

Noise Management Plan

for the

New Berrima Clay/Shale Quarry

PA08_0212

Approved

Prepared by:



R.W. CORKERY & CO. PTY. LIMITED

March 2016

Approved by
the Secretary's nominee, Howard Reed,
on 13 May 2016

Noise Management Plan

for the

New Berrima Clay/Shale Quarry

PA08_0212

Prepared for:

The Austral Brick Company Pty Limited
ABN: 52 000 005 550
Wallgrove Road,
HORSLEY PARK NSW 2164
PO Box 6550
WETHERILL PARK NSW 1851

Telephone: (02) 9830 7844
Facsimile: (02) 9831 2383
Email: stephen.wall@australbricks.com.au

Prepared by:

R.W. Corkery & Co. Pty. Limited
Geological & Environmental Consultants
ABN: 31 002 033 712

Brooklyn Office:

1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Telephone: (02) 9985 8511

Facsimile: (02) 6361 3622

Email: brooklyn@rwcorkery.com

Orange Office:

62 Hill Street
ORANGE NSW 2800

Telephone: (02) 6362 5411

Facsimile: (02) 6361 3622

Email: orange@rwcorkery.com

Brisbane Office:

Suite 5, Building 3
Pine Rivers Office Park
205 Leitchs Road
BRENDAL QLD 4500

Telephone: (07) 3205 5400

Facsimile: (02) 6361 3622

Email: brisbane@rwcorkery.com

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COMMONLY USED ACRONYMS

AHD	Australian Height Datum
AS	Australian Standard
CCC	Community Consultation Committee
DPE	Department of Planning and Environment
ENCM	Environmental Noise Control Manual
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection Licence
INP	Industrial Noise Policy
NATA	National Association of Testing Authorities
PA	Project Approval
RBL	Rating Background Levels

KEY FACTS AND FIGURES

Project Areas (approximate)	Quarry Site – 51 ha Extraction Area Stages 1-4 – 5.5 ha Extraction Area Stages 5-7 – 5.0 ha Surplus Overburden Stockpile Area – 1.5 ha Final Landform Area South – 1.4 ha Total Area of Disturbance - 14 ha
Annual Production	Maximum 150 000t per year
Approved Quarry Life	Until 30 June 2045
Capital Investment	Approximately \$1 million
Employment	Approximately four full time equivalent positions
Extraction Equipment	Scraper, bulldozer, haul truck, front-end loader
Extraction Floor	640m AHD
Extraction Stages and Resources	Stages 1 to 4 (southern section of extraction area) Approximately 1.6 million tonnes Stages 5 to 7 (northern section of extraction area) Approximately 2.3 million tonnes
Hours of Operation	Monday to Friday - 7:00am to 5:00pm Saturday - 8:00am to 1:00pm Sundays and Public Holidays – No Operations
Length of Sealing of Quarry Access Road	Approximately 400m (from Berrima Road)
Traffic Volumes (approximate)	Typical day - 0 to 34 truckloads (0 to 68 truck movements) Typical transport campaign day – 17 to 34 truckloads (34 to 68 truck movements) Maximum per day - 68 truckloads (132 truck movements)
Visibility Barrier Dimensions (approximate)	Central Visibility Barrier - approximately 8m to 12m high, 30m to 45m wide, and 420m long (Area =1.5 ha) Northern Visibility Barrier - approximately 8m to 9m high, 35m to 50m wide, and 160m long (Area = 0.7 ha) Southern Visibility Barrier – up to 4m high, up to 20m wide, and up to 350m long(Area = 0.7 ha)

1. INTRODUCTION

This *Noise Management Plan* (the Plan) has been prepared by R W Corkery & Co Pty Limited on behalf of The Austral Brick Company Pty Ltd (Austral) for the New Berrima Quarry (the Quarry). The Quarry is located approximately 1.5km east of New Berrima in the Southern Highlands of NSW (**Figure 1**).

This Plan has been prepared in satisfaction of PA *Condition 3(8)* and *5(3)* of Project Approval (PA) 08_0212¹ and describes the following.

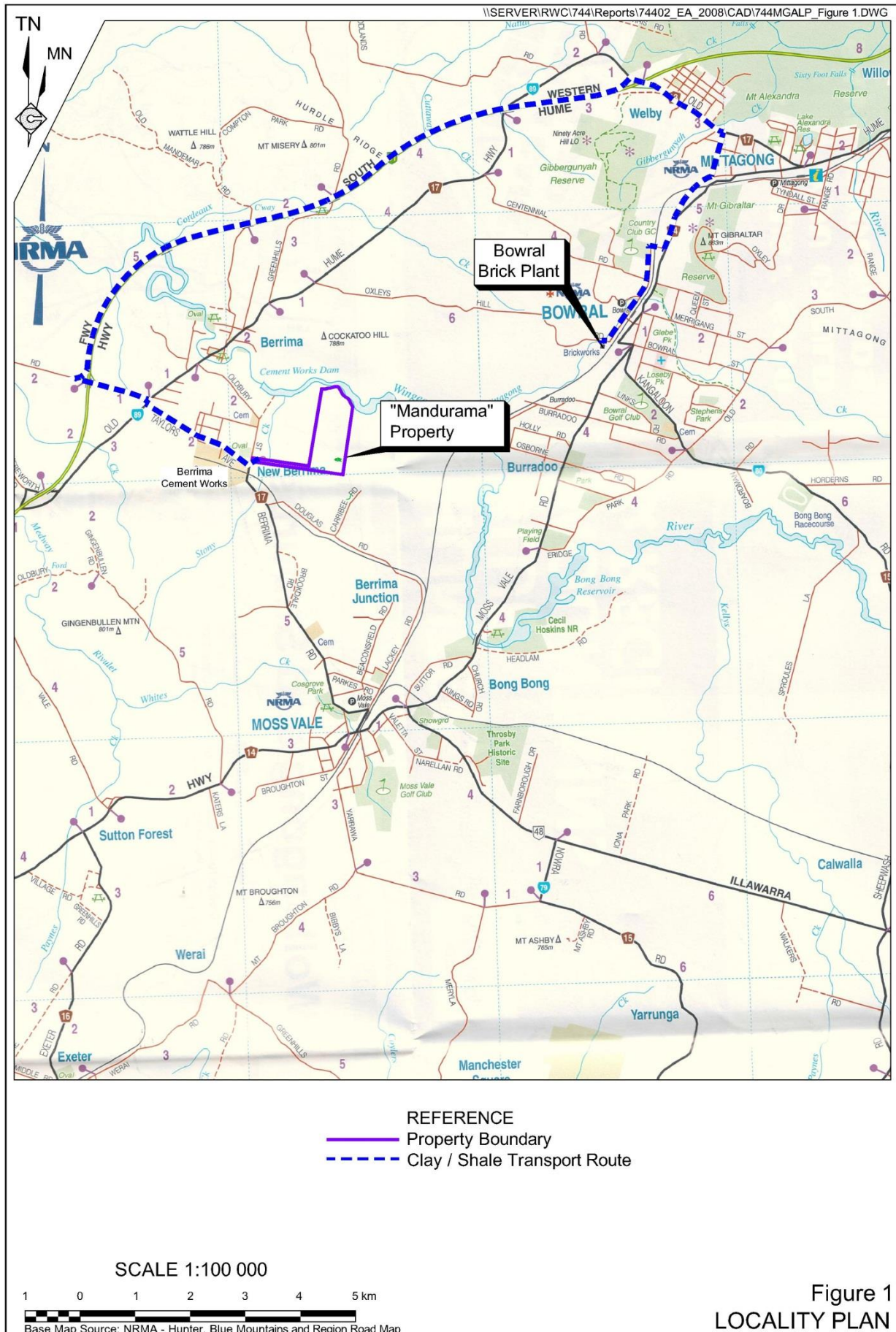
- The consultation undertaken during preparation of this Plan.
- The legal and other requirements associated with management of noise emissions from the Quarry.
- The objectives and key performance outcomes for this Plan and the Quarry.
- Roles and responsibilities.
- Competence training and awareness.
- Surrounding residences and potential noise sources and impacts.
- Noise management measures that would be implemented during construction and operation of the Quarry.
- Noise-related monitoring that will be undertaken.
- Evaluation of compliance with noise criteria.
- Complaints handling and response procedures that will be implemented.
- Continual improvement actions that will be implemented should exceedance(s) of the relevant criteria be identified.
- Incident reporting procedures.
- Publication of monitoring information.
- Plan review.

