Mid North Coast.

The hours of operation for Jandra Quarry are prescribed in Table 1, Condition 10 of Schedule 2 of the Development Consent (DA213-10-99 Mod 5) and are reproduced in **Table 1** below.

**Table 1 Hours of Operation**

Day	Extraction and processing operations	Transportation operations	Asphalt Plant and associated transport (on a campaign basis)
Monday – Friday	6:00am to 10:00pm	6:00am to 10:00pm	24 hours a day
Saturday	6:00am to 6:00pm	6:00am to 10:00pm	24 hours a day
Sundays and Public Holidays	None	None	24 hours a day

Note: The following activities are permitted to occur outside the hours specified in Table 1

- (a) return of trucks to the site prior to 12 midnight Monday to Saturday
- (b) delivery or dispatch of materials as requested by Police, Fire Brigade or other similar authorities; and
- (c) emergency work to avoid the loss of lives, property and/or to prevent environmental harm.

In circumstances outlined in (b) and (c), Holcim will notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

Jandra Quarry will operate in accordance with the hours of operation as per **Table 1**.

### 2.3 Purpose and Scope

This NBMP has been prepared in accordance with the Minister’s CoA stipulated by the Development Consent (DA-213-10-99 Mod 5) and supersedes all previous versions. The specific CoA and where these requirements are addressed within this document are provided in **Table 2** below.

**Table 2 Development Consent (DA-213-10-99 Mod 5) conditions stipulating requirements for a NBMP and where these requirements are addressed within this document.**

Approval Condition	Section Addressed
<p><b>Schedule 3, Condition 4</b></p> <p>The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> <li>a) be submitted to the Secretary for approval by 31 August 2015;</li> <li>b) describe the measures that would be implemented to ensure:                             <ul style="list-style-type: none"> <li>• compliance with the noise criteria in this consent;</li> <li>• best management noise minimisation practice is employed on site;</li> <li>• noise emissions from trucks on the site after 10pm do not annoy neighbouring residents; and</li> <li>• the noise impacts of the development are minimised during any meteorological conditions when the noise limits in this consent do not apply; and</li> </ul> </li> <li>a) detail a monitoring program that will be put in place to measure noise from the development against the noise criteria in Table 2 and 3 [of Condition 1 of Schedule 3], and which:                             <ul style="list-style-type: none"> <li>• includes quarterly attended monitoring for the first two years of each of the three Stages of the development, as shown in the three figures in Appendix 1 (this monitoring must take place within a 24 hour asphalt campaign, if any such campaign is conducted during the quarter), and thereafter annually unless the Secretary agrees otherwise; and</li> <li>• evaluates and reports on the effectiveness of the noise management system on site.</li> </ul> </li> </ul>	<p>1.0</p> <p>4.1, 5.1 &amp; 6.2 5.1</p> <p>5.1</p> <p>4.1 and 6.1</p> <p>6.2</p> <p>7.0</p>
<p><b>Schedule 3, Condition 9</b></p> <p>The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> <li>• be submitted to the Secretary for approval by 31 August 2015;</li> <li>• describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of</li> </ul>	<p>1.0 4.2 &amp; 5.2</p>

<p>this consent;</p> <ul style="list-style-type: none"> <li>• include a monitoring program for evaluating and reporting on compliance with the blasting criteria in this consent;</li> <li>• include a blast fume management protocol to demonstrate how emissions will be minimised including risk management strategies if blast fumes are generated;</li> <li>• include public notification procedures on the blasting schedule; and</li> <li>• include a protocol for investigating and responding to complaints.</li> </ul>	<p>6.3</p> <p>5.2.1 &amp; 6.3.1</p> <p>5.2</p> <p>7.2</p>
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The purpose of this NBMP is to outline how Holcim proposes to manage noise and blast impacts during the operational lifetime of Jandra Quarry. Specifically, the NBMP will describe the management strategies, procedures, controls and the monitoring programs associated with noise and blasting operations.

Holcim is committed to continued quarrying operations in the context of updated and contemporary environmental management requirements and hence this Management Plan will be reviewed and updated in accordance with Section 7 of this plan.

## 2.4 Objectives

The key objective of this NBMP is to ensure that impacts to the local community and the built environment from noise and vibration are minimised.

