

# Environmental Assessment

Cleary Bros (Bombo) Pty Ltd Modification of Development Consent 10639 of 2005 (LEC) Activation of Approved Stages 5 & 6 Albion Park Quarry

Lot 1 in Deposited Plan 858245 and Lot 23 in Deposited Plan 1039967

Dunsters Lane Croom

August 2016

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Subject	Ι	Environmental Assessment
In respect of	Ι	Cleary Bros (Bombo) Pty Ltd Modification of Development Consent 10639 of 2005 (LEC) Activation of Approved Stages 5 & 6 Albion Park Quarry
Property	Ι	Lot 1 in Deposited Plan 858245 and Lot 23 in Deposited Plan 1039967 Dunsters Lane, Croom
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# **Executive Summary**

Cleary Bros (Bombo) Pty Limited ("Cleary Bros") applies to modify the development consent granted by the Land and Environment Court (and subsequentlyamended) (the "Amended Consent") for the Albion Park quarry at Dunsters Lane Croom. The application seeks to modify the Amended Consent to undertake further rock extraction from Stages 5 and 6 within the Albion Park quarry (see *Condition 6 of Schedule 3 of LEC 10639 of 2005 Mod 2*).

The reason for the application is the increasing demand for quarry products both within the Sydney and Illawarra Regions as a result of continuing growth. Demand for product from quarries in the Illawarra Region in particular has been exacerbated by the reduction in available supply, including the reduction in alternative products such as slag due to the recent closure of a Blast Furnace by BlueScope Steel Limited at its Port Kembla facility.

By operation of cl.8J(8)(d) of the *Environmental Planning and Assessment Regulation 2000* ("the Rgeulation"), this application is to be assessed and determined in accordance with Part 3A of the Act and, in particular, s.75W. In this regard, this assessment demonstrates that the proposed modification will not *"radically transform"* the development permitted by the Amended Consent.

The likely impacts associated with the proposed quarry operations in Stages 5 and 6 primarily relate to noise, blasting and vibration, air quality, and water quality. All of these likely impacts have been assessed by appropriate expert consultants and it has been concluded that all impacts can be managed within the current development controls and performance criteria contained within the Amended Consent and existing Quarry Environmental Management Plan (QEMP). *Table 5.1* provides a comparison of the controls and performance criteria for the approved development and the modification being sought (refer to *Section 5.0* of this report). Accordingly, there are no further measures needed or proposed to minimise, manage and monitor these impacts.

The activation of Stages 5 and 6 of the Quarry can be achieved by deleting *Condition 6* of *Schedule 3* of the Amended Consent, modifying Condition 5 of Schedule 3 to include reference to Stages 5 and 6, and with minor consequential amendments to the conditions of the Amended Consent. There is no need to alter any other substantive conditions of the Amended Consent or operational characteristics of the quarry. The minor consequential amendments to existing conditions are discussed in *Section 7.0* of this report.

Therefore, it is considered that the modification sought will result in an environmentally sustainable outcome.



# 1.0 Introduction

## 1.1 Background

Martin Morris & Jones Pty Limited (MMJ Wollongong) has been engaged by Cleary Bros to prepare an Environmental Assessment ("EA") for the modification of a development consent application ("the Application") for its Albion Park quarry. The Application seeks to undertake rock extraction from Stages 5 and 6 within the Albion Park quarry.

Cleary Bros has extracted and processed hard rock from its quarries in the Albion Park area since the middle of last century. In May 2005, the Minister for Infrastructure and Planning granted development consent (No. 466-11-2003) for Cleary Bros to extend quarrying into a new area, about 400 metres southeast of the previously operating quarry ("the OriginalConsent"). The Minister also granted consent for a haul road linking the quarry extension with the existing quarry. The Minister was the consent authority at the time as the proposal was considered *"State Significant Development"* under provisions (since repealed) of the *Environmental Panning & Assessment Act 1979* ("the EP&A Act").

The Original Consent was the subject of an objector appeal to the NSW Land & Environment Court (LEC) (Proceedings No. 10639 of 2005). In February 2006, the Court approved the quarry extension subject to conditions ("the LEC Consent"). The LEC Consent for the quarry operation described the approved development as *"Extension of hard rock quarry"* and *"the extension to an existing hard rock quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom"*. The conditions of consent attached to the LEC Consent in Annexure A provided for a maximum limit of material production of 400,000 tonnes per annum (*Condition 8*). It also contained Condition 6 of Schedule 3 ("Condition 6") which states:

*"6. Under section 80(5) of the Act, Stages 5 and 6 must be the subject of another development consent.* 

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of The Fig Tree Hill Land, and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- c) assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to in subclause (b) above;



- *d)* assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public;
- seek independent expert advice on the report if deemed to be warranted;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public."

In November 2008, a modification application (under s.96AA of the EP&A Act 1979) was submitted to the Department of Infrastructure, Planning & Natural Resources (DIPNR) (as it then was) seeking an increase in the approved material production limit from 400,000 tonnes to 800,000 tonnes per annum. On 30 June 2009, the modification was approved(10639 of 2005 MOD 1 - Red) was granted which deleted Condition No. 8 of the LEC Consent and replaced it with the following condition:

# *"8. The production of quarry products from the quarry shall not exceed 600,000 tonnes per annum."*

In December 2012, a modification application (under s.75W of the EP&A Act 1979) was submitted to the Department of Planning and Infrastructure (DPI) (as it then was), seeking an increase in the approved material production limit from 600,000 tonnes to 900,000 tonnes per annum. On 25 June 2015 the Amended Consent (10639 of 2005 MOD 2 - Green) was granted for this purpose.

This Amended Consent is attached as Appendix 1.

The quarry works relative to the Amended Consent have now been operational for the past 7 years. The quarry has operated in a manner consistent with the Amended Consent and in accordance with the adopted Albion Park QEMP. The proposal described in this EA regarding Stages 5 and 6 is a continuation of existing quarry operations already reflected in the Amended Consent and seeks, in effect, to activate Condition 6 albeit by way of modification rather than the grant of further development consent. This EA addresses the matters identified in Condition 6 and is submitted subject to the Secretary issuing environmental assessment requirements (if any) pursuant to s.75W(3) of the EP&A Act.

In addition to the material set out in this EA, an Annual Review (previously titled an Annual Environmental Management Report) for the Albion Park quarry has been prepared and submitted to the Secretary (formerly the Director-General) and the Community Consultative Committee (CCC) members as required by the Amended Consent. The Annual Review is also available for public scrutiny through the Cleary Bros website at <a href="http://www.clearybros.com.au/page/projects/albion-park-quarry-/">http://www.clearybros.com.au/page/projects/albion-park-quarry-/</a>



### **1.2 Conceptual Framework**

This EA provides a description of the subject site, an identification of the modification sought by this application, and an assessment / management of the perceived impacts of this modification for relevant matters. Further, this assessment has been aided by the previous data and inputs from the following specialist consultants:-

•	SLR Global Environmental Solutions:	noise, air quality and blasting assessment;
•	Perram & Partners:	environmental impact;
•	Golder Associates:	water management;
•	Kevin Mills & Associates:	flora/environment;
•	Taylor Brammer Landscape Architects:	landscape; and
•	Cleary Bros:	quarry industry specialists.

A pre-lodgement meeting for this proposal was held with the NSW Department of Planning and Environment (DPE) on 29 September 2015, and the advice provided (dated 1 October 2015) has assisted in the preparation of the application documentation (refer to *Appendix 2*). In addition, subsequent advice from DPE dated 6 July 2016 confirms that the Department will not be issuing formal Secretary's Environmental Assessment Requirements (SEARs) for this modification, and that the Department's advice of 1 October 2015 consitutes the environmental assessment requirements for this proposed modification accordingly (refer also to *Appendix 2*).



# 2.0 Site Characteristics

# 2.1 Property Description

The site to which the Amended Consent applies is situated to the south of Albion Park Rail, and is described as follows:-

•	Lot 1 in Deposited Plan 858245:	approved/operating works;	quarry	activities	and	ancillary
•	Lot 23 in Deposited Plan 1039967:	processing plant, pro entrance.	oduct sto	rage and s	ale, sit	e

The location of these allotments is identified within Figure 1.

### 2.2 Environmental Characteristics

The following information (where relevant) has been partly extracted from the QEMP for Cleary Bros' Albion Park Quarry (Perram & Partners 2008) which is attached as *Appendix 3*. This QEMP describes construction and operational activities with the extension of the quarry that have the potential to impact on the environment. The objectives of the QEMP are as follows:-

- present the environmental management strategy for the hard rock quarry extension;
- detail practices, procedures, work methods and other requirements necessary for the operation to achieve environmental goals specified by the development consent and environmental protection license;
- include within a single document, all the regulatory environmental requirements for operating the site.

As mentioned previously, the quarry activities within Lot 1 in Deposited Plan 858245 have been operational for the past 7 years and has altered the topography of the site since that time.

#### 2.2.1 Topography & Drainage

The quarry is located near the crest of the Wentworth Hills in the upper catchment of the Minnamurra River. The land has an altitude ranging from 70 metres AHD in the south, to 140 metres AHD in the north. The extraction area is a natural amphitheatre with two spurs extending towards the south along its eastern and



western boundaries. Steep slopes drop from the spur lines to watercourses, draining to an unnamed creek flowing through the 40-hectare property. The creek is outside the extraction area. The flow in the watercourse draining the site and in the unnamed creek upstream of the site is measured and recorded on a monthly basis by an independent testing laboratory.

#### 2.2.2 Geology & Soils

R W Corkery & Co Pty Ltd investigated the geology of the site in 1997 drilling 21 boreholes. Rock strata belong to the Bumbo Latite, referred to as basalt, occurring as two distinct flows separated by tuffaceous agglomerate and overlain by weathered latite and soil. Sandstone underlies the lower basalt flow.

Soil terrain mapping shows the dominant soil type to be a friable reddish brown sandy clay loam topsoil over a subsoil comprising a reddish brown sandy clay or light medium clay. The soils are deep, well structured and free draining but with low fertility. They are strongly acidic with a low to moderate cation exchange capacity and exhibit moderate to high erodibility.

#### 2.2.3 Climate

The nearest source of climatic information is Kiama Bowling Club, approximately 9km south-east of the site. Records have been kept from this recording station since 1897. *Table 2.1* presents a summary of significant data from Meteorological Station No. 068038, Kiama Bowling Club.

Item	J	F	М	Α	М	J	J	А	S	0	Ν	D	Year
Temperature Mean Daily Max Temp. (°C)	25	24.9	24.1	22.1	20.1	17.6	16.8	18.1	19.8	21.7	22.5	23.8	21.1
Mean Daily Min. Temp (ºC)	17.5	17.7	16.4	14.1	12.2	9.3	8.4	8.8	10.6	12.4	14.3	16.3	12.8
<b>Rainfall</b> Mean Monthly Rainfall (mm)	111	119	145	132	121	126	87.6	77.4	75.2	86.7	86.8	94.4	1261
Mean No. of Rain days	12.2	11.7	12.7	11.2	10.8	9.8	8.6	8.5	9.2	10.7	11	11.3	127.6
<b>Humidity</b> Mean 9am Rel. Humidity (%)	72	74	71	69	70	65	63	59	60	64	68	70	66
Mean 3pm Rel. Humidity (%)	67	70	67	67	65	58	58	55	58	63	65	66	63
Wind Mean 9 am Wind Speed (km/hr)	8.2	8.1	8	8.1	8	10	10.1	9.3	10	9.8	9.1	9.1	9

Table 2.1	TEMPERATURE,	RAINFALL,	HUMITY AND	WIND SPEED



Mean 3pm Wind 10. Speed (km/hr)	0.8 10.7	10.3	9.1	8.5	9	9.6	11.2	11.7	10.8	11.3	11	10.3
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Note:

1. Monthly rainfall entries rounded to three significant figures

2. Consistent with current data from annual Environmental Management Report

#### Wind Data

A wind rose from the Albion Park meteorological station included in the Environmental Impact Study related to the LEC Consent ("the Original EIS") shows predominance for westerlies, occurring some 30 per cent of the time and being more than twice as common as winds from other directions. Northerlies, north-easterlies and southerlies are the next most common. Westerly winds also show the highest proportion of strong winds, followed by north-easterlies and southerlies, which show a roughly equal proportion of strong winds. (A meteorological monitoring station is established on the project site and provides ten minute average wind speed and direction data).

#### 2.2.4 Hydrogeology

The lattie has low horizontal permeability, except in fractured zones. Groundwater seepage occurs through the intervening agglomerate layer and along the contact surface between the volcanic rock and underlying sandstone. Seepage through the agglomerate layer is collected in existing farm dams. There may also be lateral movement of groundwater from the west following the easterly dipping bedding planes (Golder 1998).

Golder Associates has installed and developed three boreholes on the site for monitoring groundwater levels and quality, one of which is now, as approved by the Department, discontinued as it was located in the quarry extension. Test results are provided within the Albion Park Quarry Annual Review through the Cleary Bros website at http://www.clearybros.com.au/page/projects/albion-park-quarry-/

#### 2.2.5 Surrounding Land Use

The "Belmont" homestead and residue farmland are immediately east of the extractive area. This property forms part of CB's holdings in the area. The balance of the property to the south of the extraction area is partly forested and is being revegetated and restored to native bushland as part of the quarry project.

Land immediately west of the site is owned by Rinker Australia Pty Ltd (now Holcim Australia Pty Ltd) and is being quarried up to the site boundary. Holcim also owns the properties to the south of the site which are also partly quarried. A dairy farm occupies the hill top to the north of the site, referred to as the Figtree Hill land. The farm agists cattle on various adjoining paddocks owned by the quarry companies.

The nearest residences are located on the dairy farm at the crest of the ridge. *"The Cottage"* and *"The Hill"* are approximately 375 metres and 460 metres respectively from the nearest part of the proposed extraction areas in Stages 5 and 6.



#### 2.2.6 Natural Vegetation & Fauna

Kevin Mills & Associates identified five vegetation communities on the site, being:

- Rainforest mainly in the valley below the extraction area with some small patches on the eastern slope within the quarry. This is an endangered ecological community under the *Threatened Species Conservation Act 1995*;
- Open Forest mostly cleared with scattered remnants remaining. The remnants are part of the Illawarra Lowlands Grassy Woodland community, which is also an endangered ecological community under the *Threatened Species Conservation Act 1995;*
- Lantana shrubland occurs mostly on the edges of forested areas;
- Sedgeland/Rushland small patches in farm dams within the quarry area; and
- Non-native grassland most of the land to be quarried.

There are several plant species of conservation importance in the area, but no threatened fauna species were recorded in the area. Fig trees are to be included in the revegetation plans to maintain habitat for the Grey-headed Flying-fox. An ecological and rehabilitation monitor assessment is provided within the Albion Park Quarry Annual Review through Cleary Bros website at http://www.clearybros.com.au/page/projects/albion-park-quarry-/

#### 2.2.7 Archaeology & Heritage

Two surveys of Aboriginal archaeology have found no artefacts in the extractive area. A subsequent survey of the access road route in 2007 also found no artefacts. The Wentworth Hills have a long history of dairy farming and quarrying. The house on the neighbouring dairy farm, *"The Hill"* is a listed heritage item, but will not be physically affected by Stages 5 and 6. A heritage management plan has been prepared for the project with archival recording of the "Kyawana" ruin and "Belmont" house having been undertaken. These structures are not physically affected by Stages 5 and 6.

#### 2.3 Planning Controls

At the time the Original Consent granted (May 2005) and the LEC Consent was granted (February 2006), the site was controlled by *Shellharbour Rural Local Environmental Plan 2004 (LEP)* within which it was zoned:-



- "part 1(x) Extractive Industry Zone"; and
- "part 1(r1) Rural Landscape Zone".

The bulk of the quarry site was zoned 1(x), whilst a narrow strip along the eastern side of the quarry was zoned 1(r1). The land use controls applicable to the 1(x) zone permitted *"extractive industries"*, however this land use was generally prohibited within the 1(r1) zone. *Statement Environmental Planning Policy (SEPP) (Mining, Petroleum and Extractive Industries) 2007* permitted quarrying within the 1(r1) zone.

These planning controls were also in place at the time the first modification to the LEC Consent was issued on 30 June 2009.

On 5 April 2013, the planning controls for the City of Shellharbour were generally replaced by *Shellharbour Local Environmental Plan 2013* within which the site is zoned:-

- Part Zone RU1 Primary Production;
- Part Zone RU2 Rural Landscape;
- Part Zone E2 Environmental Conservation; and
- Part Zone E3 Environmental Management.

In this regard, the quarry workings within the site are primarily contained in those parts zoned RU1 and RU2, with the quarry haul road encroaching within the zone E2 land (refer *Figure 4*). These planning controls were also in place at the time the Amended Consent granted on 25 June 2015.

The land use planning controls applicable to Zone RU1 permit "extractive industries", however, this land use is generally prohibited within the other zones abovementioned. Notwithstanding this, these current zoning controls are similar to the controls applicable within *Shellharbour Rural LEP 2004*, which were in place at the time the original Development Consent was granted. Again, the provisions of *SEPP (Mining, Petroleum and Extractive Industries) 2007* are also applicable in this instance making 'extractive industry' permissible with consent on the land affected by Stages 5 and 6.

As mentioned within *Section 1.1* of this report, both both the Original Consent and the LEC Consent were assessed as State significant development for the purposes of s.76A(8)(c) of the EP&A Act. The development was also classified as designated development pursuant to the provisions of s.77 of the EP&A Act.

Section 76A(8) was repealed on 1 August 2005 with the introduction of what became known as Part 3A, which dealt with major infrastructure and other declared projects. The LEC Consent was, from that date, taken to be an approval granted pursuant to Part 3A and Part 3A applied to the LEC Consent as if it were a Project Approval granted pursuant to Part 3A: see EP&A Act, Schedule 6 Clause 88.



On 1 October 2011, Part 3A of the EP&A Act was repealed. Pursuant to Clause 3 Schedule 6A of the EP&A Act, Part 3A continues to apply to the Amended Consent. Clause 12 of Schedule 6A (and cl. 8J of the Regulation) specifically continues the operation of the Part 3A modification power in what was s.75W of Part 3A.