The approved Quarry is fully described in the *Environmental Assessment* dated May 2015 to support a modification to PA 08_0212, and the *Environmental Assessment* dated December 2010 and associated documentation prepared to support the application for PA 08_0212. Key facts and figures about the approved quarry are provided on the previous page and an overview of the approved activities and staged operations are outlined in Section 2.

In addition, a range of other management plans have also been prepared to guide operations within the Quarry. These include the following.

- Environmental Management Strategy.
- Transport Management Plan.
- Air Quality Management Plan.
- Water Management Plan.
- Landscape Management Plan.
- Aboriginal Cultural Heritage Management Plan.

¹ All conditions in Project Approval 08_0212 are referred to as *PA Condition* ...



2. APPROVED ACTIVITIES AND STAGED OPERATIONS

2.1 Approved Activities

The approved activities at the Quarry (**Figure 2**) comprise the following.

- Construction of visibility barriers to provide visual screening for the quarry operations.
- Establishment of an extraction area to extract clay/shale using standard ripping, pushing and loading techniques.
- Use of an existing Quarry access road and upgrading of two intersections.
- Transportation of up to 150 000t per year of quarry products via Berrima Road using articulated and rigid trucks not exceeding 19m in length.

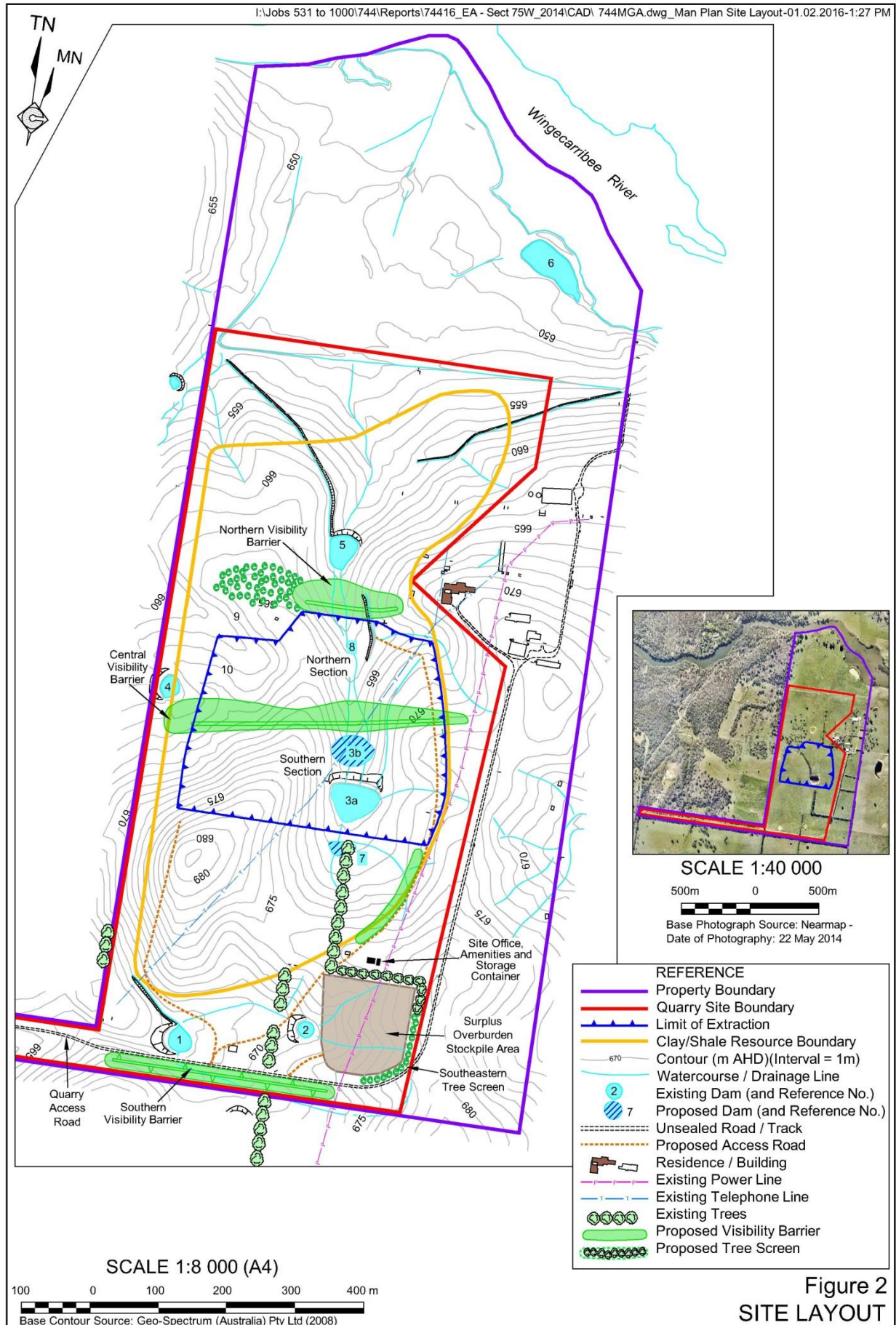
The relevant limitations upon the approved activities nominated in Conditions within PA 08_0212 are as follows.