To achieve this objective, the NBMP includes the following:

- a noise monitoring program to assess the noise impact on surrounding sensitive receivers including a mechanism for assessing performance against the Development Consent (DA-213-10-99 Mod 5) noise criteria;
- a blast monitoring program to assess the blast and vibration impact on surrounding sensitive receivers including a mechanism for assessing performance against the Development Consent (DA-213-10-99 Mod 5) blasting criteria;
- detailed controls to be implemented to minimise noise emissions from the site;
- detailed controls to be implemented to minimise blasting impacts from the site, including a blast fume protocol to manage potential impacts from blast fume generation;
- a system for managing noise and blast related community complaints in a timely and effective manner; and
- to detail the procedure for reporting noise and blast exceedances to relevant stakeholders.

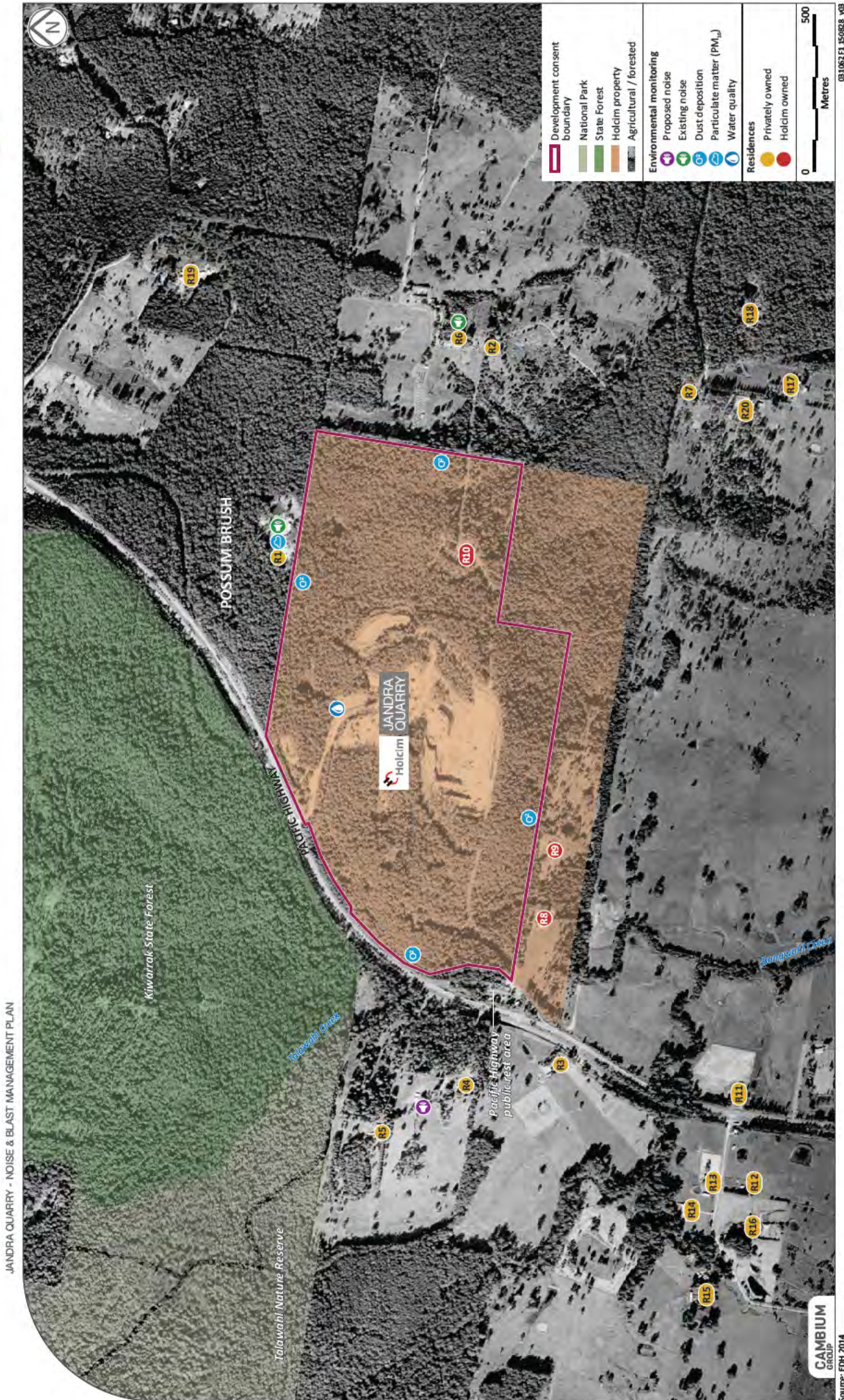
## 3. Baseline Data

The following section summarises the factors influencing noise and vibration associated with Jandra Quarry, based upon the information provided in Section 6.3.1 of the Jandra Quarry Intensification in Production Environmental Assessment (EA) (Element Environment 2014). It was noted during the EA that there were no environmental complaints relating to noise or blasting emissions at the Jandra Quarry during the period 1999 to 2014.