The Amended Consent is therefore a consent to which the provisions of Part 3A continue to apply and may be modified in accordance with the provisions of Part 3A. Section 75W relevantly provides:

*"Modification of Minister's approval 75W. (1) In this section:* 

"Minister's approval" means an approval to carry out a project under this Part, and includes an approval of a concept plan.

"modification of approval" means changing the terms of a Minister's approval, including:

- (a) revoking or varying a condition of the approval or imposing an additional condition of the approval; and
- (b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval."
- (2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.
- (3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.
- (4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.
- (5) The proponent of a project to which section 75K applies who is dissatisfied with the determination of a request under this section with respect to the project (or with the failure of the Minister to determine the request within 40 days after it is made) may, within the time prescribed by the regulations, appeal to the Court. The Court may determine any such appeal.



(6) Subsection (5) does not apply to a request to modify:

- (a) an approval granted by or as directed by the Court on appeal, or
- (b) a determination made by the Minister under Division 3 in connection with the approval of a concept plan.
- (7) This section does not limit the circumstances in which the Minister may modify a determination made by the Minister under Division 3 in connection with the approval of a concept plan."

In consideration of above, it is noted that the most recent Notice of Determination issued by the DPE on 25<sup>t</sup> June 2015 was issued under s.75W of the EP&A Act. This proposal seeks modification of the Amended Consent pursuant to this power also.



# 3.0 Modification Proposal

# 3.1 Purpose

The Application seeks to modify the Amended Consent applying to the Cleary Bros Albion Park quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom, so that rock extraction activities can be undertaken within Stages 5 and 6 of the quarry.

In accessing this new extraction area, no substantive changes to the approved quarry operations are being proposed. As a result theenvironmental impacts considered relevant for this modification will not be changed, should support for the modification be forthcoming.

### 3.2 Boundary of Operational Area

The approved limit of extraction is shown in the survey *Figure 2.2* of the QEMP (see *Appendix 3*). The boundaries have been clearly identified on the site survey pegs and fencing surrounds the area where work is being carried out.

Independent audit reports confirm that the boundaries remain clearly marked and that extraction remains within the boundaries. The audit reports are submitted to the DPE and uploaded to the Cleary Bros website for public access through <a href="http://www.clearybros.com.au/page/projects/albion-park-quarry-/">http://www.clearybros.com.au/page/projects/albion-park-quarry-/</a>

*Figure 4.1* of the QEMP (see *Appendix 3*) identifies construction work carried out prior to the commencement of extraction under the Amended Consent. Rock extraction is currently progressing in Stages 2 and 4.

### 3.3 Method of Extraction

The quarrying process in Stages 5 and 6 will essentially follow the process adopted for the previous and current extraction stages. This process involves removing overburden from the hard rock resource by blasting, excavating the broken basalt and loading to off-road trucks for delivery to the processing plant. Currently the haul road from the quarry floor runs through the eastern and northern sides of the Stage 3 and 4 extraction areas to link to the main haul road which leads to the quarry processing area. As extraction moves towards the east of the site, that is towards Stages 5 and 6, the haul road will be removed. A new haul road from the quarry floor will be constructed, as was identified in the Original EIS.

This haul road will be constructed within the western boundary of Stage 1 and 2 to link the main haul road to the processing plant. Quarry overburden will be used to form this haul road and to provide stable batters.



Surface water runoff from all disturbed land will be directed to the main sedimentation basin which is located in the quarry floor within the Stage 1 extraction area. Refer to the 'Approved Extraction Site' Plan attached as *Appendix 4* of this report.

Protocols approved by the EPA exist which permit water to be pumped from the sedimentation basin into Watercourse 2 which is included in the site's Environmental Protection Licence.

### 3.4 Rehabilitation

Quarry rehabilitation will progress in accordance with the approved Rehabilitation Management Plan for the site and in compliance with *Condition 40* and *41* of the Amended Consent.

#### 3.5 Need & Justification

The Albion Park Quarry recently received approval from the DPE to increase its annual production from 600,000 tonnes to 900,000 tonnes. The Amended Consent was granted partially on the demonstrated increase in demand for quarry products to support the construction industry both in the Illawarra and Sydney Metropolitan areas.

The demand has increased due to unprecedented growth in major infrastructure projects and the reduction in availability of blast furnace slag products following the closure of No. 6 furnace at Bluescope Steel (Port Kembla).

The increase in annual production has and will continue to impact on the extraction rate and accessibility to the existing hard rock resource at a quarry. Initially it was envisaged that each of the 6 stages of the extraction area would be completed in 5 year periods. This was based on the estimated market demand of 400,000 tonnes per annum. Market conditions have changed and created an increase in demand for quarry products. It is estimated that approximately 16.5M tonnes of high quality hard rock exists within the total extraction site. Approximately 6M tonnes is located in Stage 5 and 6.

Quarrying in the extraction area approved by the Amended Consent commenced in 2009 and based on current demand the available resource in Stages 1 to 4 may be exhausted within 3 to4 years. Approval to extend into Stages 5 and 6 is required to prepare the area for efficient and environmentally effective extraction of the high quality rock. Cleary Bros are mindful that, at any one time, only that amount of land necessary to access this rock for extraction will be disturbed.



The construction methodology to extract rock from Stage 6 will require benching through Stage 4 and into Stage 6. Consequently a substantial quantity of rock in Stage 4 cannot be extracted until overburden is removed from Stage 6. For this reason, approval to commence quarrying in Stages 5 and 6 is required now and well before all available rock is extracted from Stage 4.



# 4.0 Community Consultation

Preliminary community consultation has already taken place, with respective agencies, community groups, the landowners of Fig Tree Hill land, and stakeholders. In this regard, the following documents the details of the consultations that Cleary Bros has carried out to date in relation to the proposed modification for Stages 5 and 6.

- Letter dated 29<sup>th</sup> June 2015 sent to all CCC members including the landowners of Fig Tree Hill land, NSW DPE, EPA and Shellharbour City Council.
- Minutes of the CCC meeting held on 8<sup>th</sup> July 2015 (refer Item 3) which was attended by a representative of the landowners of Fig Tree Hill land. No comments received in response during this meeting.
- Minutes of the CCC meeting held on 9<sup>th</sup> Dec 2015 (refer Item 4) which was attended by a representative of the landowners of Fig Tree Hill land. No comments received in response during this meeting.
- Letter prepared by MMJ dated 20<sup>th</sup> July 2016 sent to all CCC members, including representatives of Fig Tree Hill land, Shellharbour City Council and the community.
- Minutes of the CCC meeting held on 21<sup>st</sup> July 2016 (refer Item 2) which was attended by a representative of the landowners of Fig Tree Hill land. Discussions were held regarding timeline for submission, and where copies of the EA prepared by MMJ could be obtained from if required.

A copy of the above meeting minutes and correspondence is attached as *Appendix 5* for consideration.

Cleary Bros has not received any written responses from any members of the community as part of this consultation process. It is understood that verbal discussions with Mr Matt Fuller from the EPA took place regarding another matter a few weeks after sending out the letter on 29 June 2015 wherein Mr Fuller acknowledged the receipt of this letter. We understand that Mr Fuller enquired as to when the works in Stage 5 and 6 would likely commence. Cleary Bros replied by suggesting they intended to submit the application for approval to the DPE within 6 months, however, that works, if approved, were not likely to commence within the next 2 years for Stages 5 and 6.



In addition, as mentioned, a pre-lodgement meeting for this proposal was held with the NSW DPE on 29 September 2015 and the advice provided has assisted in the preparation of the application documentation (refer to *Appendix 2*). Further to this, subsequent advice from DPE dated 6 July 2016 confirms that the Department will not be issuing formal Secretary's Environmental Assessment Requirements (SEARs) for this modification, and that the Department's advice of 1 October 2015 consitutes the environmental assessment requirements for this proposed modification accordingly (refer also to *Appendix 2*).

Finally, following the meeting of 21<sup>st</sup> July 2016, MMJ were contacted by a representative of the landowners of Fig Tree Hill land requesting a copy of the EA report. MMJ then mailed both an electronic and hard copy of the submission to the requested mail address. From this, a suggestion to modify *Figure 1* of the EA was put forward by a representative of the landowners of Fig Tree Hill land to include the location of an approved house site within their property. This has now been updated and included on *Figure 1* accordingly.

It is understood that further consultation with the relevant stakeholders (in addition to the above) will take place as part of the Modification Application assessment exhibition period and process.



# 5.0 Planning Considerations

As detailed in *Section 2.3* of this Assessment, the Application may be considered and determined in accordance with the provisions of *s.75W* of the *EP&A Act*.

The language of *s.75W* does not contain an express limitation on the power to amend an approval.

However, in <u>Williams v Minister for Planning</u> (2009) 164 LGERA 204 Biscoe J of the Land and Environment Court held at [57] that: ...*a modification of approval in s.75W means changing the terms of an existing approval without radical transformation.* His Honour went on to describe the test of what comprised a *radical transformation* by reference to changes to both the description of the development if modified [58] and the nature and extent of the changes brought about by such a modification [62]. His Honour's analysis indicates that it was required that both a qualitative and quantitative analysis of the consequences of a modification was required to determine if there was a radical transformation.

The proposed modification seeks to undertake Stages 5 and 6 of the Albion Park quarry for further rock extraction area, whilst maintaining the operational characteristics of the development as approved with minimal change. The modified development is considered not to be a *"radical transformation"* of the existing Amended Consent for the following reasons:-

- The LEC Consent granted consent to the development as "Extension of hard rock quarry" and "the extension to an existing hard rock quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom". The Modification Application does not alter that description as the development, even as modified, continues to be development for the purpose of a hard rock quarry;
- 2. The modified development applies to the same approved development site being Lot 1 in Deposited Plan 858245 and Lot 23 in Deposited Plan 1039967;
- 3. The total quarry extraction area (including Stages 5 and 6) of approximately 17 hectares will not be altered.
- 4. The total extraction capacity of the quarry will be maintained at the estimated 16.5 million tonnes of material as approved;
- 5. The operational characteristics of the quarry will generally remain constant with minimal change as discussed later in this EA (ie. extraction methods, transport management, hours of operation, amelioration measures, services and the like);



- 6. The only substantivechanges to the Amended Consent required will be deletion of Condition 6, the amendment of Condition 5 to refer to Stages 5 and 6 and minor consequential changes to some conditions (as described in *Section 7.0* of this report); and
- 7. It will be shown that environmental impacts of the modification will be acceptable.

The table below assesses the proposed modification against those matters considered in the Original EIS and the conditions of the Amended Consent:

CRITERIA	APPROVED LIMIT (consent condition)	NATURE OF CHANGE	PREDICTED LEVEL IF MODIFICATION IS APPROVED	CHANGE/NO CHANGE TO LIMIT
Development Site	Lot 1, D.P. 858245	No change	Nil	Nil
Quarry Extraction Area	16.96 Ha	No change	Nil	Nil
Total Extraction Capacity	16.5 million tonnes	No change	Nil	Nil
Quarry Lifespan	30 years	Possible reduction	Within consent period (see Note 1)	Nil
Topography Geology and Soils Climate Hydrology and Flooding		No change	Nil	Nil
Water Quality	As defined in Schedule 4 Cl.13	No change	Within objective levels identified in consent	Nil
Noise	Schedule 4 Cl.4-9 The Hill 35dBa Cody res 35dBa	No change	Predicted Original Current Mod. EIS The Hill 38 34 34 Cody res 52 45 45	Nil
	The Cottage 35dBa Greenmeadows 41dBa		The Cottage483434Greenmeadows413636	
Blasting & Vibration	Schedule 4 Cl.10-15 115dB (95% of annual blasts) 120dB (at any time) 5mm/s (95% of annual blasts) 10mm/s (at any time) 1 blast per day (max)	No change	Modification 112.3dB 2.72mm/s < 1 blast per day (max)	Nil
-	Schedule 4 Cl.16-20		Dust Deposition	
Air Quality	Dust Deposition <4g/m²/month (annual average) <10g/m²/month (PM10) 24hr <50mg/m <sup>3</sup>	No change	Current Mod. 2.1g/m²/m <4g/m²/m 2.7g/m²/m <10g/m²/m 30ma/ m³	Nil
Transport/Traffic	Schedule 4 Cl.46 Site access via East West link roundabout.	No change	No change to current level of service at East West link roundabout. Site access is via roundabout	Nil
Flora/Fauna	Schedule 4 CI.34-38	No change	No change	Nil
Landscape & Visual Characteristics	Schedule 4 CI.54-57	No change	No change	Nil
Indigenous & Non- Indigenous Heritage	Schedule 4 CI.51	No change	No change	Nil
Socio-Economic	No Limitation	No change	No change	N/A

#### TABLE 5.1 : COMPARISON OF DEVELOPMENT CRITERIA

**Note 1:** The quarry life span was estimated at 30 years. This equates to an average annual extraction rate of 550,000 tonnes. The recently approved increase in the extraction rate to 900,000 tpa may potentially reduce the quarry life span. However, it must be noted that this application to modify the Amended Consent does not seek to extend the quarry life span.



As can be seen from the above, this Applicationdoes not alter or vary other conditions of the Amended Consent, except where minor consequential changes are required to refer to Stages 5 and 6. In particular, the development even after modification will continue to operate in accordance with the conditions of the Amended Consent. Further, it will be shown that all constraints on the performance of the development will be met without any change.

Therefore, it is considered that the Application is capable of being characterised as a "modification" in that the proposed extension to Stages 5 and 6 does not *radically transform* the Amended Consent. As such, this Application can be approved/determined in accordance with the provisions of *s. 75W*.

The land use planning provisions now applying to the site under *Shellharbour LEP 2013* are identical to those provisions that were applicable to the site at the time the Amended Consent was granted.



# 6.0 Environmental Assessment

# 6.1 Air Quality

In considering the overall impacts on air quality relative to this Application, SLR Consulting Pty Ltd was commissioned to conduct an Air Quality Impact Assessment in relation to the activation of Stages 5 and 6 of the Albion Park Quarry. The report on the results and findings of this assessment is attached as *Appendix 6* and concludes as follows:-

"The Albion Park Quarry is currently extracting 900,000 tpa of hard rock from Stage 4 of the operations. This assessment addresses the potential impacts to air quality from extracting 900,000 tpa of hard rock from Stage 5 and 6 of the operations. SLR has historically conducted air quality impact assessments for this quarry.

Atmospheric dispersion modelling was carried out to determine the potential impacts to air quality of extractive activities for the Project. The potential emission-generating activities for the both stages of operation have been identified and potential emissions from these activities were estimated based on available information and emission factors from the literature.

The existing air quality environment was quantified through a combination of monitoring data from both the Project Site and a regional station maintained by the NSW Office of Environment and Heritage. Data from the on-site meteorological station were used to represent the local atmospheric dispersion conditions.

Dispersion modelling of the emissions to predict maximum off-site pollutant concentrations indicates that the proposed operational activities would comply with all relevant ambient air quality criteria at all representative surrounding sensitive receptors, even when existing background pollutant levels are considered.

Based on the modelling approach, it is concluded that dust and particulate matter impacts during the annual extraction of 900,000 tpa of hard rock during Stage 5 and at the Albion Park Quarry would not cause exceedances of the relevant air quality criteria."

Accordingly, there are no further measures required to minimise, manage or monitor the air quality within the locality as a result of the proposed modification.



### 6.2 Noise & Blasting

In considering the overall impacts of noise and blasting relative to this Application, SLR Consulting Pty Ltd was commissioned to conduct a Noise and Blasting Assessment/Management Plans in relation to the activation of Stages 5 and 6 of the Albion Park Quarry. The report on the results and findings of this assessment is attached as *Appendix 7*, and concludes as follows:-

#### "Blasting & Vibration

SLR Consulting Pty Ltd reviewed historic site data for compliance with Condition 14(d) of the 2015 Consent and to predict the emissions from blasting when extracting rock in Stages 5 and 6. Blast design procedures have been developed to ensure that air blast at the closest residence will not exceed the consent condition of 115dBA linear. This condition allows for up to 5% of the total number of blasts to exceed the 115dBA however there can be no exceedance of 120dBA. Site laws have been developed to manage air blast and vibration to ensure that the blast emissions are kept within the criteria.

The MIC (kg) of blasts in the Stages 5 and 6 area of the quarry extension will not exceed the mass of explosives given by the following formula:

MIC (kg) = <u>(distance to nearest receiver (m))</u><sup>2</sup> 2352

By incorporating deck charging of the blast holes in each blast, and generally initiating the blast in the direction away from the closest receiver location, it is predicted that emissions from blasting in Stage 5 and 6 (using an MIC in accordance with the blasting site law established for the quarry) will result in compliance with the general consent condition of 5mm/s ground vibration.

Predictions of ground vibration and air blast will be conducted prior to each blast by the acoustical consultant in order to determine the impact at the critical receiver locations. The ground vibration and air blast site laws will be updated on a regular basis to reflect the blast results obtained.

#### Noise

*SLR Consulting Pty Ltd reviewed the performance to date of the noise impact from quarry operations relative to the noise criteria identified in the consent conditions (Table 5.1 Noise Limits) and to utilize the available data to predict the noise levels generated by quarrying activity in Stages 5 and 6 of the approved extraction area.* 



Comparison of the 2010 to 2015 compliance noise levels, (presented in Table 2 of the report) with the noise level predictions presented in Table 7.1.1 of the original Noise & Blasting Impact Assessment for the quarry extension EIS, indicates that the quarry operational noise range is from OdBA to 1dBA lower than the predicted levels. The quarry operational equipment fleet used for the original EIS assessment is similar to that proposed for operations within Stage 5 and 6, consequently the operational noise level at "The Hill" residence would be within ± 1dBA of that predicted. The predicted Stage 5 and 6 operational noise level at "The Hill" residence in the EIS is 34dBA LAeq (15minute). It is therefore anticipated that the actual noise level will be between 33dBA LAeq (15minute) and 35 dBA LAeq (15 minute). This predicted noise level will comply with the 2015 Consent Stage 5 and 6 noise criterion at "The Hill" fo 35dBA (15 minute)."