- “The Proponent shall not carry out any development in the extraction area below a level of 640m AHD” *PA Condition 2(6)*.
- “The Proponent shall not extract more than 150 000 tonnes of extractive materials from the site in any calendar year” *PA Condition 2(7)*.
- “The Proponent shall not transport more than:
 - a) 150,000 tonnes of product from the site in any calendar year;
 - b) 68 laden trucks from the site in a day; and
 - c) 8 laden trucks from the site in an hour.

The approved quarry life is until 30 June 2045 and the approved hours of operation are outlined in **Table 1**.

Table 1
Hours of Operation

Day	Extraction Operations	Clay/Shale Transportation
Monday – Friday	7:00am to 5:00pm	7:00am to 4:00pm
Saturday	8:00am to 1:00pm	8:00am to 1:00pm
Sundays and Public Holidays	None	None



2.2 Staged Operations

The sequence of extraction throughout the initial stages of the quarry will reflect the need to complete the construction of the central visibility barrier to the north of the southern section of the extraction area (**Figure 2**) using overburden, whilst gaining access to the underlying shale as efficiently as practicable. **Figure 3** displays the staging sequence throughout the life of the Quarry. The southern section would be extracted in four stages, namely Stages 1 to 4. Once extraction ceases in the southern section, extraction would commence in the northern section with extraction undertaken in three stages, namely Stages 5 to 7. The approximate sequence plan for extraction is as follows.

- Year 1 – Stage 1 extraction to provide material for central visibility barrier construction. Commence extraction of shale in Stage 2.
- Years 2 to 4 – Complete extraction of shale in Stage 2.
- Years 5 to 14 – Complete Stages 3 and 4 of extraction and complete extraction in southern section of extraction area.
- Years 15 to 30 – Commence extraction in Stage 5 to construct the northern visibility barrier. Complete extraction of Stages 6 and 7 progressively.

3. CONSULTATION

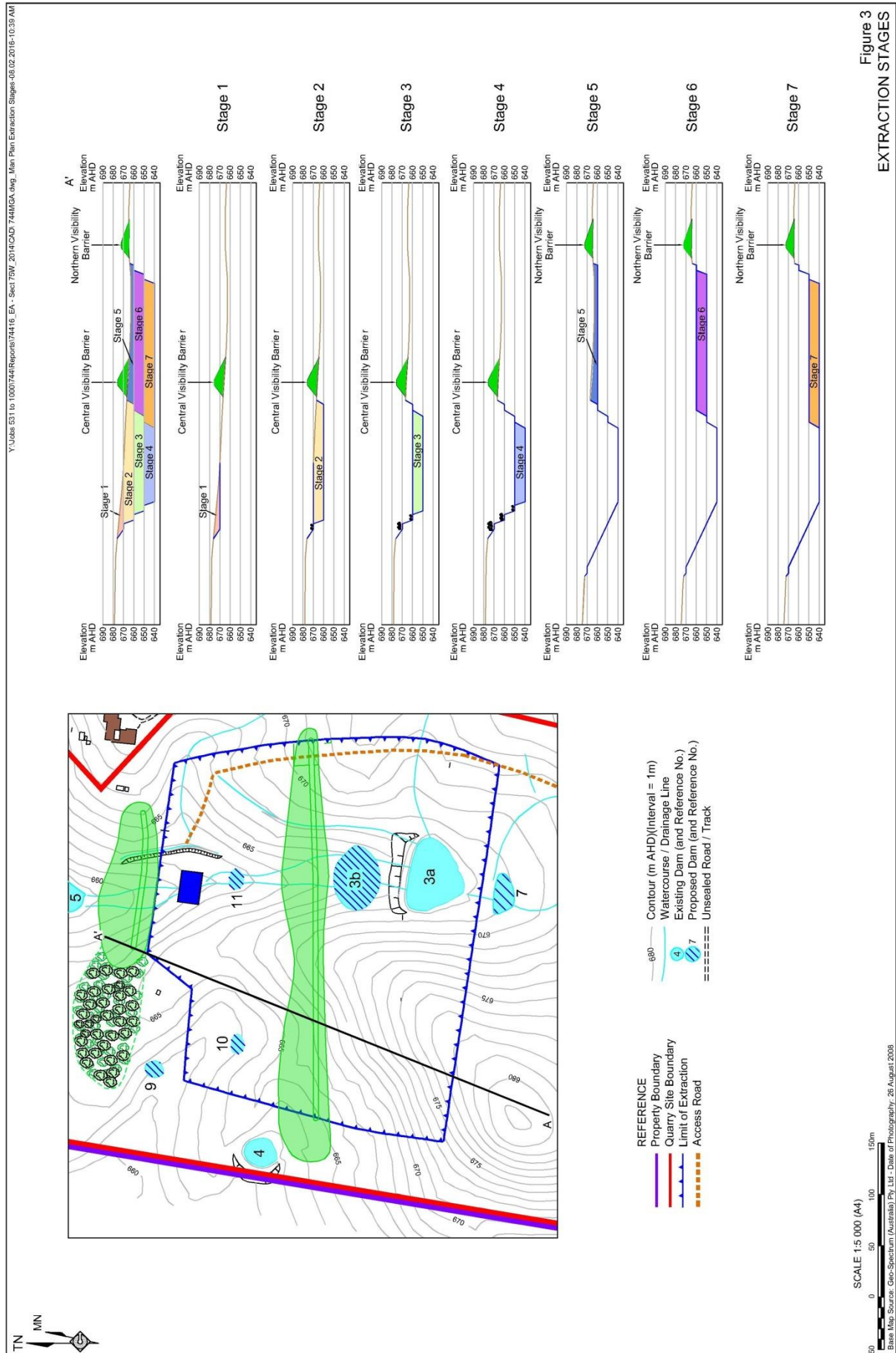
3.1 Government Agency Consultation

The following government agency consultation was undertaken during the preparation of this Plan.

- An email was sent to the Environment Protection Authority (EPA) on 16 August 2012 to confirm any requirements for this Plan. The EPA replied on 24 August 2012 stating the Authority does not review draft management plans during preparation. Rather, final plans could accompany an application for an Environmental Protection Licence.
- A meeting with Mr Matthew Fuller from the EPA was held at the Quarry Site on 16 November 2015 to determine noise monitoring locations. The nominated monitoring locations were confirmed by Matthew Fuller via email on 20 November 2015.

3.2 Landholder Consultation

Austral consulted with three surrounding landowners during the preparation of this document. Austral established that a number of the surrounding residents did not necessarily live full time at their residences and hence, access for monitoring purposes would be problematic. Austral will undertake a letterbox drop immediately before operations commence on site to notify surrounding residents about its planned activities and to provide relevant contact names and phone numbers for contact, if required.



Austral will consult with surrounding landowners, as required throughout the life of the Quarry. In the event any exceedance of the noise criteria is identified, Austral will notify potentially affected landowners in accordance with *PA Condition 4(1)*, and provide monitoring results to those landowners until compliance with the noise criterion is achieved.