### 3.1 Identified Sensitive Receivers

Jandra Quarry is surrounded by rural properties with scattered residences and hence was found to have low background noise levels. The closest sensitive receivers surrounding the quarry are residences, located to the northeast (approximately 350 metres), east (approximately 850 metres), southeast (approximately 1.45 kilometres) and southwest (approximately 800 metres) of the operational areas of the site (refer to **Figure 1** and **Table 3**). Most of the residences to the southwest are located adjacent or in proximity to the Pacific Highway, which is a dominant noise source, at least during the daytime. Receivers R1 to R10 (refer to **Table 3**) are the closest receivers to the approved quarry operations. These receivers were therefore selected to assess noise and blasting impacts associated with the Jandra Quarry Intensification in Production Project.

**FIGURE 1**  
Surrounding land use, residences and environmental monitoring locations





**Table 3 Noise sensitive receptor locations**

Receptor ID	Address	Location	
		Easting (m)	Northing (m)
R1	15418 Pacific Highway, Possum Brush	449164	6454674
<b>R2</b>	<b>112 Spicers Road, Rainbow Flat</b>	<b>449824</b>	<b>6454014</b>
R3	15165 Pacific Highway, Possum Brush	447560	6453785
<b>R4</b>	<b>Lot 6 Pacific Highway, Possum Brush</b>	<b>447484</b>	<b>6454056</b>
<b>R5</b>	<b>15215 Pacific Highway, Possum Brush</b>	<b>447333</b>	<b>6454339</b>
<b>R6</b>	<b>1677 The Lakes Way, Rainbow Flat</b>	<b>449838</b>	<b>6454136</b>
<b>R7</b>	<b>136 Spicers Road, Rainbow Flat</b>	<b>449675</b>	<b>6453391</b>
R8	Holcim owned residence	448005	6453848
R9	Holcim owned residence	448232	6453803
R10	Holcim owned residence	449172	6454104

With regards to the noise sensitive receptors listed above, Holcim executed a negotiated agreement with the property owner of R1 which excluded this receptor from the approved noise criteria stipulated in Section 3.1 of this Plan. R3 is not included in the approved noise criteria stipulated in Section 3.1 as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and therefore didn't warrant further assessment. Receivers R8, R9 and R10 are Holcim owned residences and the approved noise criteria stipulated in Section 3.1 only applies to private-owned land. Prior to the extraction area reaching the proximity of R10, the resident's lease agreement is to be terminated.

### 3.2 Existing Environment

Detailed noise and blasting investigations were completed as part of the Jandra Quarry Intensification in Production EA (Element Environment 2014). The detailed investigations considered the potential impacts of the Intensification in Production Project on nearby sensitive residential receivers.

Ambient noise monitoring surveys were undertaken at three residential locations (R1, R2 and R3).

Noise levels (without asphalt production) below the early morning shoulder project criteria (6am to 7am), were predicted at all private residential receiver locations and for all stages of the quarry life, provided that operations are restricted during this time including:

- No works in the approved overburden emplacement area;
- No works above RL50; and
- No operation of the mobile processing plant.

Noise levels (without asphalt production) above the day (7am to 6pm)/evening (6pm to 10pm) criteria were predicted at three private residential receivers (R1, R2 and R6), ranging from a marginal 2 dBA to 5 dBA above the criteria. Holcim negotiated agreements with these potentially affected property owners regarding noise levels they may experience from the project.

Predicted noise levels from asphalt production were up to 7 dBA above the criteria at one private residential receiver (R1) during all periods and all stages of the quarry development, as this receiver has a line of sight to the asphalt plant. Holcim negotiated an agreement with this property holder.

Road traffic noise levels associated with the Intensification in Production Project were predicted in the EA to be below the threshold criteria of +2 dBA and therefore no further investigations or controls were considered necessary.

Noise levels were predicted in the EA to be below the project sleep disturbance criteria at all identified residential receiver locations provided operational restrictions during the early morning shoulder periods are implemented.