It is concluded that the estimated impacts of noise, blasting and vibration will be consistent with the requirements of the current consent conditions.

### 6.3 Traffic Management

This Application does not seek to increase the rate of extraction or the annual quarry production above the existing consent condition of 900,000 tonnes per annum. There will be no increase in truck movements from the quarry site as a result of extracting rock in Stages 5 and 6.

A "Traffic Impact Assessment " report prepared by GTA Consultants was lodged as part of the in modification application for the increase in quarry production to 900,000 t.p.a that was approved by the Minister on 26<sup>t</sup> June 2015 (the Amended Consent). This report concluded that *"there will be no noticeable change to the peak operating periods for the Cleary Bros Albion Park Quarry with regards to traffic generation"* and further "*that the existing (& proposed) quarry traffic generation can be adequately accommodated by the surrounding road network which is operating satisfactorily & with good levels of service & significant spare capacity."* 

The Amended Consent grantedby the Minister for the Extension of the Albion Park Quarry, included conditions relating to the provision of a Transport Management Plan (*Condition 47*) and a Cumulative Traffic Impact Study (*Conditions 47A and 47B*). These conditions are as follows:-

#### "Transport Management Plan

47. The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:

- a) be prepared by a suitably qualified traffic consultant, in consultation with RMS and Council and submitted to the Secretary for approval by 31 August 2015;
- b) include a drivers' code of conduct for the development;



- c) describe the measures that would be implemented to ensure:
  - noise generated by heavy vehicles entering and leaving the site is minimised between 10 pm and 6 am;
  - all drivers of vehicles related to the development comply with the drivers' code of conduct; and
  - o compliance with the relevant conditions of this consent; and
- *d) include a program to monitor the effectiveness of the implementation of these measures.*

#### Cumulative Traffic Impact Study

47A. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, cause to be prepared an independent Cumulative Traffic Impact Study. The study must:

- a) be undertaken by a suitably qualified traffic consultant, whose appointment has been approved by the Secretary;
- *b) be commissioned by 31 August 2015, and completed by 30 November* 2015, or as otherwise agreed in writing by the Secretary;
- c) be co-funded by the operators of the Albion Park, Dunmore and Bass Point quarries, proportionate to the quarries' respective quarry product road transport limits, as approved at 31 August 2015;
- d) include a comprehensive assessment of current and future projected cumulative traffic impacts of the three quarries on the classified road network, undertaken in consultation with the RMS; and
- e) identify any reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road, and the likely cost of implementing these measures.

47B. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, prepare and implement a program to implement any reasonable and feasible measures identified in the Cumulative Traffic Impact Study not already undertaken by the Applicant, in an equitable manner with the two other quarry operators, to the satisfaction of the Secretary. The program must be submitted to the Secretary for approval by 31 December 2015, or as otherwise agreed in writing by the Secretary."



In this regard, the Transport Management Plan (TMP) was prepared by Traffic Consultants – The Transport Planning Partnership P/L. A copy of the TMP is included in *Appendix 8*. The TMP monitoring program is being complied with, as all drivers have been provided with a copy of the TMP and the new Drivers Code of Conduct. The effectiveness of the plan is being monitored by reviewing the complaints received (if any), which is considered on a regular basis by the Transport Manager.

In terms of the Cumulative Traffic Impact Study, this document was prepared by The Transport Planning Partnership P/L. The study investigated the impacts of truck movements generated by the Bass Point, Dunmore and Cleary Bros Albion Park quarries, as they relate to the classified road network. A copy of this study is included in *Appendix 9* for reference. The study, which was undertaken in consultation with the RMS, concluded that: -

"Based on the insignificant level of traffic volume increases, it is concluded that warrants for capacity improvements to the classified road network are not warranted in order to accommodate the combined increased production of the Albion Park, Bass Point and Dunmore quarries."

This Cumulative Traffic Impact Study was endorsed by DPE on 1 June 2016, as confirmed by correspondence also attached as *Appendix 9*.

Thus, there will be no traffic management impacts associated with this modification.

### 6.4 Water Consumption/Quality

A Water Management Plan was originally prepared for the site as part of the QEMP, which comprised:-

- a) Water Balance;
- b) Erosion and sediment control;
- c) Surface water monitoring;
- d) Ground water monitoring; and
- e) An integrated water management strategy (if the water balance shows a potential demand for water above which can be collected on site from rainfall).

Part of this original Water Management Plan is reference as 'Appendix G' within the QEMP (attached as *Appendix 3* to this report). In 2013, Golder Associates Pty Ltd prepared a Water Management Plan Review report in accordance with the provision for periodic review of the monitoring programme. This updated review is attached as *Appendix 10* of this report for reference.

Water required for dust suppression and landscape irrigation for Stages 5 and 6 is to be sourced from a water storage facility located at the low end of the quarry site and its catchment area. During initial



establishment of the quarry (including stripping of soil/overburden, construction of the haul road and quarry bund walls), it was necessary to source additional water from the existing quarry dam.

As Stages 1 to 4 of the quarry has been developed, the new storage facility has provided sufficient water to meet the requirements to suppress dust and for irrigation.

Water for dust suppression on the quarry extension haul road was estimated on the application rate of two litres per square metre per hour, for nine hours per day, over 238 non rain days per year. As adequate water storage exists, it is unlikely that there will be additional demand required for activating Stages 5 and 6.

Water for dust suppression for the existing processing plant/haul roads/stockpiles is sourced from the existing quarry dam, which has a capacity of 24 mega litres. The existing processing plant consumes 11 mega litres per year for spraying conveyors, stockpiles and the manoeuvring areas around the stockpiles. It is estimated that a further 10 mega litres per year is used on the existing haul roads not including the new haul road to the quarry extension as shown in *Appendix 4*.

It is proposed to maintain the current stockpile levels. A fifty percent increase in plant operations may increase water demand on conveyors and the truck/plant manoeuvring areas to a conservative 17 mega litres per annum. The estimated annual water demand for 900,000 tonnes per year in quarry production for the processing plant and haul roads is 27 mega litres, which is 3 mega litres greater than the current storage capacity of the dam. The decile 1 annual rainfall (10% driest) recorded at Kiama is 825mm. This rainfall will adequately replenish the dam to meet the water requirements for the quarry operation. Monitoring the quarry water balance will continue in accordance with the QEMP.

The 2010/2011 and the 2011/2012 quarry annual environmental report indicated that there has been a surplus of available water during these periods. It is therefore concluded that there is adequate water storage capacity to meet the requirements for dust suppression and irrigation within Stages 5 and 6.

Cleary Bros carries out a water monitoring program in accordance with the Water Management Plan, and the water quality in the streams and groundwater has been found generally within or trending below the historical range, recorded prior to the quarry activity commenced on site.

### 6.5 Flora & Fauna

An assessment of the Flora and Fauna impacts has been undertaken by Kevin Mills & Associates, of which the findings of this assessment (Environmental Report) are is attached as *Appendix 11* for consideration. This assessment concludes as follows:-



"The conditions of consent as they concern flora and fauna and relate to Stages 1 to 4 have been met. The problems with the plantings in the regeneration area are being addressed and will eventually be overcome.

As noted in the original EIS, there will be a loss of small regrowth patches of native rainforest vegetation and woody weeds within the footprint of Stages 5 and 6. This has previously been assessed and lead to the need for regenerating the area south of the quarry adjoining the exiting forest along the creek.

Stages 5 and 6 will remove part of the catchment of the small watercourse enfettering the deep gully to the south. The drainage from this area will eventually be captured in the quarry and discharged back into the creek system, as is the case with the current quarry workings."

As such, it is considered that the impacts associated with flora and fauna considerations are acceptable in this instance.

### 6.6 Landscape & Visual Impact

The topographic profile of the subject Stages 5 and 6 area can be described as an 'amphitheatre' amongst the existing landscape, with limited visual connections available to and from outside areas. Notwithstanding, as part of the LEC Consent and operations (refer *Schedule 4 Condition 2*), Cleary Bros constructed a bund wall along the north/north-eastern edge of the Stages 5 and 6 area (established with tree plantings), which provide an added visual buffer from the nearest residential receiver to the north (ie. 'Dunster' home). The details of these buffer works and original Certificate of Compliance provided by Taylor Brammer Landscape Architects is attached as *Appendix 12* for consideration.

As detailed in his Environmental Report attached as *Appendix 11*, Dr Kevin Mills describes – "An inspection was carried out along the screen plantings to the north and northeast of the quarry site. Generally, the trees are growing satisfactorily, forming a relatively complete screen in most places. The plantings combined with the earthen bund provide an adequate screen to the quarry working; see **Photograph 4**."

Therefore, it is considered that the matters associated with both landscape and visual impact will be acceptable.

### 6.7 Social Impact

The Original EIS prepared by Perram and Partners and dated October 2003 provided the following commentary in relation to social impact:-



#### "5.14.5 Social Impact

Having a regard to the circumstances of the application, being for a continuation of an existing quarry on company land using an existing workforce, it is apparent that the proposed extension of Cleary Bros' Albion Park quarry will not create significant social impacts nor will it alter demand for social infrastructure in the local area or Shellharbour as a whole. In particular, the proposal will not cause;

- A distinct impact on any social group;
- An identifiable effect on the social composition and/or character of a locality; or
- An identifiable effect on the availability and use of existing community services, facilities or land.

For the above reasons a specific social impact assessment of the proposal is not considered warranted.

The quarry extension will maintain employment for the current workforce at their current place of work. Hence there will no additional need for housing, transport or other community facilities.

By contrast, failure to approve the quarry extension may result in the social consequences of unemployment and reduced economic activity in the Illawarra region."

Given the proposed modification is simply an activation of the Stages 5 and 6 already considered within the Original EIS, it is submitted that no increased social impacts will be created as a result of the proposal.



## 6.8 Agricultural Impact

As detailed in his Environmental Report attached as *Appendix 11*, Dr Kevin Mills describes – "*The EIS for the quarry expansion (Perram & Partners 2003) noted that a small area of grazing land used by a local dairy farm would be lost as their dry run. That report concluded that this was not important to the viability of the farm. Grazing by cattle has not occurred on this land for some years; the value of the land for agricultural pursuits is minimal."* 

The subject Stages 5 and 6 are currently not used for agricultural purposes, nor have been for many years now since the original quarry extension (Stages 1 to 4). The nature of this proposal is such that there will be no net loss of agricultural land associated with this Application and, as such, the impacts to available agricultural lands will be negligible.

### 6.9 Economic Impact

Hard rock quarrying at Albion Park provides benefits both within the Illawarra and in the greater Sydney Metropolitan Region. The hard rock quarries located in Shellharbour and Kiama areas provide aggregates to these regions and this is expected to increase, particularly in Sydney as the hard rock supplies located in the Sydney region are exhausted.

Cleary Bros quarry product market within the Illawarra area includes supplying quarry products to its own concrete batching plants and civil engineering projects. The reliable supply of quarry products to the Company enables it to be competitive in the civil construction market. In more recent times, Cleary Bros has experienced an increase in demand for quarry products and predicts that this demand increase will continue for the foreseeable future.

The Illawarra Region has been experiencing unprecedented growth in the commercial and public infrastructure development markets in recent years and this is likely to continue. Projects such as the recent \$330m shopping development at Shellharbour, the upcoming Port Kembla Outer Harbour development, and the South Coast Princes Highway upgrades have already generated additional demand for quarry resources. Further extensive development outside the region at Port Botany also sourced hard rock resources from the Albion Park area. Other current and programmed major works also include the South Coast Rail Line upgrade, the West Sydney Infrastructure Works, and the Calderwood subdivision development. Additionally, further residential growth is predicted with 'Greenfields' developments at Shell Cove, Flinders, West Dapto and Camden. All these projects are reliant on availability of competitively priced quarry products.

The closure of the 'No.5 blast furnace' at BlueScope's Port Kembla facility has significantly reduced the availability of slag for processing/production of coarse aggregate and road base. Previously in excess of one



million tonnes of this product was provided to the market annually. Correspondence from the NSW Department of Trade & Investment (Resources & Energy) (attached as *Appendix 13*) confirms that an increase in quarry products availability can address the shortfall now bought about by the BlueScope closure. The future production of slag aggregates and road base is uncertain from the BlueScope source, however, it is clear that the quarries are now responding to the reduction in supply of this material, which is estimated in excess of 600,000 tonnes per annum. For Cleary Bros to adequately respond to the increasing growth in market demand for quarry products, it will be necessary to activate Stages 5 and 6 as proposed.

In addition, Cleary Bros is one of the major employers in the Illawarra region with over 400 current full time staff and numerous casual employees. The employees predominantly reside within the Illawarra. Cleary Bros have a policy of purchasing locally and supporting local business and community organisations. The Company clearly provides a significant and economic benefit to the Illawarra economy.

The ongoing availability of hard rock is paramount to the sustainable future of Cleary Bros to enable it to operate at its current level, remain competitive in the construction industry and continue to contribute significantly to the Region's economy.

#### 6.10 Other

We do not consider that there are any other matters required to be considered for this proposal.

The operational and environmental characteristics associated with the approved development will generally not be altered as a result of this application. This proposed application is a modification of the area for extraction, and it is considered the impacts associated with this increase will be negligible relative to that which has already been approved by the LEC and as modified by the DPE.

In general, the proposed development is in keeping with current community expectations for the appropriate use of available land and will help maintain a suitable land use outcome for Cleary Bros.



# 7.0 Proposed Modified Conditions

Condition 6 will be required to be deleted as a result of this modification.

Upon review of the existing conditions of the Amended Consent, we recommend the following additional consequential amendments/changes to accompany the Stage 5 and 6 modification proposal.

Schedule	Condition	Proposed Amendment
3	5	As part of and subject to this modification, this condition will be varied to approve works to commence in Stages 5 & 6
4	29	Insert the following paragraph at the commencement of this condition: Within 3 months of receipt of approval to commence works in Stages 5 & 6 and prior to the commencement of any works in Stages 5 & 6, an updated Erosion and Sediment Control Plan must be submitted to the Secretary for approval.
4	30	Insert the following paragraph at the commencement of this condition: Within 3 months of receipt of approval to commence works in Stages 5 & 6 and prior to the commencement of any works in Stages 5 & 6, an updated Surface Water Monitoring Program must be submitted to the Secretary for approval.
4	31	Insert the following paragraph at the commencement of this condition: Within 3 months of receipt of approval to commence works in Stages 5 & 6 and prior to the commencement of any works in Stages 5 & 6, an updated Ground Water Monitoring Program must be submitted to the Secretary for approval.

It is also noted that Schedule 4 Condition 14 requires that a Blast Management Plan be prepared prior to works being carried out in Stages 5 & 6 in current consent. This should remain in place.

No other changes to the Amended Consent will be required.



# 8.0 Conclusion

The Application seeks to modify the Amended Consent applying to the Cleary Bros Albion Park quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom, so that rock extraction activities can be undertaken within the approved Stages 5 and 6 of the quarry.

The provisions of *s.75W* of the *EP&A Act* enable the proposed modification to be approved by the DPE. It is considered that the proposed modification will generally have no notable environmental impact, and will not alter the character of the approved development.

This EA addresses the matters identified in *Condition 6* and is submitted subject to the Secretary issuing environmental assessment requirements (if any) pursuant to *s. 75W(3)* of the *EP&A Act*.

A review of those matters required to be considered for this modification has shown that:-

- the modified development is substantially the same development as that for which consent was originally granted, thereby maintaining the acceptable environmental impact assessment associated with the original proposal approved by the LEC Consent;
- the perceived traffic impacts associated with the modification will be negligible as it will not increase the movements approved by the Amended Consent;
- the proposed modification will appropriately manage the impacts of air quality by the continued application of the conditions contained in the Amended Consent;
- the noise and blasting resulting from the proposed modification will be comparable to current site emissions, and will appropriately meet the required legislative noise goals;
- the matter of water consumption and water management is not a prohibiting factor for the proposed modification;
- > the impacts associated with flora and fauna considerations are acceptable in this instance;
- > the matters associated with both landscape and visual impact will be satisfactory;
- there will be no increased social impacts created as a result of the proposal;
- > the impacts to available agricultural lands will be negligible;



- the ongoing availability of hard rock is paramount to the construction industry and the sustainable future of Cleary Bros to enable it to operate at its current level, remain competitive in the construction industry and continue to contribute significantly to the region's economy;
- the proposed modification is in keeping with current community expectations for the appropriate use of the subject land; and
- > the proposed modification will be environmentally sustainable.

It has been shown that all likely impacts for the extraction of rock from Stages 5 and 6 can be managed within the current development controls and performance criteria contained within the Amended Consent and the QEMP. As such, there are no further measures proposed to minimise, manage and monitor these impacts.

It is therefore concluded that the proposed modification can be justified relative to environmental impact and public benefit, and thus, the DPE is respectfully requested to favourably consider this application at the earliest convenience.


# FIGURES:





title :	LOCATION PLA	N		
property :	Cleary Bros Albion I	Park Quarry		
date :	August 2016	scale : reduced	figure :	











STAGING PLAN title :

property : Cleary Bros Albion Park Quarry

date :

June 2016 scale : Reduced figure :





title : ZONING PLAN

property : Cleary Bros Albion Park Quarry

date :





# **APPENDIX 1:**

"Notice of Modification Approval (25 July 2015)"

# **Notice of Modification**

Section 75W of the Environmental Planning and Assessment Act 1979

As delegate of the Minister for Planning, I modify the development consent referred to in Schedule 1, as set out in Schedule 2.

ang

25/6

Oliver Holm Executive Director Resource Assessments and Compliance

Sydney

**SCHEDULE 1** 

2015

The development consent (10639 of 2005) granted by the NSW Land and Environment Court for the operation of an extractive industry on Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom.