3.3 Community Consultation

Austral will maintain contact with the community through the required Community Consultation Committee (CCC). This committee will be established prior to the commencement of site activities. The CCC will meet at intervals considered appropriate by the committee.

4. LEGAL AND OTHER REQUIREMENTS

Austral was granted PA 08_0212 by the Director-General of Planning and Infrastructure on 7 July 2012 pursuant to Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Modification 1 of PA 08_0212 was approved on 15 December 2015 to incorporate modifications to the Quarry associated with an alternate extraction area boundary. PA 08_0212 includes the criteria that Austral needs to comply with and sets out the matters that need to be addressed within this Plan. Relevant noise-related conditions in PA 08_0212 are reproduced in **Table 2**. Relevant commitments included in the Statement of Commitments in PA 08_0212 are reproduced in **Table 3**.

Table 2
Project Approval Requirements Relating to Noise

Page 1 of 4

Page 7 of 7

Schedule (Condition No)	Condition Requirement	Plan Section						
3(3)	<p>The Proponent shall construct the visibility barriers prior to carrying out any extraction operations on site under this approval to the satisfaction of the Secretary. This condition does not prohibit the winning of extractive material on site to be used in the construction of the amenity bunds.</p> <p><i>Note: The visibility barriers are shown on Figure 2.</i></p>	Section 9.2						
3(4)	<p>During the construction of the visibility barriers, the Proponent shall ensure that the noise generated on site does not exceed the criteria in Table 1.</p> <p>Table 1 – Noise Criteria – Bund Construction</p> <table><tr><th>Receiver</th><th>$L_{Aeq(15min)}dB(A)$</th></tr><tr><td>R2</td><td>43</td></tr><tr><td>All other receivers</td><td>38</td></tr></table> <p>Notes:</p> <ul style="list-style-type: none">Receiver locations are shown in Figure 3.Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.	Receiver	$L_{Aeq(15min)}dB(A)$	R2	43	All other receivers	38	Section 10.2
Receiver	$L_{Aeq(15min)}dB(A)$							
R2	43							
All other receivers	38							
3(5)	<p>Except for the period when the visibility barriers are being constructed, the Proponent shall ensure that the noise generated by the project does not exceed 38dB(A) LAeq (15min) at any residence on privately-owned land.</p> <p>However, this criterion does not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.</p>	Section 10.2						

Table 2 (Cont'd)
Project Approval Requirements Relating to Noise

Page 2 of 4

Schedule (Condition No)	Condition Requirement	Plan Section																
3(6)	<p>The Proponent shall comply with the operating hours in Table 2.</p> <p>Table 2 – Operating Hours</p> <table><tr><th>Day</th><th>Transport</th><th>Quarrying Operations</th><th>Construction</th></tr><tr><td>Monday – Friday</td><td>7:00am to 4:00pm</td><td>7:00am to 5:00pm</td><td>7:00am to 5:00pm</td></tr><tr><td>Saturday</td><td>8:00am to 1:00pm</td><td>8:00am to 1:00pm</td><td>8:00am to 1:00pm</td></tr><tr><td>Sundays and Public Holidays</td><td>None</td><td>None</td><td>None</td></tr></table> <p><i>Note: Maintenance activities may occur at any time provided they are inaudible at privately-owned residences</i></p>	Day	Transport	Quarrying Operations	Construction	Monday – Friday	7:00am to 4:00pm	7:00am to 5:00pm	7:00am to 5:00pm	Saturday	8:00am to 1:00pm	8:00am to 1:00pm	8:00am to 1:00pm	Sundays and Public Holidays	None	None	None	Section 9.1
Day	Transport	Quarrying Operations	Construction															
Monday – Friday	7:00am to 4:00pm	7:00am to 5:00pm	7:00am to 5:00pm															
Saturday	8:00am to 1:00pm	8:00am to 1:00pm	8:00am to 1:00pm															
Sundays and Public Holidays	None	None	None															
3(7)	<p>The Proponent shall:</p> <p>(a) implement best practice noise management to minimise the construction, operational, low frequency and traffic noise of the project;</p> <p>(b) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply;</p> <p>(c) maintain the effectiveness of any noise suppression equipment on plant at all times and ensure defective plant is not used operationally until fully repaired; and</p> <p>(d) regularly assess noise monitoring data and relocate, modify, and/or stop operations onsite to ensure compliance with the relevant conditions of this approval, to the satisfaction of the Secretary.</p>	<p>Sections 9.3 and 9.4</p> <p>Section 7,9.2</p> <p>Sections 9.3 and 9.4</p> <p>Section 13</p>																
3(8)	<p>The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with the EPA, and submitted to the Secretary for approval prior to the construction of the visibility barriers;</p> <p>(b) describe the measures that would be implemented to ensure:</p> <ul style="list-style-type: none">- best management practice is being employed on site;- the noise impacts of the project are minimised during meteorological conditions when the noise limits in this approval do not apply; and- compliance with the relevant conditions of this approval; <p>(c) describe the proposed noise management system in detail; and</p> <p>(d) include a monitoring program that:</p> <ul style="list-style-type: none">- is capable of evaluating the performance of the project;- includes a protocol for determining exceedances of the relevant conditions in this approval; and- evaluates and reports on the effectiveness of the noise management system on site.	<p>Section 3.1</p> <p>Section 9</p> <p>Section 9</p> <p>Section 10</p>																
4(1)	<p>As soon as practicable after obtaining monitoring results showing an:</p> <p>(a) exceedance of any relevant criteria in schedule 3, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each of affected landowner until the project is again complying with the relevant criteria.</p>	Section 3.2																

Table 2 (Cont'd)
Project Approval Requirements Relating to Noise

Page 3 of 4

Schedule (Condition No)	Condition Requirement	Plan Section
5(3)	The Proponent shall ensure that the Management Plans required under this approval are prepared in accordance with any relevant guidelines, and include:	Section 10.2
	(a) detailed baseline data;	
	(b) a description of: <ul style="list-style-type: none"> - the relevant statutory requirements (including any relevant approval, licence or lease conditions); - any relevant limits or performance measures/criteria; and - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures; 	Sections 4, 10 and 11
	(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Section 9
	(d) a program to monitor and report on the: <ul style="list-style-type: none"> - impacts and environmental performance of the project; and - effectiveness of any management measures (see (c) above); 	Section 10
	(e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 13
	(f) a program to investigate and implement ways to improve the environmental performance of the project over time;	Section 13
	(g) a protocol for managing and reporting any: <ul style="list-style-type: none"> - incidents; - complaints; - non-compliances with statutory requirements; and - exceedances of the impact assessment criteria and/or performance criteria; and 	Sections 11, 12 and 14
5(4)	(h) a protocol for periodic review of the plan. <i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>	Section 16
	By the end of December 2016, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:	Section 15
	(a) describe the development (including rehabilitation) that were carried out in the previous calendar year, and the works that are proposed to be carried out over the next year;	
	(b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against: <ul style="list-style-type: none"> - the relevant statutory requirements, limits or performance measures/criteria; - the monitoring results of previous years; and - the relevant predictions in the EA; 	
	(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	