Blasting impacts were predicted in the EA were based on blast emission data collected from similar quarries in NSW (SLR Consulting 2014). The ground vibration and airblast criteria advocated by the Environment Protection Authority (EPA) and The Australian and New Zealand Environment Council (ANZEC) Guidelines cater for the inherent variation in emission levels from a given blast design by allowing a 5% exceedance of a general criterion up to a (never to be exceeded) maximum. Correspondingly, the '5% exceedance' prediction formulae were used in the EA predictions for identifying Maximum Instantaneous Change (MIC) for blasts (SLR Consulting 2014).

To control ground borne vibration and airblast to privately owned receivers, the Maximum Instantaneous Change (MIC) for blasts were predicted in the EA to not exceed the calculated MICs reproduced in **Table 4** below.

**Table 4 Blast emission limits**

Attribute	Recommended Maximum Level	Comments
Airblast	115 dBL (peak)	The level of 115 dBL may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 120 dBL at any time.
Ground vibration	5 mm/s peak particle velocity (ppv)	The ppv level of 5 mm/s may be exceeded on up to 5% of the total number of blasts over a period of 12 months. The level should not exceed 10 mm/s at any time.

Compliance with the guidelines was predicted at all receiver locations, for all blasts and at all stages of the quarry life, apart from R1 during Stage 3. Blasts on the northern benches during this stage of the quarry expansion should be restricted to a MIC of no greater than 125 kilograms to comply with blasting guidelines (SLR Consulting 2014).

## 4. Noise and Blasting Criteria

The following section identifies the noise and blasting criteria as defined in the Minister's CoA.

### 4.1 Noise Criteria

According to Condition 1 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5), the approved noise criteria are categorised according to two scenarios:

1. Noise criteria when quarrying only operations are being undertaken; and,

2. Noise criteria when quarrying and asphalt plant production are both being undertaken.

The noise criteria for the ‘quarrying only operations’ are stipulated in Table 2, Condition 1 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5), and is reproduced in **Table 5** below.

**Table 5 Noise criteria - quarrying operations only dB(A)**

Location	6am – 10pm (L <sub>Aeq</sub> (15 min))
<b>R1</b>	<b>46</b>
R5	40
R2, R4, R6	36
R7	35

The noise criteria for the ‘quarrying and asphalt plant production operations’ are stipulated in Table 3, Condition 1 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5), and is reproduced in **Table 6** below.

**Table 6 Noise criteria - quarrying operations and asphalt plant production combined dB(A)**

Location	6am – 10pm (L <sub>Aeq</sub> (15 min))	10pm – 6am	
		(L <sub>Aeq</sub> (15 min))	(LA1(1 min))
<b>R1</b>	<b>48</b>	<b>46</b>	<b>51</b>
R5	41	39	51
R4	40	39	51
R2, R6	40	35	48
R7	36	35	48

In relation to **Table 5** and **Table 6**, the approved noise criteria do not apply to R1 as Holcim has executed a negotiated agreement with this property owner thereby excluding this receptor from the approved noise criteria. Similarly, the approved noise criteria do not apply to R3, R8, R9 and R10 as described in **Section 3.1** of this plan.

The meteorological conditions under which these criteria do not apply are stipulated in Appendix 3 of the Development Consent (DA-213-10-99 Mod 5) and include the following:

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

Jandra Quarry EPL No. 2796 requirements for noise monitoring are consistent with the Development Consent (DA-213-10-99 Mod 5).

## 4.2 Blasting Criteria

Blasting criteria, including the maximum and allowable exceedance criteria for airblast overpressure and ground vibration is stipulated in Table 4, Condition 5 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5), and is reproduced in **Table 7** below.

**Table 7 Blasting criteria**

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Any residence on privately owned land, or any public infrastructure	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

However, as per the Development Consent (DA-213-10-99 Mod 5), these criteria do not apply if Holcim Australia has a written agreement with the relevant owner to exceed the limits, and the NSW Department of Planning and Environment (DPE) has been advised in writing of the terms of this agreement.

The permissible hours for which blasting can occur is stipulated by Condition 6 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5). That is, blasting shall only be carried out on site between 9am and 5pm Monday to Friday and 9am to 3pm Saturday. No blasting is allowed on Sundays or public holidays, or at any other time without the written approval of the Secretary.

Similarly, Condition 7 of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5) limits Holcim Australia to carrying out a maximum of 2 blasts per month. However, it is noted that this condition does not apply to blasts required to ensure the safety of the quarry or workers on site. For the purposes of this condition, it is noted that 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 quarry.