#### SCHEDULE 2

1. In the List of Definitions delete the definitions for "AEMR", "DECC", "Department", "Director-General", "DPI", "POEO Act" and "RTA" from the Definitions, and insert the following in alphabetical order:

Annual Review	Annual Review, as required under condition 5 of Schedule 6
CCC	Community Consultative Committee
Department	Department of Planning and Environment
DRE	Division of Resources and Energy within the Department of
	Trade and Investment, Regional Infrastructure and Services
EPA	Environment Protection Authority
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
Feasible	Feasible relates to engineering considerations and what is
	practical to build or to implement
Incident	A set of circumstances that:
	<ul> <li>causes or threatens to cause material harm to the</li> </ul>
	environment; and/or
	<ul> <li>breaches or exceeds the limits or performance</li> </ul>
	measures/criteria in this consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings
	or to ecosystems that is not trivial
Minister	Minister for Planning, or delegate
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
Quarry products	Extractive materials (hard rock products) that are produced at
	the site
Quarrying operations	Includes the removal of overburden and extraction, processing,
	handling, storage and transportation of extractive materials
Reasonable	Reasonable relates to the application of judgement in arriving at
	a decision, taking into account: mitigation benefits, cost of
	mitigation versus benefits provided, community views and the
	nature and extent of potential improvements
RMS	NSW Roads and Maritime Services
Secretary	Secretary of the Department, or nominee

- 2. Delete all references to "AEMR" and replace with "Annual Review".
- 3. Delete all references to "DPI" and replace with "DRE".
- Delete all references to "Director-General" and replace with "Secretary".
- 5. Delete all references to "DECC" and replace with "EPA".

- 6. Delete all references to "RTA" and replace with "RMS".
- 7. In condition 2 of Schedule 3, delete all words after "dated 24 June 2009;" and insert the following:
  - d) Modification Application 10639 of 2005 MOD 2 and the accompanying Environmental Assessment titled *Modification of Development Consent 10639 of 2005 (LEC) Albion Park Quarry Increased Production Limit* prepared by Martin Morris & Jones Pty Ltd and dated November 2013; and
  - e) conditions of this development consent.
- 8. Delete condition 4 of Schedule 3 and insert the following:
  - 4. The Applicant shall comply with any reasonable requirements of the Secretary arising from the Department's assessment of:
    - a) any reports, plans, strategies, programs, reviews, audits or correspondence that are submitted in accordance with this consent;
    - b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; and
    - c) the implementation of any actions or measures contained in these documents.
- 9. Delete condition 7 of Schedule 3 and insert the following:
  - 7. The Applicant may carry out quarrying operations on the site until 21 February 2036.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

- 10. In condition 8 of Schedule 3, delete "600,000 tonnes per annum" and insert "900,000 tonnes in any financial year".
- 11. Delete conditions 7 to 9 of Schedule 4 and insert the following:

#### **Operating Conditions**

- 7. The Applicant shall:
  - a) implement all reasonable and feasible mitigation measures to minimise the operational and road noise of the development;
  - b) minimise the noise impacts of the development during meteorological conditions under which the noise criteria in this consent do not apply; and
  - c) carry out regular noise monitoring to determine whether the development is complying with the relevant conditions of this consent,
  - to the satisfaction of the Secretary.

#### Noise Management Plan

- 8. The Applicant shall prepare and implement a Noise 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevant noise criteria and operating conditions in this consent;
  - c) describe the proposed noise management system on site; and
  - d) include a monitoring program that:
    - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
    - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.
- 7. Delete condition 13 of Schedule 4 and insert the following:
  - 13. During quarrying 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) avoid and/or minimise any blasting impacts, including flyrock, of the development on The Fig Tree Hill Land, or the continued rural use of that land; and

- c) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site,
- to the satisfaction of the Secretary.
- 8. In condition 14 of Schedule 4, delete all words after "Tables 3 and 4;" and insert the following:
  - 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;
    - describe the measures that would be implemented to:
      - ensure compliance with the blasting criteria and operating conditions of this consent; and
        - mitigate, remediate or compensate for any blasting impacts of the development on The Fig Tree Hill Land or the use of that land.
- 9. Delete condition 15 to 23 of Schedule 4 and insert the following:

#### AIR QUALITY

e)

#### Impact Assessment Criteria

15. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate emissions generated by the development do not exceed the air quality impact assessment criteria listed in Table 5 at any residence on privately-owned land.

Pollutant	Averaging Period	Criterion	
Particulate matter < 10 $\mu$ m (PM <sub>10</sub> )	Annual	a,d 30 µg/m³	
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>b</sup> 50 μg/m³	
Total suspended particulates (TSP)	Annual	a,d <sub>90 µg/m</sub> ³	
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	a,d 4 g/m <sup>2</sup> /month

Table 5: Air quality criteria

Notes to Table 5:

- a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
- c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003:Methods for Sampling and Analysis of Ambient Air Determination of Particulate Matter Deposited Matter Gravimetric Method; and
- d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.
- e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 16 and 17 to develop and implement air quality management system that ensures operational responses to the risks of exceedance of the criteria.

#### **Operating Conditions**

- 16. The Applicant shall:
  - (a) implement best management practice to minimise the dust emissions of the development;
  - (b) regularly assess meteorological and air quality monitoring data to guide the day-to-day planning of operations and implementation of air quality mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see Note d to Table 5 above);
  - (d) monitor and report on compliance with the relevant air quality conditions in this consent; and
     (e) minimise surface disturbance of the site, other than as permitted under this consent,
  - to the satisfaction of the Secretary.

#### Air Quality Management Plan

- 17. The Applicant shall prepare and implement an Air Quality 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 by 30 September 2015;
  - (b) describe the measures that would be implemented to ensure compliance with the relevant air quality impact assessment criteria and conditions of this consent;
  - (c) include a site-specific best management practice determination;

- (d) describe the proposed air quality management system; and
- (e) include an air quality monitoring program that:
  - is capable of evaluating the performance of the development;
  - includes a protocol for determining any exceedances of the relevant conditions of this consent;
  - adequately supports the air quality management system; and
  - evaluates and reports on the adequacy of the air quality management system.

#### **METEOROLOGICAL MONITORING**

18. For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

#### SURFACE & GROUNDWATER

#### Water Supply

19. The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of quarrying operations on site to match its available water supply, to the satisfaction of the Secretary.

Note: The Applicant is required to obtain all necessary water licences for the development under the Water Management Act 2000.

#### Water Pollution

- 20. Unless an EPL or the EPA authorises otherwise, the Applicant shall comply with section 120 of the Protection of the Environment Operations Act 1997 during the carrying out of the development.
- 21. The Applicant shall ensure that the discharges from any licensed discharge point/s comply with the limits in Table 6, unless otherwise agreed by the EPA.

Pollutant Units of Measure		Maximum Limit
TSS	mg/L	50
рН	pН	6.5 - 8.5

Table 6: Water Discharge Pollution Limits

10. Delete condition 47 of Schedule 4 and insert the following:

#### Transport Management Plan

- 47. The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:
  - (a) be prepared by a suitably qualified traffic consultant, in consultation with RMS and Council and submitted to the Secretary for approval by 30 September 2015;
  - (b) include a drivers' code of conduct for the development;
  - (c) describe the measures that would be implemented to ensure:
    - noise generated by heavy vehicles entering and leaving the site is minimised between 10 pm and 6 am;
    - all drivers of vehicles related to the development comply with the drivers' code of conduct;
    - compliance with the relevant conditions of this consent; and
  - (d) include a program to monitor the effectiveness of the implementation of these measures.

#### **Cumulative Traffic Impact Study**

- 47A. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, cause to be prepared an independent Cumulative Traffic Impact Study. The study must:
  - (a) be undertaken by a suitably qualified traffic consultant, whose appointment has been approved by the Secretary;
  - (b) be commissioned by 31 August 2015, and completed by 30 November 2015, or as otherwise agreed in writing by the Secretary;
  - be co-funded by the operators of the Albion Park, Dunmore and Bass Point quarries, proportionate to the quarries' respective quarry product road transport limits, as approved at 31 August 2015;
  - (d) include a comprehensive assessment of current and future projected cumulative traffic impacts of the three quarries on the classified road network, undertaken in consultation with the RMS; and
  - (e) identify any reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road, and the likely cost of implementing these measures.
- 47B. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, prepare and implement a program to implement any reasonable and feasible measures identified in the Cumulative Traffic Impact Study not already undertaken by the Applicant, in an equitable manner with the two other quarry operators, to the satisfaction of the Secretary. The program must be submitted to the Secretary for approval by 31 December 2015, or as otherwise agreed in writing by the Secretary.
- 11. Delete conditions 3 to 6 of Schedule 5.
- 12. In condition 1 of Schedule 6 delete all words after "respond to emergencies;" and insert the following:
  - (e) describe the role, responsibility, authority, and accountability of all key personnel involved in environmental management of the development; and
  - (f) include:
    - copies of any strategies, plans and programs approved under the conditions of this consent; and
    - a clear plan depicting all monitoring required to be carried out under the conditions of this consent.
- 13. Delete conditions 2 to 11 of Schedule 6 and insert the following:

#### ANNUAL REVIEW

- 2. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:
  - (a) describe the development (including rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
  - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against:
    - the relevant statutory requirements, limits or performance measures/criteria;
    - the monitoring results of previous years; and
    - the relevant predictions in the EIS;
  - (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
  - (d) identify any trends in the monitoring data over the life of the development;
  - (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
  - (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.

#### **REVISION OF STRATEGIES, PLANS AND PROGRAMS**

- 3. Within 3 months of a modification to this consent or following the submission of an:
  - (a) annual review under condition 2 above:
  - (b) incident report under condition 5 below; or
  - (c) audit report under condition 8 below,

the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

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

#### COMMUNITY CONSULTATIVE COMMITTEE

4. The Applicant shall establish and operate a Community Consultative Committee (CCC) for the development in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and to the satisfaction of the Secretary.

#### Notes:

- The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.
- In accordance with the guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community.
- This condition may be satisfied by a combined CCC covering a number of quarry operations in the region.

#### REPORTING

#### Incident Reporting

5. The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

#### **Regular Reporting**

6. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent, and to the satisfaction of the Secretary.

#### INDEPENDENT ENVIRONMENTAL AUDIT

- 7. Within 2 years of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
  - (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been endorsed by the Secretary;
  - (b) include consultation with the relevant agencies;
  - (c) assess the environmental performance of the development, and whether it is complying with the relevant requirements in this consent and any relevant EPL (including any assessment, plan or program required under these approvals);
  - (d) review the adequacy of any approved strategy, plan or program required under these approvals; and
  - (e) recommend measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and may include additional experts in any field specified by the Secretary.

8. Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

#### ACCESS TO INFORMATION

(b)

- 9. For the duration of the development, the Applicant shall:
  - (a) make copies of the following publicly available on its website:
    - the EIS;
    - current statutory approvals for the development;
    - approved strategies, plans and programs required under the conditions of this consent;
    - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
    - a complaints register, which is to be updated monthly;
    - minutes of CCC meetings;
    - the annual reviews of the development (for the last 5 years);
    - any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit;
      - any other matter required by the Secretary; and
    - keep this information up-to-date to the satisfaction of the Secretary.
- 14. Delete "APPENDIX 2 INDEPENDENT DISPUTE RESOLUTION PROCESS".

# **Development Consent**

## Section 80 of the Environmental Planning & Assessment Act 1979

### ANNEXURE A

Figtree Hill Pty Limited v Cleary Bros (Bombo) Pty Limited & Minister for Planning

Land and Environment Court Proceedings No. 10639 of 2005

#### CONDITIONS OF CONSENT

Red type represents 2009 modification Green type represents 2015 modification

#### **SCHEDULE 1**

Development Application:	No. 10639 of 2005		
Applicant:	Cleary Bros (Bombo) Pty Ltd.		
Consent Authority:	Minister for Infrastructure and Planning		
Land:	Lot 1 DP 858245 and Lot 23 DP 1039967, Dunsters Lane, Croom.		
Proposed Development:	Extension of hard rock quarry		
State Significant Development	The proposal is classified as State significant development under section 76A(7) of the <i>Environmental Planning and</i> <i>Assessment Act 1979,</i> as it meets the criteria specified in a declaration made by the Minister for Planning on 3 September 1999.		
Integrated Development	<ul> <li>The proposal is classified as integrated development under section 91 of the <i>Environmental Planning and Assessment Act</i> 1979, because it requires additional approvals under the:</li> <li>Protection of the Environment Operations Act, 1997; and</li> <li>Rivers and Foreshores Improvement Act, 1948.</li> </ul>		
Designated Development	The proposal is classified as designated development under section 77A of the <i>Environmental Planning and Assessment Act</i> 1979 because it meets the extractive industry criteria in schedule 3 of the <i>Environmental Planning and Assessment Regulation 2000.</i>		
Commencement of Consent	Pursuant to section 83(2) of the <i>Environmental Planning and Assessment Act 1979,</i> this consent operates from the date of determination.		
Lapse of Consent	Pursuant to section 95 of the <i>Environmental Planning and Assessment Act 1979</i> , this development consent is liable to lapse five years after the date from which it operates unless the use of any land, building or work the subject of the consent is actually commenced before the date on which the consent would otherwise lapse.		

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#### SCHEDULE 2 DEFINITIONS

Annual review	Annual Review, as required under condition 5 of schedule 6
Applicant	Cleary Bros (Bombo) Pty Ltd
BCA	Building Code of Australia
	Community Consultative Committee
	Shelinarbour City Council Development Application
Department	Development of Planning and Environment
Design event	90 percentile. 5 day rain event
DRE	Division of Resources and Energy within the Department of Trade and
	Investment, Regional Infrastructure and Services
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EFL	Environment Operations Act 1997
Feasible	Equipriment operations and what is practical to
	build or to implement
Fig Tree Hill Land	Lots 4 and 5 in deposited plan 3709 in their present or succeeding
-	titles
Heavy vehicle	Any vehicle with a gross vehicle mass of 5 tonnes or more
Incident	A set of circumstances that:
	• causes, or threatens to cause, material harm to the environment; and/or
	<ul> <li>breaches or exceeds the limits or performance measures/criteria in this consent</li> </ul>
Land	Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this development consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to
	ecosystems that is not trivial
Minister	Minister for Planning, or delegate
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
Privately-owned land	Land not owned by the Applicant or its related companies or where a
	owner
Quarry products	Extractive materials (hard rock products) which are produced at the
	site
Quarrying operations	Includes the removal of overburden and extraction, processing,
	handling, storage and transportation of extractive materials
Reasonable	Reasonable relates to the application of judgement in arriving at a
	decision, taking into account: mitigation benefits, cost of mitigation
	versus benefits provided, community views and the nature and extent
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
SEE	Statement of Environmental Effects
Site	Land to which the DA applies
Stage	The quarry development stages as described in the EIS

#### SCHEDULE 3 ADMINISTRATIVE CONDITIONS

#### **Obligation to Minimise Harm to the Environment**

1. The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

#### Scope of Development

- 2. The Applicant shall carry out the development generally in accordance with:
  - a) DA No. 466–11-2003;
  - b) The EIS titled *Proposed Quarry Extension Albion Park*, dated October 2003, and prepared by Perram & Partners;
  - c) Modification Application 10639 of 2005 MOD 1 and the accompanying SEE titled "Albion Park Quarry: Application to Modify Development Consent Increase Production Limit", dated November 2008, as amended by the correspondence to the Department dated 24 June 2009;
  - d) Modification Application 10639 of 2005 MOD 2 and the accompanying Environmental Assessment titled *Modification of Development Consent 10639 of 2005 (LEC) Albion Park Quarry – Increased Production Limit* prepared by Martin Morris & Jones Pty Ltd and dated November 2013; and
  - e) conditions of this development consent.
- 3. If there is any inconsistency between the above, the conditions of this consent shall prevail to the extent of the inconsistency.
- 4. The Applicant shall comply with any reasonable requirement/s of the Secretary arising from:
  - a) any reports, plans, strategies, programs, reviews, audits or correspondence that are submitted in accordance with this consent;
  - b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; and
  - c) the implementation of any actions or measures contained in these documents.

#### **Staged Development**

- 5. Under section 80(4) of the Act, this consent is issued for Stages 1 to 4 of the development only.
- 6. Under section 80(5) of the Act, Stages 5 and 6 must be the subject of another development consent.

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of The Fig Tree Hill Land, and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- c) assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to in subclause (b) above;
- d) assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public;
- seek independent expert advice on the report if deemed to be warranted;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public.

#### **Period of Approval**

7. The Applicant may carry out quarrying operations on the site until 21 February 2036.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

#### **Limits on Production**

- 8. The production of quarry products from the quarry shall not exceed 900,000 tonnes in any financial year.
- 9. The Applicant shall:
  - a) provide annual production data to the DRE using the standard form for that purpose; and
  - b) include a copy of this data in the Annual Review.

#### Protection of Public Infrastructure

- 10. The Applicant shall:
  - a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
  - b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

#### **Operation of Plant and Equipment**

- 11. The Applicant shall ensure that all plant and equipment at the site, or used in connection with the development, are:
  - a) maintained in a proper and efficient condition; and
  - b) operated in a proper and efficient manner.

#### Demolition

12. The Applicant shall ensure that all demolition work is carried out in accordance with AS 2601-2001: *The Demolition of Structures*, or its latest version.

#### Compliance

- 13. Prior to commencement of operations, the Applicant shall commission an independent person(s) or organisation(s), approved by the Secretary, to certify in writing to the satisfaction of the Secretary, that the Applicant has complied with all conditions of this consent applicable prior to that event.
- 14. At least two weeks prior to the commencement of any works, the Applicant shall notify the owners of the Fig Tree Hill Land, in writing, of the date of commencement of works authorised by this consent.

#### SCHEDULE 4 SPECIFIC ENVIRONMENTAL CONDITIONS

#### **IDENTIFICATION OF BOUNDARIES**

- 1. Prior to the commencement of works, the Applicant shall:
  - (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction;
  - (b) submit a survey plan of these boundaries to the Secretary; and
  - (c) ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

Note: The limit of extraction includes the area described in the EIS, as amended by the 'Quarry Area' shown on the plan in Appendix 1 (southern boundary), and as amended by the conditions below.

#### BUFFER

2. A minimum buffer of 10 metres must be maintained between the common northern boundary of Lot 1, DP 858245 and the southern boundary of Lot 4, DP 3709. No extraction is permitted within this 10 metre buffer area. The buffer may be used for landscaping, minor drainage works, noise/visual bunds, alignment of the haul road (including batters), as depicted on the plan in Appendix 2.