Table 2 (Cont'd)
Project Approval Requirements Relating to Noise

Page 4 of 4

Schedule (Condition No)	Condition Requirement	Plan Section
5(4) (Cont'd)	(d) identify any trends in the monitoring data over the life of the project; (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	
5(7)	The Proponent shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Section 14

Table 3
Statement of Commitments

	Commitment	Plan Section
5(8)	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Section 15
Minimisation of the noise impacts attributable to extraction and transportation of clay /shale product from the Project Site.	5.1 Retain the existing tree screen on the eastern side of the extraction area.	Section 9.2
	5.2 Regularly service all equipment on Site to ensure sound power levels of each item remains at or below that nominated for noise modelling purposes.	Section 9.3
	5.3 Ensure all earth-moving equipment are fitted with mid-frequency band reversing alarms.	Section 9.3

5. OBJECTIVES AND OUTCOMES

Table 4 presents the objectives and key performance outcomes for this Plan and the Quarry.

Table 4
Objectives and Key Performance Outcomes

Objectives	Key Performance Outcomes
Noise	
(a) To ensure compliance with all relevant Project Approval and Environment Protection Licence criteria and reasonable community expectations.	(i) Compliance is achieved with all relevant criteria nominated in the Project Approval 08_0212 and Environment Protection Licence and reasonable community expectations.
(b) To implement appropriate noise management and mitigation measures during all stages of the Project.	(ii) All identified noise management and mitigation measures are implemented to the extent required.
(c) To implement an appropriate attended and unattended noise monitoring program to establish compliance or otherwise with relevant criteria during all stages of the Project.	(iii) All identified monitoring is undertaken in accordance with the relevant procedures and at the relevant intervals.
(d) To implement an appropriate complaints handling and response protocol.	(iv) Complaints (if any) are handled and responded to in an appropriate and timely manner.
(e) To implement continual improvement for investigating, implementing and reporting on reasonable and feasible measures to reduce noise.	(v) An appropriate continual improvement program has been implemented.
(f) To implement an appropriate incident reporting program, if required.	(vi) Incidents (if any) are reported in an appropriate and timely manner.

6. ROLES AND RESPONSIBILITIES

Table 5 lists the roles and responsibilities of the personnel responsible for the development and operation of the New Berrima Quarry and implementation of this plan.

Table 5
Roles and Responsibilities

Roles	Responsibilities
NSW Manufacturing Manager	<ul style="list-style-type: none">• Ensure all documentation is reviewed, as required.• Ensure adequate resources are available to enable implementation of the Plan.
Quarry Manager/ Supervisor	<ul style="list-style-type: none">• Ensure for the overall environmental performance of the New Berrima Quarry operations, including the following outcomes of this Plan and specifically the implementation of all noise controls outlined in Section 9.• Incident reporting as outlined in Section 14.
Environmental Officer	<p>Manage the implementation of the following components of this Plan.</p> <ul style="list-style-type: none">• Noise monitoring as outlined in Section 10• Evaluation of compliance as outlined in Section 11 and related follow-up actions.• Complaints handling and response as outlined in Section 12.• Coordinate Environmental Monitoring and publishing of data as outlined in Section 15.• Review of this Plan as outlined in Section 16.• Conduct environmental component of site induction for all employees and contractors.
All personnel	<ul style="list-style-type: none">• Ensure training and awareness induction has been undertaken.• Compliance with this Plan.

7. COMPETENCE TRAINING AND AWARENESS

All Austral personnel and contractors and their employees will undergo noise management awareness training as part of the site induction program. The following areas will be covered in the induction.

- Use of only approved reversing alarms, i.e. mid frequency alarms (“quackers”).
- Use of noise enclosures around any generators and any other stationary noise sources (permanent and/or temporary).
- Awareness of prevailing wind directions and their potential to increase noise emissions downwind (i.e. when < 3m/s).
- Awareness of the noise enhancing effects of temperature inversions and the times of day and meteorological conditions under which they may occur.
- Awareness of operating hours.
- Awareness of Austral’s community complaints protocols.
- Awareness of the period monitoring of noise emissions near the boundary of “Mandurama” property.

The Environmental Officer will be responsible for ensuring the appropriate noise management training is included in the site induction.

8. SURROUNDING RESIDENCES

Figure 4 displays the locations of residences surrounding the Quarry Site.

9. NOISE MITIGATION MEASURES

9.1 Introduction

PA Condition 3(8)(b) requires that this Plan describes the noise mitigation measures that will be adopted to ensure compliance with PA Conditions 3(4), 3(5), and 3(6) (Table 2). This section has been prepared in satisfaction of that requirement. The mitigation measures comprise design and operational safeguards and engineering and procedural noise controls.