Jandra Quarry EPL No. 2796 requirements for blast monitoring are consistent with the Development Consent (DA-213-10-99 Mod 5).

## 5. Operational Management Controls

Holcim is committed to implementing reasonable and feasible best practice noise and blast impact mitigation measures at Jandra Quarry. The relevant noise and blast controls for the operation are detailed in the sections below and will be reviewed to confirm their applicability on an ongoing basis through the process outlined in **Section 8** of this plan.

### 5.1 Noise Management Controls

Holcim Australia will implement the following noise management measures:

- use of broadband reversing alarms instead of beeper style alarms on all mobile equipment;
- use of best management practice in controlling noise at the source through the elimination of noisy equipment, relocating equipment or re-orientating equipment to reduce the noise impacts;
- regular inspection and maintenance of noise attenuation systems on quarry equipment;
- the maintenance of product stockpiles in strategic locations, where practical, to provide acoustic shielding of product trucks and product loading equipment to nearby residences;

- the management of mobile machines during adverse weather conditions when wind conditions or inversion conditions enhance the noise propagation towards sensitive receiver locations. This could include but is not limited to:
  - ensuring the sales loader operates behind the product stockpile during adverse weather conditions;
  - moving quarrying activities to locations deeper in the quarry pit during adverse weather conditions and ceasing operations in exposed area; and
  - Shut down of some equipment during adverse weather conditions if required.
- Holcim Australia shall ensure that noise emissions from trucks on the site after 10pm do not annoy neighbouring residents through the following:
  - ensuring that unsealed roads and tracks are well maintained to prevent vehicle noise from corrugations and potholes;
  - Idling trucks to be positioned in areas that minimise the potential for adverse impacts to nearby sensitive receivers; and
  - trucks are to be regularly inspected and serviced when required, to ensure that they are free from unusual or excessive noises that is likely to generate a nuisance.

## 5.2 Blast Management Controls

Holcim Australia will implement the following blast management practices:

- blasting will only occur between the hours permitted through the Development Consent (DA-213-10-99 Mod 5) (refer to **Section 4.2** of this plan);
- completion of a detailed design for each blast in order to maximise the blast efficiency, minimise dust, fumes, ground vibration and air blast, the potential for flyrock as well as to ensure compliance with site specific blasting conditions;
- establishing an exclusion zone for each blast to protect the safety of personnel and assets;
- blast monitoring to inform future designs so that they can be optimized based on more detailed site information; and
- video recording all blast events.

In addition to the above, as required by Condition 8(b) of Schedule 3 of the Development Consent (DA-213-10-99 Mod 5), Holcim Australia will continue to operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site. This process is managed by weighbridge staff or their delegates, who send a text message to sensitive receivers near the quarry the day before a planned blast is to be undertaken.

### 5.2.1 Blast Fume Management Protocol

In accordance with Condition 9(d) of Schedule 3 of the Development consent (DA-213-10-99 Mod 5), Holcim Australia has developed a blast fume management protocol which aims to minimise blast fumes emanating from the Jandra Quarry operation.

This blast fume management protocol includes the following controls which should be undertaken prior to undertaking, or during a blast event:

- use of appropriately qualified personnel. This includes undertaking an assessment to determine whether the contractor is appropriately trained to undertake the drill and blast works;
- use of appropriate blast design as approved by the Quarry Manager, Pit Supervisor or their delegate;

- minimisation of time between loading and blasting, where practical;
- prior to blasting, a visual weather assessment of meteorological conditions will be undertaken by the Quarry Manager, Pit Supervisor or their delegate to confirm that weather conditions are not conducive to fume migration; and
- all blasts will be video recorded to confirm whether any blast fume has been generated.

Blast fume monitoring will occur as described in **Section 6.3.1** of this plan.

## 6. Monitoring Programs

Noise and blast compliance monitoring will be undertaken by suitably trained professionals and will occur throughout the operational lifetime of the quarry.

The following section details the nature of the compliance monitoring programs implemented at Jandra Quarry.

### 6.1 Meteorological Monitoring

Meteorological monitoring is to be undertaken in accordance with the *'Approved methods for the sampling and analysis of air pollutants in NSW'* (EPA 2001).

Meteorological data is to be sourced from the Jandra Quarry weather station and shall be used to:

- determine the conditions during which collection of noise and blast data is not appropriate;
- evaluate compliance with noise and blast criteria considering any influence due to prevailing weather conditions; and
- to inform pre-blast design.