#### NOISE

#### **Construction of Noise/Visual Bunds**

3. The Applicant shall complete construction of the noise/visual bunds prior to commencing extraction of production material, and shall make all reasonable efforts to complete construction of the bunds within 26 weeks of commencement.

#### **Noise Limits**

4. The Applicant shall ensure that noise generated by the development does not exceed the criteria specified in Table 1.

	Noise Limits dB(A) LAeq (15minute)		
Receiver Locations	Stages 1-2	Stages 3-4	Stages 5-6
'The Hill' residence (Dunster premises)	35	38	35
'The Cottage' residence (Dunster premises)	35	38	35
Approved rural workers dwelling (Dunster premises)	35	38	35
Greenmeadows Residential Estate	41	41	41

Table 1: Noise Criteria for the Development

Notes:

- 1. Staging as depicted in Figure 3.5 of the EIS prepared by Perram and Partners, dated October 2003.
- Receiver locations nominated in Table 5.12 of the report prepared by Richard Heggie and Associates Report No. 30-1079R1 titled 'Noise and Blasting Impact Assessment – Cleary Bros Albion Park Quarry' (13 December 2002). At the time of the DA the above were the nearest affected residences.
- 3. The receiver locations and noise limits in the above table may be varied in the instance that negotiated agreements are entered into by the licensee and affected residents/occupiers or if existing agreements become void, or the nearest receiver location changes due to urban encroachment. These limits may be subject to change with an EPL variation.
- 4. Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Table 1. Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- 5. The noise emission limits in Table 1 apply under meteorological conditions of:
  - Wind speed up to 0.5m/s in any direction at 10 metres above ground level; or
    - Temperature gradient (environmental lapse rate) conditions of less than or equal to 0<sub>°</sub>C/100m (lapse).

#### **Operating Hours**

5. The Applicant shall comply with the operating hours in Table 2.

Activity	Days of the Week	Time
Drilling, rock breaking, loading and haulage of material from quarry to processing plant, processing and stockpiling, overburden stripping and other stage preparatory works, all site construction activities, rehabilitation works, general plant and maintenance. Processing, crushing and screening and product transfer to stockpiles	Monday – Friday Saturday	7.00 am – 5.30 pm 7.00 am – 1.00 pm

Table 2: Operating Hours for the Development

- The following activities may be carried out at the premises outside the hours specified in Table 2:
- a) the delivery of materials as requested by Police or other authorities for safety reasons;
- b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm;
- c) workshop activities and other maintenance work inaudible at the nearest affected receiver.

#### **Operating Conditions**

6.

- 7. The Applicant shall:
  - a) implement all reasonable and feasible mitigation measures to minimise the operational and road noise of the development;
  - b) minimise the noise impacts of the development during meteorological conditions under which the noise criteria in this consent do not apply; and
  - c) carry out regular noise monitoring to determine whether the development is complying with the relevant conditions of this consent,
  - to the satisfaction of the Secretary.

#### Noise Management Plan

- 8. The Applicant shall prepare and implement a Noise 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevant noise criteria and operating conditions in this consent;
  - c) describe the proposed noise management system on site; and
  - d) include a monitoring program that:
    - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
    - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

#### 9. Deleted

#### **BLASTING AND VIBRATION**

#### Airblast Overpressure Criteria

10. The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 3 at any point that is located at least 3.5m from any residence or other sensitive receiver on privately-owned land.

Airblast overpressure level [dB(Lin Peak)]	Allowable exceedance	
115	5% of the total number of blasts over any 12 month reporting period	
120	0%	

Table 3: Airblast Overpressure Limits

#### **Ground Vibration Criteria**

11. The Applicant shall ensure that the peak particle velocity from blasting at the development does not exceed the criteria in Table 4 at any residence or sensitive receiver on privately-owned land.

Peak particle velocity (mm/s)	Allowable exceedance	
5	5% of the total number of blasts over any 12 month reporting period	
10	0%	

Table 4: Ground Vibration Limits

#### **Blasting Restrictions**

- 12. Blasting operations on the premises may only take place:
  - a) between 9am and 5pm Monday to Friday inclusive;
  - b) are limited to 1 blast each day; and
  - c) at such other times as may be approved by the EPA.

#### **Operating Conditions**

a)

- 13. During quarrying operations on site, the Applicant shall:
  - 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) avoid and/or minimise any blasting impacts, including flyrock, of the development on The Fig Tree Hill Land, or the continued rural use of that land; and
  - c) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site,
  - to the satisfaction of the Secretary.

#### Blast Management Plan

- 14. Prior to the commencement of operations in each stage of the development after Stage 1, the Applicant shall prepare, and subsequently implement, a Blast Management Plan for the development in consultation with the landowner(s) of The Fig Tree Hill Land, the EPA and to the satisfaction of the Secretary. This plan must:
  - a) include a summary of monitoring results for the previous quarry stage;
  - b) describe the objectives for noise and blasting at that stage;
  - c) describe the proposed blasting design for that stage, and demonstrate that the design will meet the blast criteria listed in Tables 3 and 4;
  - d) include a monitoring program for evaluating and reporting on the performance of the development, including:
    - compliance with the blasting criteria in this consent; and
    - minimising the fume emissions from the site;
    - describe the measures that would be implemented to:
      - ensure compliance with the blasting criteria and operating conditions of this consent; and
        - mitigate, remediate or compensate for any blasting impacts of the development on The Fig Tree Hill Land or the use of that land.

Note: The plan shall be generally in accordance with the draft Blast Management Plan titled 'Albion Park Quarry Extension, Noise Monitoring Program/Blast Management Plan' dated 10 February 2006 and prepared by Heggies Australia Pty Ltd

#### **AIR QUALITY**

e)

#### Impact Assessment Criteria

15. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not exceed the criteria in Table 5 at any sensitive receiver or residence on privately-owned land.

Pollutant	Averaging Period	Criterion	
Particulate matter < 10 μm (PM <sub>10</sub> )	Annual	<sup>a,d</sup> 30 µg/m <sup>3</sup>	
Particulate matter < 10 μm (PM <sub>10</sub> )	24 hour	<sup>b</sup> 50 μg/m <sup>3</sup>	
Total suspended particulates (TSP)	Annual	Annual <sup>a,d</sup> 90 µg/m <sup>3</sup>	
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a,d</sup> 4 g/m <sup>2</sup> /month

Table 5: Air quality criteria

Notes to Table 5:

- a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
- c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003:Methods for Sampling and Analysis of Ambient Air Determination of Particulate Matter Deposited Matter Gravimetric Method; and
- d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.
- e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 16 and 17 to develop and implement air quality management system that ensures operational responses to the risks of exceedance of the criteria.

#### **Operating Conditions**

- 16. The Applicant shall:
  - (a) implement best management practice to minimise the dust emissions of the development;
  - (b) regularly assess meteorological and air quality monitoring data to guide the day-to-day planning of operations and implementation of air quality mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see Note d to Table 5 above);
  - (d) monitor and report on compliance with the relevant air quality conditions in this consent; and
  - (e) minimise surface disturbance of the site, other than as permitted under this consent, to the satisfaction of the Secretary.

#### Air Quality Management Plan

- 17. The Applicant shall prepare and implement an Air Quality 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevant air quality impact assessment criteria and conditions of this consent;
  - c) include a site-specific best management practice determination;
  - d) describe the proposed air quality management system; and
  - e) include an air quality monitoring program that:
    - is capable of evaluating the performance of the development;
    - includes a protocol for determining any exceedances of the relevant conditions of this consent;
    - adequately supports the air quality management system; and
    - evaluates and reports on the adequacy of the air quality management system.

#### METEOROLOGICAL MONITORING

18. For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

#### SURFACE & GROUNDWATER

#### Water Supply

19. The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of quarrying operations on site to match its available supply, to the satisfaction of the Secretary.

Note: The Applicant is required to obtain the necessary water licences for the development under the Water Management Act 2000.

#### Water Pollution

- 20. Unless an EPL or the EPA authorises otherwise, the Applicant shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.
- 21. The Applicant shall ensure that the discharges from any licensed discharge point/s comply with the limits in Table 6, unless otherwise agreed by the EPA.

Pollutant	Units of Measure	Maximum Limit
TSS	mg/L	50
рН	рН	6.5 - 8.5

Table 6: Water Discharge Pollution Limits

- 22. Deleted
- 23. Deleted

#### Storm Water Management System

- 24. The Applicant shall ensure that the stormwater management system for the development is designed, constructed and operated to capture and treat polluted waters from storm event(s) of less than, and including a 1:10 year, 24 hour duration, average recurrence interval (that is 225 mm of total rainfall within the 24 hour period).
- 25. Within 5 days of a rainfall event, the Applicant shall ensure that the basins in the stormwater management system are treated and emptied to maintain the required storage volume.

#### Flocculant Management

26. The Applicant shall not use a flocculant, other than gypsum, without the written approval of the EPA.

#### **Monitoring and Management**

- 27. Within 12 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Water Management Plan for the development, in consultation with the NOW and to the satisfaction of the Secretary. This plan must be prepared by a qualified hydrogeologist and include:
  - a) a Water Balance;
  - b) an Erosion and Sediment Control Plan;
  - c) a Surface Water Monitoring Program;
  - d) a Ground Water Monitoring Program; and
  - e) an Integrated Water Management Strategy, if the water balance shows a potential demand for water above that which can be collected from rainfall.
- 28. The Water Balance shall include:
  - a) consideration of the existing quarry and processing site, existing water storage dam and the proposed quarry and haul road;
  - b) the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;
  - c) the estimated water use demand in wet, average and drought years.
- 29. The Erosion and Sediment Control Plan shall:
  - a) be consistent with the requirements of the Department of Housing's *Managing Urban Stormwater: Soils and Construction* manual;
  - b) identify activities that could cause soil erosion and generate sediment;
  - c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters
  - d) describe the location, function, and capacity of erosion and sediment control structures; and
  - e) describe what measures would be implemented to maintain the structures over time.

- The Surface Water Monitoring Program shall include: 30.
  - detailed baseline data on surface water flows and quality; a)
  - surface water impact assessment criteria; b)
  - a program to monitor surface water flows and quality; c)
  - d) a program to manage water releases from the site;
  - a program to monitor bank and bed stability; e)
  - f) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria; and
  - a program to monitor the effectiveness of the Erosion and Sediment Control Plan. g)
- 31. The Ground Water Monitoring Program shall include:
  - a) detailed baseline data on groundwater levels and quality, based on statistical analysis;
  - groundwater impact assessment criteria; b)
  - a program to monitor regional groundwater levels and guality; c)
  - d) a program to monitor groundwater level effects on vegetation, and on groundwater supply to adjoining properties; and
  - a protocol for the investigation, notification and mitigation of identified exceedances of the e) groundwater impact assessment criteria.
- 32. The Integrated Water Management Strategy shall include:
  - exploration of a range of options for a sustainable resource alternative for water supply to the a) site:
  - identification of all possible and available sources of water; b)
  - c) consistency with Government Water Reform initiatives and policies;
  - quality of water to meet usage requirements including any possible effects on product; d)
  - costs of supply; e)
  - health and environmental impacts; f)
  - legislative requirements; g)
  - assessment of the feasibility, benefits and costs of options; h)
  - i) a process to identify and evaluate preferred options for implementation; and
  - j) the identification of a timetable for implementation of the selected options.

#### Reporting

- 33. Each year, the Applicant shall:
  - review the Water Management Plan; a)
  - b) update each sub-plan; and
  - report the results of this review in the Annual Review, including: c)
    - the results of monitoring; ٠
    - details of the review for each sub-plan; ٠
    - amendments to the sub-plans; and
    - details of the measures undertaken/proposed to address any identified issues.

#### **FLORA & FAUNA**

#### **Vegetation Clearing Protocol**

- 34. Prior to the commencement of works, the Applicant shall prepare a Vegetation Clearing Protocol for the development in consultation with Shellharbour City Council and the OEH, and to the satisfaction of the Secretary. This plan shall:
  - delineate the areas of remnant vegetation to be cleared; and a) b)
    - describe the procedures that would be implemented for:
      - pre-clearance surveys; ٠
      - progressive clearing;
      - fauna management;
      - conserving and reusing topsoil;
      - collecting seed from the site;
      - salvaging and reusing material from the site; and •
      - controlling weeds. •

#### Southern Remnant Vegetation and Revegetation Area

- 35. The Applicant shall conserve and maintain the southern areas of remnant vegetation marked on the map in Appendix 1.
- 36. The Applicant shall revegetate/rehabilitate and maintain the areas marked 'Area to be Planted' and Weed Control to Promote Natural Vegetation' on the map in Appendix 1. Revegetation shall be in accordance with the Vegetation Management Plan described in Condition 37.

Note: Other revegetation areas shall be covered in the Vegetation Management Plan referred to in Condition 37 below.

#### Vegetation Management Plan

- 37. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Vegetation Management Plan for the development in consultation with Council and the OEH, and to the satisfaction of the Secretary. The plan shall be prepared by a suitably qualified ecologist / bush regenerator, and shall address:
  - a) establishment of baseline data for existing vegetation and habitat in the area;
  - b) vegetation management on all areas of the site outside the working area of the quarry;
  - c) conservation, maintenance and enhancement of threatened communities, including 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands';
  - d) conservation, maintenance and enhancement of threatened plant species, including *Cynanchum elegans* (White Cynachum), *Daphnandra sp.aff micrantha* (Illawarra Socketwood), and *Zieria granulata* (Illawarra Zieria);
  - e) establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed flying fox;
  - f) ongoing weed control and maintenance;
  - g) a program for how the performance of the measures described in (b) to (f) above would be monitored over time;
  - h) a program for monitoring the effect of quarrying, including water management, on vegetation communities.

#### Reporting

38. The Applicant shall include a progress report on the implementation of the Vegetation Management Plan in the Annual Review.

#### REHABILITATION

#### Rehabilitation

39. The Applicant shall progressively rehabilitate the site to the satisfaction of the Secretary.

#### **Rehabilitation Management Plan**

- 40. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Rehabilitation Management Plan to the satisfaction of the DRE. This plan must:
  - a) identify the disturbed area at the site;
  - b) describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site;
  - c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site; and
  - d) describe how the performance of these measures would be monitored over time.
- 41. Within 5 years of providing the Rehabilitation Management Plan to the Secretary, and every 5 years thereafter, the Applicant shall review and update the plan to the satisfaction of the Secretary.

#### **Rehabilitation Bond**

- 42. Within 6 months of the date of this consent, the Applicant shall lodge a suitable rehabilitation and conservation bond for the development with the Secretary. The sum of the bond shall be calculated at:
  - a) \$2.50/m<sup>2</sup> for the total area of disturbance at the development; and
  - b)  $3.00/m^2$  for the total area of the revegetation area,

to the satisfaction of the Secretary.

Notes:

- If the rehabilitation and revegetation area is completed to the satisfaction of the Secretary, the Secretary will release the rehabilitation and conservation bond.
- If the rehabilitation and revegetation area is not completed to the satisfaction of the Secretary, the Secretary will call in all or part of the rehabilitation and conservation bond, and arrange for the satisfactory completion of these works.
- 43. Within 3 years of lodging the rehabilitation and conservation bond with the Secretary, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the Secretary. This review must consider:
  - a) the effects of inflation;
  - b) any changes to the total area of disturbance; and
  - c) the performance of the revegetation area.

#### Reporting

44. The Applicant shall include a progress report on the Rehabilitation Management Plan in the Annual Review.

#### TRAFFIC AND TRANSPORT

#### Right of Way

45. Prior to the commencement of works, the Applicant shall formalise the Right of Way for the haulage road, to the satisfaction of the Secretary.

#### Site Access

46. All access to the site is to be via the roundabout at East-West Link Road, except in an emergency, as agreed by the Secretary in consultation with Council.

#### Transport Management Plan

- 47. The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:
  - a) be prepared by a suitably qualified traffic consultant, in consultation with RMS and Council and submitted to the Secretary for approval by 31 August 2015;
  - b) include a drivers' code of conduct for the development;
  - c) describe the measures that would be implemented to ensure:
    - noise generated by heavy vehicles entering and leaving the site is minimised between 10 pm and 6 am;
      - all drivers of vehicles related to the development comply with the drivers' code of conduct; and
    - compliance with the relevant conditions of this consent; and
  - d) include a program to monitor the effectiveness of the implementation of these measures.

#### Cumulative Traffic Impact Study

- 47A. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, cause to be prepared an independent Cumulative Traffic Impact Study. The study must:
  - a) be undertaken by a suitably qualified traffic consultant, whose appointment has been approved by the Secretary;
  - b) be commissioned by 31 August 2015, and completed by 30 November 2015, or as otherwise agreed in writing by the Secretary;
  - c) be co-funded by the operators of the Albion Park, Dunmore and Bass Point quarries, proportionate to the quarries' respective quarry product road transport limits, as approved at 31 August 2015;
  - d) include a comprehensive assessment of current and future projected cumulative traffic impacts of the three quarries on the classified road network, undertaken in consultation with the RMS; and
  - e) identify any reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road, and the likely cost of implementing these measures.
- 47B. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, prepare and implement a program to implement any reasonable and feasible measures identified in the Cumulative Traffic Impact Study not already undertaken by the Applicant, in an equitable manner with the two other quarry operators, to the satisfaction of the Secretary. The program must be submitted to the Secretary for approval by 31 December 2015, or as otherwise agreed in writing by the Secretary.

#### Parking

48. The Applicant shall provide sufficient parking on-site for all quarry-related traffic to the satisfaction of the Secretary.

#### **Road Haulage**

- 49. The Applicant shall ensure that all loaded vehicles entering or leaving the site are covered.
- 50. The Applicant shall ensure all loaded vehicles leaving the site are cleaned of materials that may fall on the road before they are allowed to leave the site.