9.2 Design and Construction Safeguards

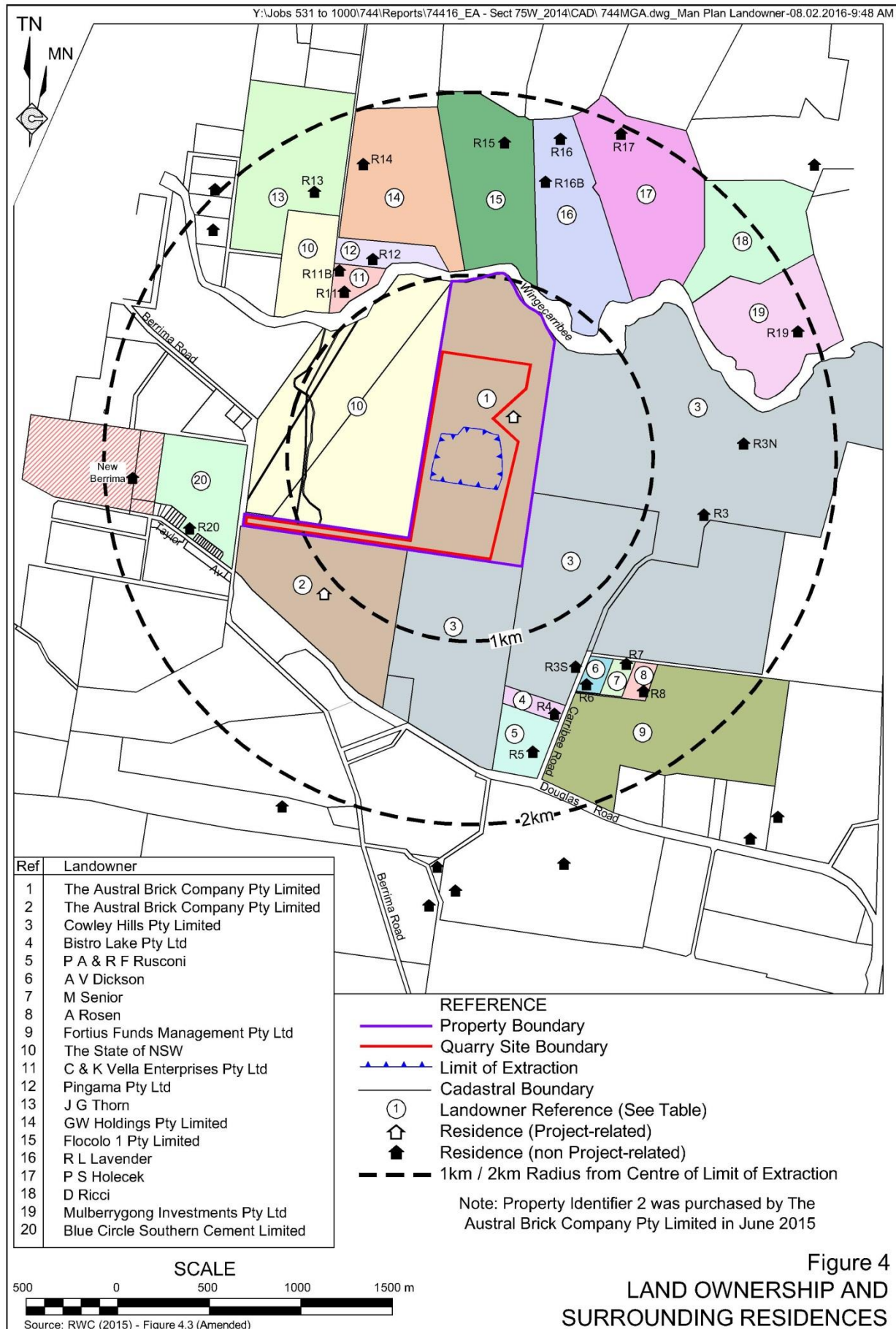
The following design features and construction safeguards will be implemented.

- The construction of the central visibility barrier during Stage 1 of extraction to provide noise screening to residences on the northern side of Wingecarribee River during extraction Stages 2 to 4.
- Following completion of Stage 4 of extraction, the northern visibility barrier will be constructed to continue noise screening to residences on the northern side of Wingecarribee River during extraction Stages 5 to 7.
- The construction of a southern visibility barrier if surplus material is available after construction of the central visibility barrier.
- Retention of existing tree screens at the northwestern and northeastern corners of the extraction area, and retain the existing tree screen on the eastern side of the extraction area
- Planting of a southeastern tree screen to increase tree screening surrounding the Surplus Overburden Stockpile Area.
- No processing of materials will be conducted at the Quarry.
- The transport route avoids wherever possible residential, school and other sensitive receiver areas. Significant proportions of the proposed route include State or regional roads or an existing transportation route.

9.3 Engineering Noise Controls

The following engineering noise controls will be implemented.

- The sound power levels of the mobile equipment to be used at the Quarry will be as follows.
 - Scraper (CAT 637 or equivalent, construction only) SWL L_{Aeq} 118dB(A).
 - Bulldozer (CAT D10 or equivalent) SWL L_{Aeq} 116dB(A).



- Front-end loader (CAT 966 or equivalent) SWL L_{Aeq} 111dB(A).
- Haul Truck (30t) SWL L_{Aeq} 110dB(A).
- Product Truck (road-registered) SWL L_{Aeq} 108dB(A) (L_{max} pass-by).
- All equipment at the Quarry would be regularly serviced to ensure sound power levels of each item remains at or below that nominated above.
- Reversing alarms (mid frequency band) would be fitted to all earthmoving equipment to avoid high frequency noise associated with conventional alarms.

9.4 Procedural Noise Controls

9.4.1 Extraction Operations

The following operational noise management controls will be adopted.

- Austral will ensure that the operating hours and conditions identified in *PA Conditions 3(6)* are strictly complied with. The Quarry Manager/Supervisor will be responsible for ensuring the operating hours are included in the site induction and that no departures will be tolerated outside of these hours.
- Mobile plant will be fitted with standard mufflers. These will be maintained to manufacturer's specifications.
- Regular and effective maintenance of all earthmoving equipment either at the Quarry or off site. Prompt attention will be given to repair of loose or rattling parts and broken equipment. All maintenance work will be carried out by qualified persons.
- All Company personnel and contractors and their employees will be made aware of their obligations and responsibilities with regard to minimising noise emissions. Contractors will be required to familiarise themselves with methods of controlling noisy equipment.

The Quarry Manager/Supervisor will be responsible for all implementation of procedural noise controls and to ensure the noise level from all Quarry activities are within the required noise criteria during the transportation of clay/shale from the Quarry.

9.4.2 Traffic

The following traffic noise management measures will be implemented to minimise truck noise.

- Recording of heavy vehicle departure times via Austral's recording system.
- Implementation of a Drivers' Code of Conduct (see Transport Management Plan).
- Enforcement of speed limit of 30km/hr on the Quarry access road. The 30km/hr limit will be sign posted at the entrance to the Quarry.

The Quarry Manager/Supervisor will be responsible for the implementation of procedural noise controls.

10. MONITORING

10.1 Introduction

PA Condition 3(8)(d) requires that this Plan include a monitoring program that:

- is capable of evaluating the performance of the Quarry;
- includes a protocol for determining exceedances of the relevant conditions in this approval; and
- evaluates and reports on the effectiveness of the noise management system on site.

Additionally, PA Condition 5(3)(a) requires that this Plan include detailed baseline data.

This section has been prepared in satisfaction of those requirements.

It is noted that the criteria nominated in PA Condition 3(4) relate to all Quarry-related activities undertaken within Austral's property including extraction, processing, product loading and truck movements until they depart from the Quarry onto Berrima Road.

10.2 Baseline Monitoring

Ambient noise levels at three representative locations were measured in 2008 by Spectrum Acoustics to support the 2010 *Environmental Assessment*. Noise levels were measured at 15 minute statistical intervals using Svan 949 sound and vibration analysers as environmental noise loggers. The measurements were undertaken in accordance with relevant guidelines and AS 1055-1997 "Acoustics – Description and Measurement of Environmental Noise". The noise loggers used complied with the requirements of AS 1259.2-1990 "Acoustics – Sound Level Meters", and have current NATA calibration certification.

The loggers were programmed to continuously register environmental noise levels over 15 minute intervals, with internal software calculating and storing Ln percentile noise levels for each sampling period. Calibration of the loggers was performed as part of the instruments' initialisation procedures, with calibration results being within the allowable ± 0.5 dB(A) range.