### 6.2 Noise Monitoring Program

Noise monitoring at Jandra Quarry will be undertaken in accordance with the policies, principles, regulations and guidelines contained with:

- *Protection of the Environment Operations Act 1997* (POEO Act);
- EP&A Act;
- *NSW Noise Policy for Industry* (EPA 2017) [replaces the *NSW Industrial Noise Policy 2000*] and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

Attended noise monitoring is to be undertaken quarterly for the first two stages of each of the three stages of the development. This monitoring must take place within a 24 hour asphalt campaign, if such campaign is conducted during the quarter. After the first two years of each stage, attended noise monitoring is to be undertaken annually unless the Secretary agrees otherwise.

Attended noise monitoring will be undertaken by a suitably qualified professional using calibrated equipment consistent with Australian Standards.

Attended noise monitoring is to be undertaken in accordance with the Development Consent (DA-213-10-99 Mod 5) and the EPL, at three representative monitoring locations.

To determine compliance with the  $L_{eq(15 \text{ minute})}$  noise limits, the acoustic instrumentation must be located:

- approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
- within 30 metres of a dwelling façade but not closer than 3 metres where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises.

To determine compliance with the  $L_{A1(1 \text{ minute})}$  noise limits, the acoustic instrumentation must be located within 1 metre of a dwelling façade.

### 6.3 Blast Monitoring Program

Blast monitoring at Jandra Quarry will be undertaken in accordance with the policies, principles, regulations and guidelines contained within:

- POEO Act;
- EP&A Act;
- AS 2187.2-2006 'Explosives – Storage and Use – Use of Explosives';
- *OHS Amendment (Dangerous Goods) Act 2005*;
- *Explosives Act 2003*;
- Prevention and Management of Blast Generated  $NO_x$  Gases in Surface Blasting – Code of Good Practice (AEISG 2011); and
- ANZECC '*Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration*'.

Monitoring of airblast overpressure and ground vibration is to be undertaken by a suitably qualified professional using calibrated instrumentation that meets the requirements of Australian Standard AS 2187.2-2006 Explosives – Storage and Use – Use of Explosives.

Monitoring of airblast overpressure and ground vibration is to be undertaken for all blast events at receiver locations R4 and R2 as stipulated by the Development Consent (DA-213-10-99 Mod 5) and EPL. Refer to **Figure 1** and **Section 3.1** of this plan for the location of these receivers.

The following data is to be collected for every blast:

- Date;
- Time;
- Monitoring point/location;
- Measured vibration;
- Measured overpressure;
- Maximum instantaneous charge (MIC);
- Number of holes and estimated rock tonnage;
- Blast type;
- Video footage; and
- Meteorological conditions.

Blast monitoring will be undertaken by a suitably qualified professional using calibrated equipment consistent with Australian Standards.

### **6.3.1 Blast Fume Monitoring**

Blast fume monitoring and post blasting investigation into fume events will be undertaken at Jandra Quarry.

Blast fume monitoring will include a visual assessment and analysis of each blasting event to determine whether excessive fume was generated as a result of the blast. Video recording of each blast event will assist with analyses. In the event that any blast at Jandra Quarry leads to the development of excessive fume, an analysis of the blast will be undertaken to determine the cause of the blast fume development and whether the blast fume travelled off site. In addition to this, meteorological monitoring will occur to determine the likely, if any, offsite impact of NO<sub>x</sub> fume events post blasting.

Where excessive blast fumes have been generated, this will be reported in accordance with **Section 7.1** of this plan.

## **6.4 Availability of Noise and Blast Monitoring Data**

All noise and blasting monitoring results for Jandra Quarry will be published on the Holcim Australia website (<https://www.holcim.com.au/>) in accordance with Condition 7 of Schedule 5 of the Development Consent (DA-213-10-99 Mod 5) and as required by the *Protection of the Environment Legislation Amendment Act 2011* (Amendment Act).

## **7. Reporting**

### **7.1 External Reporting Protocol**

Exceedances of noise and blast criteria as well as noise and blast related incidents will be managed in accordance with the Jandra Quarry Environmental Management Strategy (EMS). That is, exceedances and incidents will be investigated to a level commensurate to their risk level, by the Jandra Quarry Manager in consultation with the Holcim Australia Environmental Representative. Additional controls will be implemented where required, based on the outcomes of the investigation.