#### HERITAGE

51. Within 3 months of the date of this consent, and prior to the disturbance of any relic, the Applicant shall prepare and subsequently implement a Heritage Management Plan for the development, in

consultation with the OEH and Council, and to the satisfaction of the Secretary. The plan shall be prepared by a suitably qualified heritage consultant and must include:

- a) a program for baseline dilapidation surveys of residences on The Fig Tree Hill Land and the 'Belmont' property (with the consent of the landowners). Surveys shall be undertaken at least prior to the commencement of each quarrying stage;
- b) archival recording of 'Kyawana' and 'Belmont' properties, the dry stone walls and other heritage elements affected by the development;
- c) a plan for the salvage and on-site reconstruction of the dry stone walls affected by the proposal, in accordance with a conservation and interpretation strategy;
- d) a plan for the conservation and maintenance of the dry stone wall on the eastern boundary of the allotment;
- e) a plan for providing Council the opportunity to salvage any relic proposed to be destroyed by the development, including 'Kyawana';
- f) a procedure for obtaining permits under the Heritage Act prior to disturbance of any relic, and permits under the National Parks and Wildlife Act prior to disturbance of any Aboriginal objects or archaeological remains.
- 52. The dilapidation surveys required under Condition 51 shall be conducted by a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary. The owners of the Fig Tree Hill Land are to supply the applicant with three suggested nominees within 3 months from the grant of this consent. The applicant will submit one engineer from the list to be put forward by the applicant for approval by the Secretary.

#### Reporting

53. The Applicant shall include a progress report on the Heritage Management Plan in the Annual Review.

#### **VISUAL IMPACT**

#### Visual Amenity

- 54. The Applicant shall minimise the visual impacts of the development to the satisfaction of the Secretary.
- 55. The visual/noise bunds and screen plantings shall be designed and established in accordance with a Landscape Plan prepared in consultation with Shellharbour City Council, and to the satisfaction of the Secretary. The Landscape Plan shall be prepared by a suitably qualified landscape architect with heritage experience, and shall have regard to the cultural landscape of Wentworth Hills. The plantings shall be commenced prior to the commencement of extraction and completed within six months of this consent.
- 56. The Applicant shall ensure that the trees in the bund are maintained, and that in the event that trees die that they are replaced within 28 days to the satisfaction of the Secretary.
- 57. Following construction of the visual/noise bunds, the Applicant shall undertake an independent review of their effectiveness, and undertake any improvements to the satisfaction of the Secretary.

#### WASTE MANGEMENT

#### Waste Minimisation

58. The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Secretary.

#### Waste Classification

59. All liquid and non liquid wastes resulting from activities and processes at the site must be assessed, classified and managed in accordance with the EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (1999), or any other EPA document superseding this guideline.

#### Reporting

60. The Applicant shall describe what measures have been implemented to minimise the amount of waste generated by the development in the Annual Review.

#### EMERGENCY AND HAZARDS MANAGEMENT

#### **Dangerous Goods**

61. The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.

#### Safety

62. The Applicant shall secure the development to ensure public safety to the satisfaction of the Secretary.

#### **Emergency Management**

- 63. Within 6 months of the date of this consent, the Applicant shall document, and subsequently implement, measures to minimise the environmental impacts of any emergency situations that could arise as a result of the operation of the quarry to the satisfaction of the EPA and the Secretary. This documentation must:
  - a) identify any significant threats to the environment and/or public health that could arise from activities associated with the operation of the quarry or construction works associated with the production increase. These threats may include excessive rainfall, pump failures, excess flocculation, power or other utility failure, natural disaster, landslip, accidental spills and discharges, spillage from trucks, fire etc;
  - b) identify any subsequent direct or indirect environmental effects as a result of the threats;
  - c) identify the pollution that would result due to these threats and impacts on operations and what impact the pollution would have on the health of the community and the environment;
  - d) develop actions to effectively respond to the disruption of operations so the risk of pollution is minimised;
  - e) develop a communications strategy for alerting relevant agencies and the potentially affected community in the event of the disruption to operations leading to significant pollution;
  - f) ensure that all relevant employees are familiar with the documentation; and
  - g) when developing this documentation, identify any opportunities to integrate with Cleary Bros Emergency plans.

### **BUSHFIRE MANAGEMENT**

- 64. The Applicant shall:
  - a) ensure that the development is suitably equipped to respond to any fires on-site;
  - b) assist the Rural Fire Service and emergency services as much as possible if there is a fire onsite.
- 65. Within 6 months of the date of this consent, the Applicant shall prepare a Bushfire Management Plan for the development, to the satisfaction of Council and the Rural Fire Service. The plan must have regard to the management of fire regimes and hazard reduction activities so as to avoid negative impacts to threatened species and habitat, endangered communities and populations as well as any cultural assets that may be present.

#### SCHEDULE 5 ADDITIONAL PROCEDURES

#### NOTIFICATION OF LANDOWNERS

1. If the results of monitoring required in schedule 4 identify that emissions generated by the development are greater than the criteria in schedule 4, then the Applicant shall notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of quarry owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 4.

### INDEPENDENT REVIEW

2. If a landowner (excluding quarry owned properties) considers that the operations of the quarry are exceeding the criteria in schedule 4, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.

If the Secretary is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Secretary advising that an independent review is warranted:

- (a) consult with the landowner to determine his/her concerns;
- (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to determine whether the development is complying with the relevant criteria in schedule 4, and identify the source(s) and scale of any impact on the land, and the development's contribution to this impact: and
- (c) give the Secretary and landowner a copy of the independent review.

#### SCHEDULE 6 ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

#### ENVIRONMENTAL MANAGEMENT STRATEGY

- 1. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
  - (a) provide the strategic context for environmental management of the development;
  - (b) identify the statutory requirements that apply to the development;
  - (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
  - (d) 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;
    - manage cumulative impacts; and
    - respond to emergencies;
  - (e) describe the role, responsibility, authority, and accountability of all key personnel involved in environmental management of the development; and
  - (f) include:
    - copies of any strategies, plans and programs approved under the conditions of this consent; and
    - a clear plan depicting all monitoring required to be carried out under the conditions of this consent.

#### **ANNUAL REVIEW**

- 2. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:
  - (a) describe the development (including rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
  - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against:
    - the relevant statutory requirements, limits or performance measures/criteria;
    - the monitoring results of previous years; and
    - the relevant predictions in the EIS;
  - (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
  - (d) identify any trends in the monitoring data over the life of the development;
  - (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
  - (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.

#### **REVISION OF STRATEGIES, PLANS AND PROGRAMS**

- 3. Within 3 months of a modification to this consent or following the submission of an:
  - (a) annual review under condition 2 above:
  - (b) incident report under condition 5 below; or
  - (c) audit report under condition 8 below,

the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

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

#### COMMUNITY CONSULTATIVE COMMITTEE

4. The Applicant shall maintain the Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version).

Notes:

• The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.

- In accordance with the guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community.
- This condition may be satisfied by a combined CCC covering a number of quarry operations in the region.

#### REPORTING

#### Incident Reporting

5. The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

#### **Regular Reporting**

6. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent, and to the satisfaction of the Secretary.

#### INDEPENDENT ENVIRONMENTAL AUDIT

- 7. Within 2 years of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
  - (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been endorsed by the Secretary;
  - (b) include consultation with the relevant agencies;
  - (c) assess the environmental performance of the development, and whether it is complying with the relevant requirements in this consent and any relevant EPL (including any assessment, plan or program required under these approvals);
  - (d) review the adequacy of any approved strategy, plan or program required under these approvals; and
  - (e) recommend measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and may include additional experts in any field specified by the Secretary.

8. Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

#### ACCESS TO INFORMATION

- 9. For the duration of the development, the Applicant shall:
  - (a) make copies of the following publicly available on its website:
    - the EIS;
    - current statutory approvals for the development;
    - approved strategies, plans and programs required under the conditions of this consent;
    - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
    - a complaints register, which is to be updated monthly;
    - minutes of CCC meetings;
    - the annual reviews of the development (for the last 5 years);
    - any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit;
    - any other matter required by the Secretary; and
    - (b) keep this information up-to-date,

to the satisfaction of the Secretary.

APPENDIX 1 REVEGETATION/REHABILITATION AREA





APPENDIX 3 LANDSCAPE BUND, HAUL ROAD AND BATTERS





# **APPENDIX 2:**

"Pre-Lodgement Meeting and Environmental Requirements Advices from NSW Department of Planning and Environment (1 October 2015 and 6 July 2016)"

# Luke Rollinson

From:	Colin Phillips <colin.phillips@planning.nsw.gov.au></colin.phillips@planning.nsw.gov.au>	
Sent:	Thursday, 1 October 2015 2:10 PM	
То:	Luke Rollinson	
Cc:	Gen Seed; Keara McDonagh; Carl Dumpleton; Howard Reed	
Subject:	Albion Park Quarry -Stages 5 and 6	

Good Afternoon Luke,

Thank you for meeting us this week regarding the activation of Stages 5 and 6 at the Albion Park Quarry.

The Department recommends the following actions:

- Lodgement of a modification application under Section 75W of the *Environmental Planning and Assessment Act 1979*.
- Preparation of an Environmental Assessment (EA) that is consistent with Condition 6 of Schedule 3 of the Project Approval.
- Ensure that the consultation requirements for the preparation of the 'Report', are addressed in the preparation of the EA.
- Consideration of whether any other existing conditions would benefit from change/review/updating as part of the proposed modification.
- The EA to be produced in accordance with the proposed structure presented in the letter to the Department dated 11 September 2015 keeping in mind that the Section 75W an independent approval pathway and does not rely on Condition 6.

This assessment should focus on the changed impacts associated with Stages 5 and 6, and does not need to address already-approved operations. However, in accordance with Condition 6, the EA must provide assessment of the environmental performance of the quarry to date and where possible, use this information to calibrate the prediction of impacts for Stages 5 and 6.

The application fee for this Section 75W modification is \$5,000 plus exhibition fees of \$2,830.

I would appreciate it if you kept the Department informed on your progress and likely time that the EA will be lodged. If you have any further questions please contact Gen Seed or myself.

Kind regards,

Colin Phillips Team Leader Mining Projects Department of Planning and Environment P: 92286483 colin.phillips@planning.nsw.gov.au

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This message is intended for the addressee named and may contain confidential/privileged information. If you are not the intended recipient, please delete it and notify the sender.

Views expressed in this message are those of the individual sender, and are not necessarily the views of the Department.

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\_\_\_\_\_



 Planning Services

 Resource Assessments

 Name:
 Jessie Evans

 Phone:
 9228 6419

 Email:
 jessie.evans@planning.nsw.gov.au

Mr Luke Rollinson Director – Town Planner MMJ Wollongong PO Box 1167 WOLLONGONG NSW 2500

Dear Mr Rollinson

# Albion Park Quarry (LEC Consent No. 10639 of 2005) Proposed Modification – Stages 5 and 6

I refer to your letter dated 5 July 2016 seeking confirmation that the advice provided in the Department's correspondence dated 1 October 2016 constitutes the environmental assessment requirements for a proposed modification to the Albion Park Quarry development consent.

I note that under condition 6 of Schedule 3 of the development consent, Stages 5 and 6 of the quarry must be the subject of "another development consent". As that condition also points out, such consent does not require the lodgement of a fresh development application. The process by which the *Environmental Planning and Assessment Act 1979* (EP&A Act) governs the grant of development consent otherwise than by way of approval of a development application is by way of modification of an existing development consent. The Department has previously advised that this should occur via the lodgement of a modification application under section 75W of the EP&A Act.

The Department will not be issuing formal Secretary's Environmental Assessment Requirements (SEARs) for this modification. I can confirm that, along with the requirements under condition 6 of Schedule 3, the Department's advice in its correspondence dated 1 October 2015 constitutes the environmental assessment requirements for the proposed modification. Documentation submitted in support of the modification application should address the relevant condition and the environmental assessment requirements as previously advised.

If you have any enquiries about this matter, please contact Jessie Evans.

Yours sincerely

How and head

Howard Reed 6.7.(6 Director Resource Assessments


# **APPENDIX 3:**

"Albion Park Quarry – Quarry Environmental Management Plan (Perram and Partners – July 2008 as amended)"

# Albion Park Quarry

# Quarry Environmental Management Plan

For: Cleary Bros (Bombo) Pty Ltd

Report 112R1 July, 2008

# **Controlled Document Register**

This Quarry Environmental Management Plan is a controlled document within Cleary Bros' Quality Management System. The revision and distribution registers below will be maintained in the master copy. All printed copies issued by Cleary Bros will be controlled copies recorded in the register. The document will also appear on Cleary Bros' web page.

The document may be amended with the approval of the Director-General. When an amendment occurs Cleary Bros will ensure that the revised pages are forwarded to all registered holders of controlled copies and will update the copy appearing on the web page. Any copy of the document downloaded from the internet will be an uncontrolled copy and may become superseded.

Version No.	Date of Issue	Reason for Revision Solution		Approved by
1	July 08	Original issue	N/A	DoP
2	Aug 09	Revised dust monitoring	Pgs 7.6 & 7.7	DoP
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# **Revision Register**

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# INTRODUCTION

# 1.1 BACKGROUND

Cleary Bros (Bombo) Pty Ltd has extracted and processed hard rock from quarries in the Albion Park area since the middle of last century. In May 2005 the Minister for Infrastructure and Planning granted development consent for the company to extend quarrying into a new area, about 400 metres south east from its then operating quarry. The Minister also granted consent for a haul road linking the quarry extension with the existing quarry. The Minister was the consent authority because at the time the proposal was considered State significant development under provisions (since repealed) of the Environmental Planning and Assessment Act 1979.

The haul road consent was not challenged and became operative after 28 days. The quarry consent however, was put aside to allow an appeal to be heard in the Land and Environment Court. In February 2006 the Court granted development consent for the quarry extension, issuing a revised set of conditions.

The haul road consent issued by the Minister traversed land owned by Readymix Holdings (now Rinker Australia Pty Ltd). During the period of the court appeal, Rinker revised its quarrying plan and subsequently indicated to Cleary Bros that the approved haul road route would not be available. Cleary Bros then developed a new route for an access road to the quarry and with Rinker's concurrence submitted a development application to Shellharbour City Council. On 10 May 2007 Council granted development consent for the new access road linking the quarry extension with the existing haul road to Cleary Bros crushing plant. A subsequent development application was submitted to Council at the request of Rinker for approval to construct a short road across the approved quarry access road to maintain access to Rinker property from Dunsters Lane.

The Minister's quarry consent and Council's access road consents are included as *Appendix A* and *Appendix B* to this document.

The location of the approved quarry and access road is shown on *Figure 1.1*. Details of the site and affected properties are presented in section 2.

Albion Park Quarry Extension Quarry Environmental Management Plan Cleary Bros (Bombo) Pty Ltd



112R1 4.04.2007

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# **1.2 PURPOSE OF THE QEMP**

This quarry environmental management plan (QEMP) describes construction and operational activities associated with the extension of Cleary Bros' Albion Park quarry that have the potential to impact on the environment. Its purpose is to be a reference document for use by:

- □ Cleary Bros staff with responsibility for managing the operation and its environmental performance;
- environmental auditors;
- □ regulatory bodies;
- □ the community monitoring committee established in accordance with the quarry development consent; and
- interested members of the public who may access the QEMP via the internet or in person.

For the QEMP to fulfil its purpose it needs to contain all of the information relevant to environmental management of the quarry. Consequently the QEMP incorporates a number of the sub-plans and other documents specified in the development consents. In cases where these other documents have been separately produced and approved in stand-alone format, only the essential content of the sub-plans has been included, to avoid the QEMP becoming unwieldy.

*Table 1.1* lists the conditions of consent requiring documentation to be prepared and indicates the manner in which the requirements of those conditions have been incorporated in the QEMP.

# Table 1.1CONSENT CONDITIONS REQUIRING APPROVEDDOCUMENTATION

Condition No		Documentation Specified	Manner of Inclusion
<b>Quarry</b> (court consent)	Access Rd (council consent)		
Schedule 4, Condition 1	Cond. 15	Survey Plan	Separately approved document. A smaller scale copy is incorporated in the QEMP.
Schedule 4, Condition 7		Noise Monitoring Program	Separately approved document. Noise monitoring requirements are listed in the QEMP.

Schedule 4, Conditions 14 and 15		Blast Management Plan and Blast Monitoring Program	Combined into a separately approved document. Blast management and monitoring requirements are listed in the QEMP.
Schedule 4, Cond. 20		Dust Management Plan	Separately approved document. Dust monitoring requirements are listed in the QEMP.
Schedule 4, Conditions 27 to32	Cond. 23 (erosion & sediment plan)	Water Management Plan	Separately approved documents for erosion and sediment control, surface water and groundwater monitoring. Requirements of approved plans are listed in the QEMP. Water balance included.
Schedule 4, Cond. 34	Cond. 25	Vegetation Clearing Protocol	Separately approved documents. Clearing protocols are listed in the QEMP.
Schedule 4, Cond. 37		Vegetation Management Plan	The Vegetation Management Plan is included as an appendix to the QEMP.
Schedule 4, Cond. 40	Cond. 34	Rehabilitation Management Plan	The rehabilitation management plans for the quarry and haul road are addressed in the QEMP.
Schedule 4, Cond. 51	Cond. 40	Heritage Management Plan	Separately approved document. Heritage management requirements are listed in the QEMP.
Schedule 4, Cond. 55	Cond. 43	Landscape Plan for quarry works and road	Separately approved documents. Smaller scale copies of the plans are incorporated in the QEMP.
Schedule 4, Cond. 63		Emergency Management Plan	The emergency management plan is addressed in the QEMP.
Schedule 4, Cond. 65		Bushfire Management Plan	The bushfire management plan is addressed in the QEMP.
Schedule 6, Condition 1		Environmental Management Strategy	The environmental management strategy is presented in the QEMP.
Schedule 6, Condition 3		Environmental Monitoring Program	The environmental monitoring program is presented in the QEMP.

# **1.3 DOCUMENT CONTROL**

# 1.3.1 Approval

The QEMP is to be submitted to the Director-General of Planning for approval. The date of approval will be noted at the front of the document prior to distribution. The QEMP will also be submitted to Shellharbour City Council for approval of documentation pertaining to the access road.