Ambient L_{Aeq} and Rating Background Levels (RBL, L_{A90}) are shown in **Table 6**. Most of the noise data were found to be wind-affected, with noise from nearby trees contributing strongly to data at R1 and R2. The logger at R3 was placed in an open paddock and, in the interests of conservatism, the daytime RBL of 33 dB(A), L_{90} has been adopted for all assessed receivers.

Table 6
Ambient Noise Levels

Location	Leq (day)	Leq (eve)	Leq (night)	L90 (day)	L90 (eve)	L90 (night)
R1 "Mandurama"	57	57	54	48	47	46
R2 "Chesley Park"	46	44	43	39	36	38
R3 "Carribee Farm"	55	46	46	33	32	34

10.3 Attended monitoring

10.3.1 Purpose

The purpose of the attended noise monitoring will be to determine compliance with the criteria identified in *PA Condition 3(4) and 3(5)* (**Table 2**).

10.3.2 Noise Monitoring Locations

Attended noise monitoring will be conducted at three locations near the Quarry property boundary (to the north, east and southeast) to measure compliance with the Quarry noise criterion. **Figure 5** displays noise monitoring locations.

It is noted that in order to minimise disturbance and inconvenience for surrounding land owners, noise monitoring locations are within the Quarry Site boundary between the proposed extraction area and the respective representative residences. The EPA has agreed that demonstration of compliance at those locations will satisfy the requirements of *PA Conditions 3(4), 3(5) and 3(8)*.

Noise monitoring will also be undertaken at surrounding residences in the event of a substantiated complaint, i.e. subject to access being granted to undertake the attended noise monitoring (see Section 10.4 - Supplementary Noise Surveys).

10.3.3 Noise Criteria

It is noted that the criterion throughout the operational life of the Quarry at any non-Quarry-related residence at any time of day, including during visibility barrier construction is 38dB(A) L_{Aeq} 15 minutes.

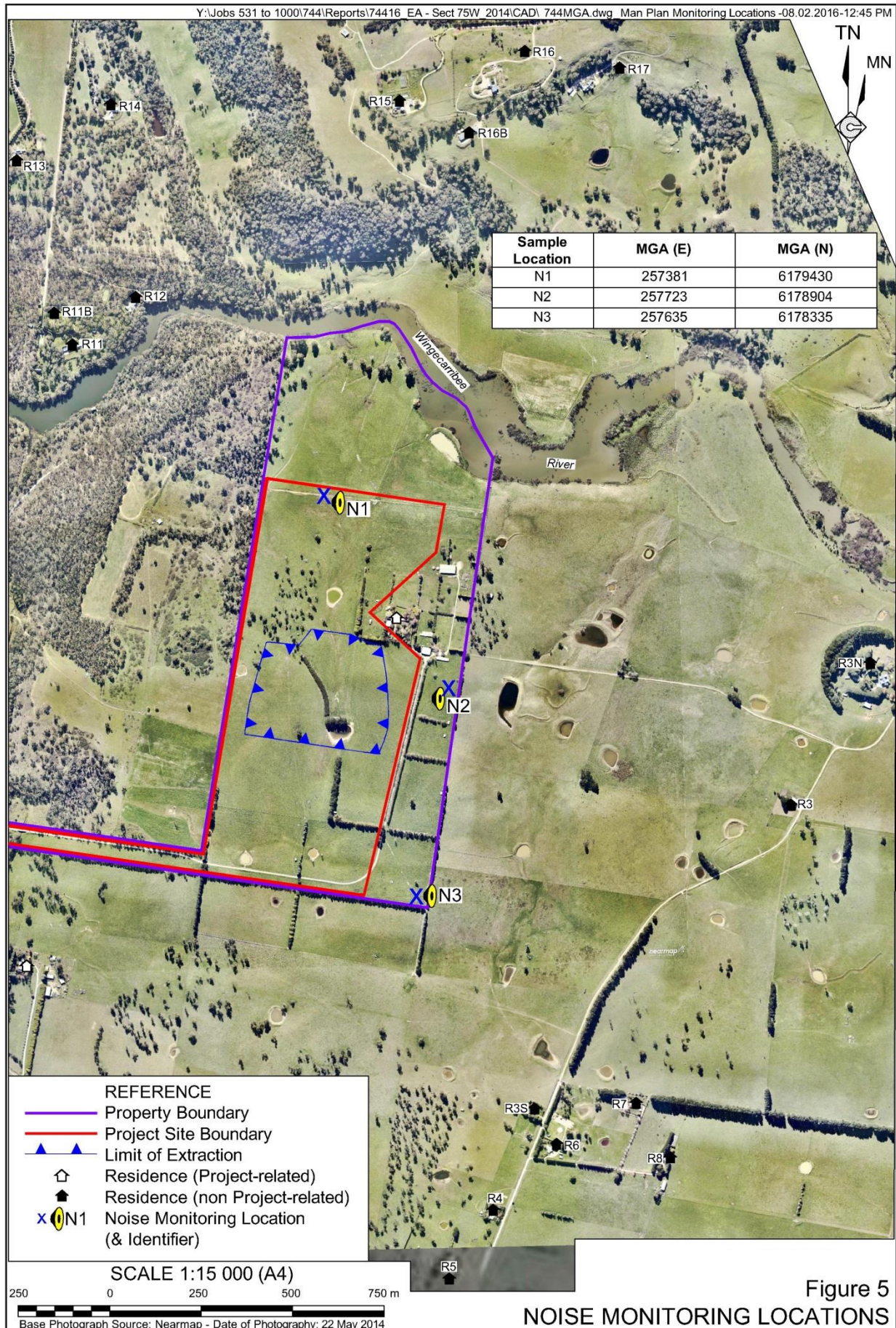
The noise criteria relevant to each noise monitoring location is set out below recognising that each location lies between the approved Quarry Operations and the respective representative residences.

- N1 - 42dB(A)
- N2 - 49dB(A)
- N3 - 44dB(A)

Each of the above criteria has been back calculated by Spectrum Acoustics based upon the acoustic model developed to assess the noise impacts of the Quarry. Compliance with the above intermediate noise levels would ensure the 38dB(A) criterion will be achieved at the surrounding residences.

It is noted that the above criteria does not apply under the following meteorological conditions.

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



During the above meteorological conditions Austral will review the locations of the operating equipment to identify any changes that could be implemented under these conditions. In any event, Austral will discuss the neighbour's perceptions of the noise levels under these conditions as part of its ongoing consultation with neighbours.

10.3.4 Methodology

Attended noise monitoring will be undertaken quarterly during the construction period, i.e. until the commencement of clay/shale despatch from the Quarry. Once operational, noise monitoring would be undertaken annually. Austral may undertake and/or commission more frequent attended noise monitoring during the initial stages of the extraction operations to ensure that the nominated noise-related management and mitigation measures are effective as anticipated.

Attended noise monitoring will be undertaken during the approved operating hours, and will cover a sufficient period to ensure that all project-related operations are monitored. All attended noise monitoring will be conducted in accordance with the requirements of the following documents, as amended.