In accordance with Condition 6 of Schedule 5 of the Development Consent (DA-213-10-99 Mod 5), Holcim Australia will notify, at the earliest opportunity, the Secretary and any other relevant agencies (e.g. the EPA) of any incident that has caused, or threatens to cause, material harm to the environment. For any other noise and blast incident associated with the development, Holcim Australia will notify the Secretary and any other relevant agencies (e.g. the EPA) as soon as practicable after it becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies (e.g. the EPA) with a detailed report on the incident.

Corrective actions will be generated based on the outcomes of the investigation. Similarly, as required by Condition 1 of Schedule 4 of the Development Consent (DA-213-10-99 Mod 5), affected landowners shall be notified in writing of the exceedance (except where a negotiated agreement has been entered into in relation to that impact), and regular monitoring results will be provided to each affected landowner until the development is complying with the relevant criteria.



In addition to the above protocol, noise and blast monitoring results as well as exceedances and incidents will be included in the Jandra Quarry Annual Review (submitted to DPE annually) and the Annual Return (submitted to EPA annually). In accordance with R4 of the EPL, a Noise Compliance Assessment Report and a Blast Monitoring Report will be submitted to the EPA with each Annual Return.

### **7.1.1 Adaptive Management**

Jandra Quarry will also:

- Take all reasonable and feasible measures to ensure the exceedance or cause of the incident does not re-occur;
- Consider all reasonable and feasible options for remediation where required; and
- Implement reasonable and feasible remediation measures where appropriate or as directed.

Exceedances and noise and blast related incidents are to be recorded internally using INX software. This method of recording facilitates continual improvement as key learnings from exceedances and incidents can be tracked and shared. Exceedances are to be logged into INX under the category 'Incident - breach of licence/permit' while incidents are to be logged under the category 'Incident – Environment' with subcategory being either 'noise' or 'blasting'. The INX entry shall include at a minimum; the date and time of the event, description of the event and immediate actions taken as this information will be vital to achieving adaptive management.

## **7.2 Complaints Response**

Complaints related to noise and/or blasting at Jandra Quarry will be recorded and responded to in a timely and professional manner.

All complaints are to be logged internally using INX software under the category 'Incident – Community Complaint'. Where possible, the INX entry should include details such as:

- (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, the reasons why no action was taken.

Additional information such as prevailing weather conditions and similar details that could be utilised to assist in the investigation of the complaint should also be recorded.

A register of complaint records will be included in the Annual Review as per Condition 4(b) of Schedule 5 of the Development Consent (DA-213-10-99 Mod 5).

### **7.2.1 Independent Review**

In the event that a landowner considers that Jandra Quarry is exceeding noise and/or blast criteria at his or her property, the landowner may request an independent review of the impacts the property. The independent review will be conducted in accordance with the

procedure described in Conditions 3 to 5 of Schedule 4 of the Development Consent (DA-213-10-99 Mod 5).

## 8. Review and Improvement

Ongoing monitoring and review of the performance and implementation of this NBMP will be undertaken in accordance with Jandra Quarry EMS.

In accordance with Condition 5 of Schedule 5, Holcim Australia shall review, and if necessary revise, the strategies, plans and programs required under the Development Consent (DA-213-10-99 Mod 5) to the satisfaction of the Director-General, within 3 months of the submission of:

- (a) annual review under condition 4 above;
- (b) incident report under condition 6 below;
- (c) audit report under condition 8 below; and
- (d) any modifications to this consent.

The Quarry Manager in consultation with Holcim Australia Environmental Representative will review and if necessary, revise this NBMP and re-submit to DPE every year or earlier if required.

A copy of the revised NBMP will be supplied to the Director General of DPE for approval. The NBMP will reflect changes in environmental requirements, technology and operational procedures. Updated versions of the approved NBMP will be made publicly available on the Holcim Australia website (<http://www.holcim.com.au>).

Continuous improvement will also occur through independent review as a result of the three-yearly compliance audit required under Condition 8 of Schedule 5 of the Development Consent (DA-213-10-99 Mod 5).

The Continuous improvement process shall strive to:

- identify areas of opportunity for improvement of environmental management and performance;
- determine the cause or causes of non-conformances and deficiencies;
- develop and implement a plan of corrective and preventative action to address any non- conformances and deficiencies;
- verify the effectiveness of the corrective and preventative actions;
- document any changes in procedures resulting from process improvement; and
- make comparisons with objectives and targets.