# 1.3.2 Distribution

Following receipt of approval the QEMP is to be made available as follows:

- within 14 days send copies to Department of Environment and Climate Change, Shellharbour City Council, Department of Primary Industries;
- within 14 days make the document publicly available;
- within one month provide a copy to the community consultative committee;
- within one month place a copy on Cleary Bros web site

# 1.3.3 Amendment

The QEMP is a perpetual document, capable of being amended and updated as needed to take account of changes occurring from time to time. Such updates will enable the operator to keep the document relevant to changing circumstances including:

- the outcome of environmental monitoring and audits;
- any future development consents issued;
- **u** periodic review and re-issue of the environment protection licence;
- **u** modified practices based on market requirements or improved technology;

The QEMP may be amended at any time at the discretion of Cleary Bros or as requested by the Director-General. Any amendment must be approved by the Director-General of Planning before it has effect. An amendment to the QEMP is to be consistent with the development consents currently in force for the quarry and access road.

Following approval, any amendment to the QEMP is to be made publicly available in the manner described in section 1.3.2 above.

Albion Park Quarry Extension Quarry Environmental Management Plan Cleary Bros (Bombo) Pty Ltd

# 1.4 OBJECTIVES

The objectives of the QEMP area are as follows:

- □ present the environmental management strategy for the hard rock quarry extension;
- detail practices, procedures, work methods and other requirements necessary for the operation to achieve environmental goals specified by the development consent and environment protection licence;
- □ include within a single document, all of the regulatory environmental requirements for operating the site.

Requirements for the environmental management strategy are included in Condition 1 of Schedule 6 of the quarry consent, as follows:

- (a) provide the strategic context for environmental management of the development;
- *(b) identify the statutory requirements that apply to the development;*
- (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
- (d) 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;
  - manage cumulative impacts; and
  - respond to emergencies; and
- (e) describe the role, responsibility, authority, and accountability of all the key personnel involved in environmental management of the development.

The QEMP forms part of Cleary Bros' Environmental Management System, compliant with ISO/AS 14001.

# 1.5 CONSTRUCTION AND OPERATION

Development consents for the quarry and access road require site development work to be undertaken prior to commencement of hard rock extraction in the extension area. Section 4 of the QEMP describes environmental controls to be implemented during the development phase. This section will become redundant when construction work is complete. At the time of preparing the QEMP, Cleary Bros is extracting and processing hard rock at its Albion Park operations in accordance with previous development consents issued by Shellharbour City Council. The development consents for the extension area and access road will operate from the date that work, other than investigatory or monitoring activities, commences respectively in the extension area, Lot 1 DP 858245 and on the route of the access road, Lot 2 DP 858245 and Lot 23 DP 1039967.

## **1.6 SPECIALIST INVESTIGATIONS**

Prior to the 2006 quarry development consent being granted, a number of investigations were undertaken by specialists to determine characteristics of the quarry extension site and make predictions relevant to the hard rock extraction operation. These investigations provided information for the development application and rezoning process. All of the specialist reports listed below dated prior to October 2003 are included in *Proposed Quarry Extension, Albion Park, Environmental Impact Statement* (Perram & Partners, October 2003). Any findings or recommendations relevant to environmental management of the site have been incorporated into the management procedures referenced in Section 5 of this QEMP.

- Report on the Dry Stone Walls on the Cody's and Lindsay Lane Properties, Albion Park
   Geoff Duggan, August 1997;
- □ *A Brief Report on the Geology of the Cody Property* R.W. Corkery &Co Pty Ltd, September 1997;
- Preliminary Hydrogeological Study, Proposed Rezoning Area, Cleary Bros Albion Park Quarry – Golder Associates, March 1998;
- An Archaeological Assessment of a proposed Hard Rock Quarry Extension Near Albion Park, New South Wales – Robert Paton Archaeological Studies Pty Ltd, May 1998;
- □ A Report on the Effect of an Extension to Cleary Bros Quarry at Albion Park on the Continued Operation of the Dairy Farm "The Hill" at Dunsters Lane Cowman Stoddart Pty Ltd, June 2001;
- Albion Park Quarry Extension, Air Quality Impact Assessment Richard Heggie Associates, October 2002;
- Noise and Blasting Impact Assessment, Cleary Bros Albion Park Quarry Richard Heggie Associates, December 2002;
- Transport Study, Albion Park Quarry, Extension to Quarry Area Masson Wilson Twiney, April 2003;
- Non Indigenous Heritage Assessment of the Impact of the Proposed Quarry (Lot 1 DP 858245) Near Signal Hill, Croom – HLA–Envirosciences Pty Limited, April 2003;
- Flora and Fauna Assessment, Proposed Extension to Cleary Bros (Bombo) Albion Park Quarry, City of Shellharbour – Kevin Mills & Associates, May 2003;

 Results of the Water Sampling and Analysis at Albion Park Quarry – Golder Associates, 4 June 2003 (letter report).

Other reports of site investigations undertaken by or on behalf of Connell Wagner are included in the Local Environmental Study prepared for Shellharbour City Council (Connell Wagner, October 2003). These reports are generally consistent with the assessments contained in the EIS, with the exception of the indigenous heritage study, which is considered to supersede that of Robert Paton, referred to above. The LES indigenous heritage study is referenced below:

 Aboriginal Archaeological Survey & Assessment Report, Albion Park Quarry Proposed Extension – Mary Dallas, February 2001;

Following receipt of the initial development consent from the Minister for Infrastructure and Planning in May 2005, a number of separate management plans were prepared consistent with that development consent. The plans were progressively submitted to the Director General for approval and where necessary modified for consistency with the subsequent court approval. Approved plans are listed below:

- □ Soil and Water Management Plan, Proposed Quarry Extension, Stage 1 K. F. Williams & Associates, April 2005 (drawings only);
- Vegetation Clearing Protocol, Albion Park Hard Rock Quarry and Associated Haul Road – Kevin Mills & Associates, July 2005;
- Surface Water and Groundwater Management Plan, Cleary Bros Quarry, Albion Park
   Golder Associates, October 2005;
- Dust Management Plan, Albion Park Quarry Extension Richard Heggie Associates, November 2005;
- □ *Landscape Plan, Albion Park Quarry* Taylor Brammer Landscape Architects, revision C, January 2006 (drawing only)
- Noise Monitoring Program/Blast Management Plan, Albion Park Quarry Extension -Richard Heggie Associates, February 2006;
- Heritage Management Plan, Cleary Bros Albion Park Quarry Navin Officer Heritage Consultants, March 2006.

Two additional studies were undertaken to accompany the development application for the access road submitted to Shellharbour Council. Those studies are referenced as follows:

- □ Flora and Fauna Assessment, Access Road to Lot 1 DP 858245 Kevin Mills & Associates, August 2006;
- Aboriginal Archaeological Assessment, Albion Park Quarry Extension Haul Road Mary Dallas, March 2007 (letter report being an adjunct to the 2001 report by the same author, see above).

Following receipt of development consent for the access road from Shellharbour Council the following reports/plans were completed:

- Vegetation Clearing Protocol and Vegetation Management Plan, Access Road for Albion Park Hard Rock Quarry – Kevin Mills & Associates, September 2007;
- Landscape Plan and Details, Proposed Access Road, Lots 1, 2 and 3 DP 858245 -Taylor Brammer Landscape Architects, revision B, September 2007 (drawing only)
- □ Vegetation Management Plan for Albion Park Hard Rock Quarry- Kevin Mills & Associates, October 2007

In addition, the previously approved soil and water management plan and the landscape plan for the quarry were amended to reflect the redesign required for the new access road.

# 1.7 PERFORMANCE REQUIREMENTS

Condition 2 of Schedule 3 of the development consent for the quarry requires that the development be conducted in accordance with:

- the conditions of the consent;
- the development applications submitted in October 2003; and
- the environmental impact statement (Perram & Partners 2003).

Should there be any inconsistency, the development consent prevails. Cleary Bros is also required to comply with any reasonable requirements of the Director-General arising from the Department of Planning's assessment of any documentation submitted in accordance with the consent or the implementation of any actions or measures contained in the documentation.

In addition to specific requirements referred to in the development consent, site operations are to be conducted in accordance with all relevant New South Wales legislation. New South Wales legislation applicable to extraction of hard rock from the Albion Park site includes:

- Protection of the Environment Operations Act, 1997
- Environmental Planning and Assessment Act, 1979
- □ Heritage Act, 1977
- Local Government Act, 1993
- Mines Inspection Act, 1901
- □ National Parks and Wildlife Act, 1974
- Occupational Health and Safety Act, 2000
- □ Roads Act, 1993
- Threatened Species Conservation Act, 1995
- Waste Avoidance and Resource Recovery Act; 2001

**u** Water Act, 1912

# 2

# THE SITE

### 2.1 PROPERTY DESCRIPTION

The development consents associated with the quarry extension refer to the following properties:

<b>Property Description</b>	Owner	Activities
Quarry conser	nt	
Lot 1 DP 858245	Bridon Pty Ltd (a Cleary Bros company)	Quarry extension and ancillary works
Lot 23 DP 1039967	Cleary Bros (Bombo) Pty Ltd	Existing site entrance, haul road, processing plant, product storage and sale.
Access Road c	onsent	
Lot 2 DP 858245	Rinker Australia Pty Ltd	New access road and ancillary works
Lot 23 DP 1039967	Cleary Bros (Bombo) Pty Ltd	New access road and ancillary works

The location of these properties is shown on Figure 2.1.

Cleary Bros existing quarry is located on Lot 2 DP 1021840. Use of this site together with the contiguous Lot 23 DP 1039967 for quarrying, haul road, processing plant, product storage site entrance and ancillary uses is authorised under earlier development consents that remain current.

## 2.2 APPROVED EXTRACTION AREA

The approved extraction area is shown on the quarry survey plan, reproduced as *Figure* 2.2. Larger scaled copies of this plan are available. The plan shows an area of 16.96 hectares approved for extraction with the following boundaries:



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Boundary	Identifying Features
West	Aligned along the property boundary with Lot 2 DP 858245
North	Set back 10 metres from the property boundary with Lot 4 DP 3709, except towards the north-eastern corner where the setback is 20 metres to allow for a vegetated bund wall to be constructed.
East	In the north-eastern corner a marked survey line delineates the inner side of the vegetated bund wall. A second marked survey line delineates the outer side of the bund. Towards the southern corner the bund ends and the outer surveyed line continues as the extraction boundary. The survey lines are based on the boundary submitted with the development application and approved by the Court.
South	A marked survey line delineates the southern boundary coinciding with the edge of the extractive industry zoning in Shellharbour Rural LEP 2004.

### 2.3 APPROVED ACCESS ROAD

The approved route of the access road is shown on the road survey plan, *Figure 2.3*. Larger scaled copies of this plan are available. The plan shows the access road continuing within the quarry extension site. The route shown within the quarry is the initial location of the access road. The road will be realigned within the quarry during subsequent stages of quarrying.

A right of way has been established by agreement over land owned by Rinker Australia Pty Ltd to permit construction of the access road and its use in relation to the quarry extension.

## 2.4 ZONING AND STATUTORY RESTRICTIONS

The following planning instruments apply to the site:

- □ Shellharbour Rural LEP 2004;
- Illawarra Regional Environmental Plan No 1 1986; and
- SEPP (Mining, Petroleum and Extractive Industries) 2007.

The quarry is located in the City of Shellharbour with the applicable planning instrument being Shellharbour Rural LEP 2004. Most of the land approved for quarrying is zoned 1(x) Extractive Industrial. A narrow strip along the eastern side of the quarry is zoned 1(rl) Rural Landscape where extractive operations are prohibited by the Rural LEP. However, the quarry application was assessed under the since repealed provisions for State significant development. The Minister and subsequently





 the Court, approved extraction and bund construction within the 1(rl) zoned area, as then permitted in the Act for State significant development.

Subsequent to the date of the development consent SEPP (Mining, Petroleum and Extractive Industries) 2007 has come into force, permitting extractive industry to be carried out with development consent on any land where agriculture is permitted.

# 2.5 ENVIRONMENT PROTECTION LICENCE

The Department of Environment and Climate Change has issued licence No 299 for Cleary Bros existing extractive operation at Albion Park. The licence regulates hard rock quarrying and concrete batching referring to the existing quarry and the processing plant site. An amendment will be required to incorporate the quarry extension onto the new allotment, Lot 1 DP 858245.

A copy of the current licence is included in *Appendix C*.

# 2.6 ENVIRONMENTAL CHARACTERISTICS

# 2.6.1 Topography and Drainage

The quarry is located near the crest of the Wentworth Hills in the upper catchment of the Minnamurra River. The land has an altitude ranging from 70 metres AHD in the south to 140 metres AHD in the north. The extraction area is a natural amphitheatre with two spurs extending towards the south along its eastern and western boundaries. Steep slopes drop from the spurlines to watercourses draining to an unnamed creek flowing through the 40-hectare property. The creek is outside the extraction area. Two gauges have been installed to measure flow in the watercourse draining the site and in the unnamed creek upstream of the site discharge.

# 2.6.2 Geology and Soils

RW Corkery & Co Pty Ltd investigated the geology of the site in 1997 drilling 21 boreholes. Rock strata belong to the Bumbo Latite, referred to as basalt, occurring as two distinct flows separated by tuffaceous agglomerate and overlain by weathered latite and soil. Sandstone underlies the lower basalt flow.

Soil terrain mapping shows the dominant soil type to be a friable reddish brown sandy clay loam topsoil over a subsoil comprising a reddish brown sandy clay or light medium clay. The soils are deep, well structured and free draining but with low



Figure 2.3 Approved Access Road



fertility. They are strongly acidic with a low to moderate cation exchange capacity and exhibit moderate to high erodibility.

## 2.6.3 Climate

A weather station was established at the quarry in 2004. While records are being accumulated from this source, the nearest source of climatic information is Kiama Bowling Club, approximately nine kilometres south east of the quarry. Records have been kept from this recording station since 1897. *Table 2.1* presents a summary of significant data from Meteorological Station No 068038, Kiama Bowling Club.

Table 2.1TEMPERATURE, RAINFALL, HUMIDITY AND WIND SPEED

Item	J	F	Μ	Α	Μ	J	J	Α	S	0	Ν	D	Year
Temperature													
Mean Daily	25	24.9	24.1	22.1	20.1	17.6	16.8	18.1	19.8	21.7	22.5	23.8	21.1
Max. Temp. (°C)													
Mean Daily	17.5	17.7	16.4	14.1	12.2	9.3	8.4	8.8	10.6	12.4	14.3	16.3	12.8
Min. Temp. (°C)													
Rainfall													
Mean Monthly	111	119	145	132	121	126	87.6	77.4	75.2	86.7	86.8	94.4	1261
Rainfall (mm)													
Mean No of	12.2	11.7	12.7	11.2	10.8	9.8	8.6	8.5	9.2	10.7	11	11.3	127.6
Raindays													
Humidity													
Mean 9am Rel.	72	74	71	69	70	65	63	59	60	64	68	70	66
Humidity (%)													
Mean 3pm Rel.	67	70	67	67	65	58	58	55	58	63	65	66	63
Humidity (%)													
Wind													
Mean 9am Wind	8.2	8.1	8	8.1	8	10	10.1	9.2	10	9.8	9.1	9.1	9
Speed (km/hr)													
Mean 3pm Wind	10.8	10.7	10.3	9.1	8.5	9	9.6	11.2	11.7	10.8	11.3	11	10.3
- Speed (km/hr)													

Note: 1. Monthly rainfall entries rounded to three significant figures.

#### Wind Data

A wind rose from the Albion Park meteorological station included in the quarry EIS shows a predominance for westerlies, occurring some 30 per cent of the time and being more than twice as common as winds from other directions. Northerlies, north-easterlies and southerlies are the next most common. Westerly winds also show the highest proportion of strong winds, followed by north easterlies and southerlies, which show a roughly equal proportion of strong winds.



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300m

0

# 2.6.4 Hydrogeology

The latite has low horizontal permeability, except in fractured zones. Groundwater seepage occurs through the intervening agglomerate layer and along the contact between the volcanic rock and underlying sandstone. Seepage through the agglomerate layer is collected in existing farm dams. There may also be lateral movement of groundwater from the west following the easterly dipping bedding planes (Golder 1998).

Golder Associates has installed and developed three boreholes on the site for monitoring groundwater levels and quality.

# 2.6.5 Surrounding Land Use

The "Belmont" homestead and residue farmland are immediately east of the extractive area. This property forms part of Cleary Bros' holdings in the area. The balance of the property to the south of the extraction area is partly forested and is to be revegetated/restored to native bushland as part of the quarry project.

Land immediately west of the site is owned by Rinker Australia Pty Ltd and is being quarried up to the site boundary. Rinker also owns the properties to the south of the site which are also partly quarried. A dairy farm occupies the hill top to the north of the site, referred to as the Figtree Hill land. The farm agists cattle on various adjoining paddocks owned by the quarry companies.

The nearest residences are located on the dairy farm at the crest of the ridge as shown on *Figure 2.4.* "The Cottage" and "The Hill" are approximately 375 metres and 460 metres respectively from the nearest part of the extractive area.

# 2.6.6 Natural Vegetation and Fauna

Kevin Mills & Associates identified five vegetation communities on the site:

- Rainforest mainly in the valley below the extraction area with some small patches on the eastern slope within the quarry. This is an endangered ecological community under the Threatened Species Conservation Act 1995;
- Open Forest mostly cleared with scattered remnants remaining. The remnants are part of the Illawarra Lowlands Grassy Woodland community which is also an endangered ecological community under the Threatened Species Conservation Act 1995;
- Lantana shrubland occurs mostly on the edges of forested areas;
- Sedgeland/Rushland small patches in farm dams within the quarry area; and

• Non-native grassland – most of the land to be quarried.

There are several plant species of conservation importance in the area, but no threatened fauna species were recorded in the area. Fig trees are to be included in the revegetation plans to maintain habitat for the Grey-headed Flying-fox.