- *NSW Industrial Noise Policy (INP).*
- *AS 1055.1-1997 "Acoustics – Description and Measurement of Environmental Noise – General Procedures".*

Attended monitoring will be undertaken using a Type 1 integrating sound level meter with 1/3 octave filter and will be set to A-weighting (fast response).

Attended noise monitoring will expressly seek to identify and quantify any relevant modification factors referred to in Chapter 3 of the INP.

All acoustic instrumentation employed throughout the monitoring program will comply with the requirements of AS IEC 61672-2004, *Electroacoustics – Sound Level Meters*, as amended, and will carry current NATA or manufacturer calibration certificates. Instrument calibration will be checked before and after each survey, with the variation in calibrated levels not exceeding $\pm 0.5\text{dB(A)}$.

The maximum ($L_{A\text{max}}$), and the energy equivalent ($L_{A\text{eq}}$) intrusive noise level from operations within the Quarry Site over a 15 minute measurement period will be recorded. On some occasions, the L_{A90} noise level (i.e. without contributions from the Quarry) will also be recorded to identify the prevailing background noise level. Information that will be recorded during monitoring and about each location will include:

- the name of the person undertaking the monitoring;
- location(s) of the monitoring;
- recording intervals (date and times);
- meteorological conditions, i.e. temperature, humidity, cloud cover, and wind speed and direction drawn from the Berrima Cement Works weather station;
- statistical noise level descriptors together with notes identifying the principal noise sources;

- instrument make, model, serial number and calibration details; and
- a brief description of activities occurring within the Quarry during the monitoring period.

Austral will record the type of mobile equipment and their locations operating during the period of noise monitoring.

10.4 Supplementary Noise Surveys

In the event of a substantiated noise-related complaint, Austral will undertake or commission a supplementary attended noise survey as described in Section 10.3.3.

In addition, Austral may, particularly during the initial construction stages of the Quarry, undertake supplementary attended noise surveys in accordance with the procedures identified in Section 10.3.3.

11. EVALUATION OF COMPLIANCE

A noise monitoring report will be prepared within 7 days of each attended noise monitoring event. This report will include an assessment of the monitoring results against the criteria identified in *PA Condition 3(4)*.

All monitoring reports will be reviewed by the Environmental Officer and a copy included within each Annual Review.

In the event that attended noise monitoring identifies an exceedance of the noise criteria identified in *PA Condition 3(4)*, Austral will initiate appropriate corrective and preventative actions as discussed in Section 13.

A copy of the investigation report and regular updates on the status of the identified corrective and/or preventative actions will be provided to the NSW Department of Planning and Environment (DPE) and Environment Protection Authority (EPA) and, if required, the complainant, in accordance with the procedures identified in Sections 12 and 13. In addition, a copy of the report will be placed on Austral's website and included in the subsequent Annual Review.

12. COMPLAINTS HANDLING AND RESPONSE

Noise-related complaints may be received via one of the following methods.

- Directly via the 24-hour, 7 day per week Community Information Line (1800 635 620) or via the Bowral Brick Plant phone line 4861 3031). This number will be displayed on a sign at the Quarry entrance and on Austral's web site.
- Directly via a dedicated email address nswenvironmental@australbricks.com.au which will be advertised in a similar manner to the Community Information Line.
- Indirectly via a local or state government agency.

Following receipt of any noise-related complaint, Austral will implement the following procedure.

1. The complaint will be reviewed by the Environmental Officer or their delegate in conjunction with Quarry personnel to confirm that complaint is justified, and if so to determine the nature, date and time of the offending noise source(s).
2. A supplementary attended noise survey will be undertaken in accordance with the procedures identified in Section 10.3.3 during the next period when operations are comparable to those during the period relating to the complaint. The resulting attended noise monitoring report will be provided to the complainant on receipt.
3. Should the attended noise monitoring report indicate that no exceedance of the criteria identified in *PA Condition 3(4) or 3(5)*, the Environmental Officer will continue to consult with the complainant in relation to managing noise emissions within the Quarry Site.
4. Should the attended noise monitoring report indicate that an exceedance of the criteria identified in *PA Condition 3(4) or 3(5)*, the Environmental Officer will notify the EPA and DPE in accordance with the procedures identified. In addition, the Environmental Officer will continue to consult with the complainant, as required, in relation to the complaint.
5. No further monitoring will be undertaken in the event that two complaints are received from the same person(s) and Austral can demonstrate compliance with the criteria identified in *PA Conditions 3(4) or 3(6)*.

All complaints would be recorded using a proforma complaints book developed for all sites operated by Austral Bricks throughout NSW.

13. CORRECTIVE AND PREVENTATIVE ACTIONS

In the event that attended noise monitoring identifies an exceedance of the noise criteria identified in *PA Conditions 3(4) and 3(5)*, the exceedance will be reviewed to determine the likely cause(s). The review will seek to determine:

- whether the exceedance of the criteria was directly related to a source associated with the Quarry or if environmental factors contributed to the exceedance;
- the primary cause of the exceedance;
- any contributing factors which led to the exceedance;
- whether appropriate controls were implemented to prevent the exceedance; and
- corrective and preventative measures that may be implemented to prevent a recurrence of the exceedance.

Corrective and/or preventative actions will be assigned to relevant personnel of either Austral or its contractor. Actions will be communicated internally through planning meetings and toolbox talks and outstanding actions will be monitored for their effectiveness upon completion.

14. INCIDENT REPORTING

In the event that an initial investigation concludes that an exceedance of an environmental criterion was directly attributed to activities associated with the Quarry, as described in Section 11, the exceedance will be reported to DPE and EPA within 72 hours of identifying the exceedance.

Within 7 days of identifying the exceedance, Austral will submit a written report with regular updates on the status of the additional mitigation actions to the DPE, EPA and, where relevant, the complainant, in accordance with the procedures identified in Section 12. In addition, a copy of all report will in included in the *Annual Review*.

The Environmental Officer will be responsible for incident reporting.

15. PUBLICATION OF MONITORING INFORMATION

Austral will place a copy of all attended noise monitoring reports, as well as incident and noise exceedance investigation reports on Austral's website.

In addition, Austral will include a summary of all attended noise monitoring data within each *Annual Review*. That document, once approved by the relevant government agencies, will be published on Austral's website.

The Environmental Officer will be responsible for publication of all relevant monitoring information.

16. PLAN REVIEW

This Plan will be reviewed, and amended if necessary, following the receipt of an Environment Protection Licence.

In accordance with *PA Condition 5(5)*, this *Noise Management Plan* will be reviewed and, if required, revised within 3 months of:

- the submission of an annual review under *PA Condition 5(4)*;
- the submission of an incident report under *PA Condition 5(7)*;
- the submission of an audit report under *PA Condition 5(9)*; and
- any modification to the conditions of PA08_0212.

The Environmental Officer will be responsible for the review of this Plan.