## 9. Accountabilities

### 9.1 Roles and Responsibilities

Environmental management at Jandra Quarry will be the responsibility of all employees and contractors, with the Jandra Quarry Manager having overall responsibility for environmental management of the operations. Environmental roles and responsibilities for project personnel are outlined below, with additional responsibilities contained within the respective environmental management plans. Environmental responsibilities are included in the position descriptions of all employees at Jandra Quarry.

General environmental responsibilities for key personnel at Jandra Quarry are outlined in **Table 8** below.

**Table 8 NBMP responsibilities at Jandra Quarry**

Personnel	Responsibilities
Quarry Manager	<p>Provide that sufficient resources are allocated for the implementation of this Plan.</p> <p>Coordinate the implementation of noise and blast management controls and strategies in accordance with this Plan.</p> <p>Coordinate the review of this plan in accordance with the requirements of the Development Consent (DA-213-10-99 Mod 5).</p>
Line Managers	<p>Have a working knowledge of this NBMP.</p> <p>Be aware of the environmental legislative requirements associated with the Jandra Quarry and take measures to ensure compliance.</p>
Environmental personnel	<p>Coordinate the noise and blast monitoring requirements of this plan.</p> <p>Evaluate and report monitoring results as required.</p> <p>Coordinate noise and blast related incident investigations and reporting as required by legislation and internal standards and guidelines.</p> <p>Undertake an annual review of this NBMP.</p>
All employees and contractors	<p>Comply with all requirements of this NBMP.</p> <p>Report all potential environmental incidents to the Quarry Manager immediately.</p> <p>Seek approval from the Quarry Manager prior to making any operational changes which may result in increased noise and blast impacts.</p>

## 10. Abbreviations and Definitions

The terminology utilised with this NBMP are defined in Table below.

Term	Definition
Airblast/Overpressure	An airborne shock wave resulting from detonation of explosives. An airblast may be caused by blasted material movement or the release of expanding gas into the air.
ANZEC	The Australian and New Zealand Environment Council
Blasting	An activity involving the use of explosives for the purpose of producing an explosion to fragment rock for extraction.
CoA	Conditions of Approval
dB(Lin Peak)	decibel associated with the maximum excess pressure in the overpressure wave. Lin represents linear - indicating that no weighting or adjustment is made to the measurement.
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DPE	Department of Planning and Environment (NSW)
EA	Environmental Assessment
EMS	Environmental Management Strategy
EPA	Environment Protection Authority (NSW)
EPA Act	<i>Environmental Planning and Assessment Act 1979</i>
EPL	Environment Protection Licence
Flyrock	Rock that is propelled outside of the blasting area through the air or along the ground as a result of the detonation of explosives.
Ground Vibration	The movement of the ground caused by the blast wave emanating from the blast.
INX	Integrated workforce management system that which enables different departmental reporting requirements (i.e. safety, environmental hazards, incidents etc) to be captured in one shared database.
LAeq('period')	The average noise level, measured in dB(A), during a measurement period.
L <sub>eq</sub>	Equivalent continuous sound level – the constant sound level which, when occurring over the same period of time, would result on the receiver experiencing the same amount of sound energy.
Maximum Instantaneous Charge (MIC)	Maximum amount of explosives detonated per delay.
mm/s	millimetres per second
NBMP	Noise and Blast Management Plan
Peak particle velocity (ppv)	The rate of the ground vibration movement measured in millimetres per second (mm/s)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Reduced level (RL)	Calculated elevation in relation to a particular datum

## 11. References

Australian and New Zealand Environment Conservation Council (ANZECC) (2011) *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*.

Australian Explosives Industry and Safety Group Inc. (AEISG) (2011) *Prevention and Management of Blast Generated NO<sub>x</sub> Gases in Surface Blasting – Code of Good Practice*.

Element Environment (2014) Holcim Jandra Quarry Environmental Management Strategy, prepared for Holcim (Australia) Pty Ltd, July 2014.

Element Environment (2014) Jandra Quarry: Intensification in Production Environmental Assessment, prepared for Holcim (Australia) Pty Ltd, July 2014.

Environment Protection Authority (EPA) (2001) *Approved methods for the sampling and analysis of air pollutants in NSW*.

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SLR Consulting (2014) Jandra Quarry Intensification Project Appendix C: Noise and Blasting Impact Assessment, prepared for Holcim (Australia) Pty Ltd, June 2014.