## 2.6.7 Archaeology and Heritage

Two surveys of Aboriginal archaeology have found no artefacts in the extractive area. A subsequent survey of the access road route in 2007 also found no artifacts. The Wentworth Hills have a long history of dairy farming and quarrying. The house on the neighbouring dairy farm, "The Hill" is a listed heritage item, but will not be physically affected by the project. A heritage management plan has been prepared for the project with archival recording of the "Kyawana" ruin and "Belmont" house having been undertaken. These structures are not listed heritage items and are not physically affected by the project.

#### 2.6.8 Access

Prior to commencement, the only access to the property for investigatory work has been via Dunsters Lane. Once the access road has been constructed it will be the only permitted access to the property for operational purposes. 3

# MANAGEMENT RESPONSIBILITY

## 3.1 ORGANISATION STRUCTURE

The chief executive officer of Cleary Bros (Bombo) Pty Ltd has ultimate responsibility for hard rock extraction at Albion Park. The quarry production manager, is responsible for day-to-day operation of the quarry, reporting to the General Manager Quarries. *Figure 3.1* shows an organisational chart for the company focussing on the line of responsibility for Albion Park hard rock quarry.

When the quarry production manager is absent for any significant length of time (holidays), an acting manager is appointed to take responsibility for site operations.

Head Office	Board of Directors; Chief Executive Officer; General Manager Quarries
On site	Quarry Production Manager; Operational staff; Drivers (as required);

The staff complement and line of responsibility for the quarry is as follows:

Cleary Bros' Environmental Engineering and Contracts Division supplies the environmental officer, based in head office, who reports to the Chief Executive via the company's Technical Manager.

## **3.2 EMERGENCY CONTACT DETAILS**

The phone number of the weighbridge for business and emergency calls during operating hours is **02 4256 9070**. The 24-hour hot line number is **0408 322 213**.





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# 3.3 ROLE RESPONSIBILITY AND AUTHORITY

Quarry personnel are multi-skilled, undertaking a number of tasks during the course of their work. The formal management roles of staff at various levels is summarised in *Table 3.1*.

# Table 3.1 ROLE, RESPONSIBILITY AND AUTHORITY

Task	Chief Executive	General Manager Quarries	Quarry Production Manager (QPM)	Operational Staff	Environmental Officer
Quarry Development	Set objectives, provide broad industry overview, review detailed planning and approval processes.	Assess future needs of the quarry, develop plans, obtain approval, then coordinate and oversee projects to achieve overall objectives.	Assist with long term planning; undertake minor construction projects.	Assist with minor construction projects as required.	Ensure that minor construction and development projects are consistent with approvals; monitor development works for environmental performance.
Rock Production	Review performance of the quarry, assist General Manager Quarries in market development.	Develop markets for hard rock; overview operation of the quarry to ensure production objectives are achieved.	Plan and supervise quarry operation on a daily and longer term basis to produce the required quantity and quality of rock; operate mechanical plant for maximum efficiency	Undertake day to day operational tasks as required	

Albion Park Quarry Extension Quarry Environmental Management Plan Cleary Bros (Bombo) Pty Ltd

PARTNERS	
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PERRAM	

Task	Chief Executive	General Manager Quarries	Quarry Production Manager (QPM)	Operational Staff	Environmental Officer
Environmental Management	Independently review indicators of environmental performance, confirm compliance with environmental objectives and approvals.	Approve the QEMP and any subsequent amendments; ensure that environmental objectives are understood; monitor quarry operation to confirm compliance	Program work and take corrective action as required to maintain operations within environmental objectives set down in this QEMP. Respond to all incidents and complaints.	Undertake work within guidelines set down by the quarry production manager.	Inspect or internally audit operations at the quarry from time to time and advise the quarry production manager and technical manager of any environmental issues.
Community Liaison	Assist with community relations if major issues arise.	Work with community to ensure that an adequate response is given when environmental issues are raised.	Assist the General Manager as required; participate in all forums where community comment on the quarry is expected.		Attend community monitoring committee meetings; prepare agenda, take minutes and distribute; arrange for all issues to be followed up.
Induction and Training		Ensure that an adequate induction and training program is given to staff	Provide induction and training for all staff. Retain records of all training given.	Attend training sessions conducted by the quarry production manager. If unsure about any aspect of the work, ask the quarry production manager.	Participate in staff induction and training to stress the importance of observing requirements of the QEMP.

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Task	Chief Executive	General Manager	Quarry Production	<b>Operational Staff</b>	Environmental Officer
		Quarries	Manager (QPM)		
Complaints		Review complaints	Record details of any		Confirm that complaints
Register		register. Ensure	complaints and		register is up to date for
		procedures are followed.	investigate Decide and		reporting purposes; follow
		Provide a response to	implement corrective		up complaints with
		every complaint. Review	action and provide		environmental issues to
		effectiveness of corrective	relevant information to		see if modifications to the
		action. Ensure records are	General Manager		QEMP or additional
		available for audit.	Quarries.		training is required.
Monitoring		Ensure that the	Review monitoring results		Undertake or arrange for
		monitoring program is	with the General Manager		all monitoring and audits
		adequate and effectively	Quarries. Initiate		to be completed according
		implemented. Review all	corrective and follow up		to the schedule in this
		results with the QPM.	action where needed.		QEMP.
		Initiate audits.			
Recording		Ensure that an adequate	Maintain records of		Maintain all monitoring,
		system of record keeping	quarry operations,		auditing and
		is being implemented.	including quantities of		environmental reporting
			materials received and		records.
			dispatched and all		
			monitoring results.		

Albion Park Quarry Extension Quarry Environmental Management Plan Cleary Bros (Bombo) Pty Ltd

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Task	Chief Executive	General Manager Quarries	Quarry Production Manager (QPM)	Operational Staff	Environmental Officer
Emergency		Intervene at any time	Take action at any time	Advise the QPM of any	provide advice on
Action		where there is an	where there is an	suspected risk to safety, or	rectification of
		unacceptable risk to	unacceptable risk to	any likelihood of	environmental damage to
		safety, or significant	safety, or significant	significant environmental	Quarry Production
		environmental damage	environmental damage	damage. Take action as	Manager and general
		may occur. Review	may occur. Arrange	required to prevent	Manager Quarries, as
		procedures as required.	remedial measures to	emergency situations	required. Review reports
		Ensure that any reports of	overcome the emergency.	arising.	of environmental damage
		environmental damage			to ensure appropriate
		are forwarded to			action has been taken and
		appropriate authorities			appropriate authorities
		within timeframes			advised within required
		specified in this QEMP.			timeframes.

Albion Park Quarry Extension Quarry Erwironmental Management Plan Cleary Bros (Bombo) Pty Ltd
# 3.4 STAFF TRAINING

All staff employed at the site are trained in their responsibilities. The quarry production manager provides training to any new operational staff. The environmental officer may assist to explain the environmental basis for operational procedures. Refresher training is provided as required with a maximum time between training of two years.

# 4

# CONSTRUCTION

## 4.1 NOTIFICATION TO NEIGHBOURS (Quarry consent: schedule 3, condition 14,)

The owners of the Figtree Hill property are to be notified in writing of the date of commencement of works within the quarry site, at least two weeks prior to that date. This requirement does not apply to works within the access road corridor external to the quarry site.

Shellharbour City Council is to be notified prior to the start of construction work on the access road and Rinker Australia is to be notified prior to the commencement of access road construction within the Rinker property.

# 4.2 CONSTRUCTION PROJECTS

Construction work includes necessary site preparation prior to commencing hard rock extraction from the quarry extension area. Where actions are specifically required by Conditions of consent, the condition is referenced. The general location of construction works is shown on *Figure 4.1*.

# **4.2.1** Erosion and Sediment Controls (Quarry Consent: schedule 4, condition 27; Access road consent: conditions 23 and 33)

Erosion and sediment controls will be installed prior to soil disturbance along the access road and on the quarry site. Details of devices to be installed or constructed are shown on the Erosion and Sediment Control Plan. *Figure 4.2* has been derived from the plan to show the location and nature of devices. Full detail for construction purposes is shown on the full sized plan (A1).

# 4.2.2 Access Road

Initial earthworks will be for the purpose of constructing the access road. The location and design of the access road is shown on *Figure 2.3*. The access road requires cut and fill. Any surplus material will be used in constructing road bunds and the noise/sight bund at the north eastern side of the extraction area, referred to in section 4.2.7.



Note: Refer to text for details of each project.

Surplus material and topsoil may be stored in the existing quarry. Requirements for vegetation clearing for the access road are described in section 4.2.3. Landscaping requirements are described in section 4.2.8.

The access road is to be the only access to the quarry site during construction and subsequent operation of the quarry. Except in an emergency, all access to the site is to be via the roundabout from the East-West link (Quarry consent: schedule 4, condition 46). If emergency access is required via another route, the Department of Planning and Shellharbour City Council are to be notified as soon as possible seeking their agreement to the action taken.

## **4.2.3** Vegetation Clearing – Access Road (Access road consent: condition 25)

Clearing for the access road will involve pasture grass and shrubland areas, predominantly weeds but close to some significant vegetation on the lower slope. The access road route passes in proximity to two endangered ecological communities and four significant plant species, one of which is listed as endangered and three are noted as regionally rare.

The access road Vegetation Clearing Protocol (Kevin Mills & Associates 2007) prepared in compliance with condition 25 of the access road consent, has the following requirements for clearing work associated with the access road:

- a) vegetation is not to be cleared outside the approved access road corridor;
- b) prior to commencing clearing or earthworks, robust fencing will be erected to protect significant vegetation specimens in the locations marked on the ground by Kevin Mills and Associates on 12 September 2007;
- c) topsoil will be spread immediately for revegetation rather than stockpiled, if possible;
- d) the planting contractor will collect plant propagatory material from the site and provide to a specialist nursery for propagating the plants required for the landscape plan;
- e) a weed control strategy will be developed for the location aimed at destroying weeds and ensuring they are not spread with the soil;
- f) material identified as useful for revegetation or creating habitat, such as logs, mulch, soil and rocks will be stored for use in rehabilitation;

To inhibit weed propagation, topsoil from the weed patch near "Kyawana" will be buried in one of the bund walls rather than be placed on the surface.

Albion Park Quarry Extension Quarry Environmental Management Plan Cleary Bros (Bombo) Pty Ltd



Erosion and Sediment Controls FIGURE 4.2

## 4.2.4 Dry Stone Walls (Quarry Consent: schedule 4, condition 51)

Stone pieces from the two dry stone walls affected by the works are to be salvaged and used for constructing a dry stone feature. Details of the requirements for this work are as follows, quoted from the approved Heritage Management Plan, prepared in compliance with condition 51.

- 1. Before construction commences on the site an experienced and accredited dry stone waller will be employed who will carry out the following at walls A and B:
  - a. Removal of any vegetation covering the walls and its disposal.
  - b. Dismantling of the walls by hand into the bucket of a front-end loader (to keep stone clean and free from soil).
  - *c. Transport the dismantled walls to the new site.*
  - *d.* Backhoe to prepare the new site for the foundations of the new wall.
  - e. Sort stone and reconstruct the new wall following the NSW Southern Highlands regional style using the stone from both walls in the one wall.
- 2. Erection of an interpretation sign that outlines the history and origin of the wall including maps and photos of their original locations.

The stone is to be salvaged prior to any construction work that would disturb the existing walls. Stone wall A is located near the access road to "Belmont" and will be affected by the noise/sight bund. Stone wall B is within the extraction area and may be affected by the haul road descending to the base of the site.

The location for the reconstructed stone structure is not firmly fixed, but the following guidance is given in the Heritage Management Plan:

It is considered the location for the reconstruction of the structures should be in an area that highlights the history and associations of the walls to their original location. The entrance to the Cleary Bros' 'Belmont' property would be a location that would both allow the structures to retain their original associations with the area and place them in public view.

The Quarry Production Manager will determine a location for the reconstructed stone structure having regard to the above guidance.

# 4.2.5 Fencing and Signage

Prior to commencing preparatory excavations, the quarry site is to be fenced to keep farm animals from the workings. The restoration/revegetation areas to the south of the extraction area are to be fenced off from the remainder of the property for the duration of the quarry life to prevent vehicles inadvertently entering this area. A stock fence will be suitable for this purpose.

Fencing around the extraction area may be confined to the part of the site where work is taking place so the remainder can continue to be used for grazing until it is required for extraction. Fencing is to be fitted with signage warning of the excavation. Locked gates will be included in the fence line at locations determined by the Quarry Production Manager.

Prior to fencing the restoration/revegetation area, any rubbish or old fencing within the area is to be removed. Gates in the fencing to the restoration/revegetation area are to be fitted with signs to advise employees that vehicles are not permitted to enter except for essential maintenance purposes (Vegetation Management Plan – see *Appendix E*).

## **4.2.6** *Clearing and Stripping – Quarry Area* (Quarry Consent: schedule 4, condition 34)

Initial clearing in the extraction area is to be confined to removing vegetation and topsoil from land that is about to be disturbed. Such disturbance will occur for road construction, bund construction, drainage, water storage, and the first stage of excavation in the south-west corner. Vegetation to be affected in the initial stage of works is mostly pasture grass. Coral trees and shrubs are to be cleared for the earthen bund at the north eastern corner of the extraction area. When trees or shrubs are encountered they are to be removed from the site. Where practicable debris resulting from native species clearing will be chipped or mulched for use in rehabilitation work.

The Vegetation Clearing Protocol for the quarry (Kevin Mills & Associates 2005) prepared in compliance with Condition 34 of the quarry consent has the following requirements for clearing work associated with the quarry:

- g) vegetation is not to be cleared outside the approved quarry site;
- h) no longer relevant as a separate protocol applies to the access road (see 4.2.3);
- i) clearing is to be carried out in stages, according to the approved quarry plans;
- j) prior to clearing any of the rainforest patches an ecologist will inspect the vegetation for plant propagatory material, material that could be used in revegetation (logs, mulch, soil, rocks), recently colonised plants and any special fauna habitats;

- k) if special fauna species or habitats are identified in pre-clearing surveys, action recommended by the ecologist will be implemented;
- plant propagation material collected from rainforest patches will be given to a specialist nursery to produce plants required for the planting program;
- m) material suitable for revegetation collected from rainforest patches will be directly reused in revegetation or stored for later re-use;
- n) if constructed quarry ponds require revegetating, the ecologist is to nominate appropriate wetland plants for collecting from the existing farm dams;
- o) topsoil will be spread immediately for revegetation rather than stockpiled, if possible; and
- p) prior to clearing any part of the land, a weed control strategy will be developed for the location aimed at destroying weeds and ensuring they are not spread with the soil.

None of the rainforest patches are to be cleared as part of the initial construction clearing for the quarry. The requirements of the quarry vegetation clearing protocol relevant to initial construction work are items a), c), i) and j).

# **4.2.7** *Noise/Sight Bund* (Quarry Consent: schedule 4, conditions 3 and 57)

The 350-metre long earthen bund in the north eastern corner of the site will be completed as quickly as possible. Condition 3 of the quarry consent requires that all reasonable efforts be made to complete the bund within six months of commencement of site works and that extraction may not commence until the bund is completed. This bund will be constructed using surplus excavated material from the access road and material from the upper layer of overburden covering the first stage of extraction. The top of the bund will be approximately three metres above natural ground level along its centre line. The designed height may vary according to the topography traversed.

Following construction of the noise/sight bund and prior to landscaping, an independent review of its effectiveness is to be undertaken in accordance with Condition 57 of the quarry consent. The report from the review is to be promptly forwarded to the Department of Planning. Should the Director-General require any improvements they are to be immediately undertaken, prior to landscaping.

# **4.2.8** Landscaping and Screen Planting (Quarry Consent: schedule 4, condition 55; Access road consent: condition 43)

Following completion of earthworks on the access road all batters are to be hydromulched as shown on the access road landscape plan.



Figure 4.3 Landscape Plan - Quarry

Please refer to full size drawings for detail.

Landscape plantings are required in the following locations as shown on the landscape plans for the quarry and access road:

- on the 350-metre long noise/sight bund in the north east corner of the site;
- within the 10 metre wide buffer zone along the northern quarry boundary;
- within part of the road reserve of the existing access road to "Belmont", north of the extraction site;
- on both sides of the access road near its northern end on Lot 23 DP 1039967; and
- on the eastern side of the access road within the right of way on Rinker property near the turning point above the Forest Red Gum trees.

Further landscape plantings to screen the access road may be required after the road is constructed, following joint inspection of its visibility with representatives from Shellharbour City Council (Access Road SEE, visual impact assessment).

*Figure 4.3* and *Figure 4.4* are small scale copies of the quarry and access road landscape plans. Full size versions are available for construction purposes.

Landscape plantings associated with the quarry consent are required to commence prior to commencement of extraction and be complete within six months (Quarry consent: schedule 4, condition 55).

# **4.2.9** *Infiltration Trench* (Quarry Consent: schedule 4, condition 27)

The Water Management Plan prepared by Golder Associates in compliance with condition 27 of the quarry consent requires construction of a infiltration trench immediately downhill of the extraction area. The purpose of the trench is to allow water to be injected into the upper aquifer to counter the likely draw-down effect of the quarry and thereby maintain existing groundwater conditions for the band of vegetation downhill of the quarry and above the creek line.

The trench will be generally constructed within 10 metres of the quarry edge, sited to minimise the possibility of injected water flowing back into the quarry. The trench should follow the contours to have a level base, but if the side slope makes this impractical then several shorter trenches will be constructed. The trench excavation will be approximately 1.5 to 2 metres deep with a slotted pipe at the base, backfilled with gravel. Access pits shall be included as required for maintenance. Water injection is to occur at several locations for more uniform infiltration.

The first section of the trench and necessary pipework for injecting water will be installed during the construction phase, adjacent to the Stage 1 excavation area. This work should be complete prior to planting trees and shrubs in the restoration area (see below).



Landscape Plan - Access Road Figure 4.4

Please refer to full size drawings for detail.

## 4.2.10 Revegetation/Restoration (Quarry consent: schedule 4, conditions 35, 36 & 37)

Conservation, revegetation and restoration are required for land to the south of the extraction area shown in Appendix 1 of the quarry consent. This land is partly covered with remnant native vegetation and partly cleared. The native vegetation is partly degraded with weeds, but includes remnants of two endangered ecological communities. Appendix 1 of the quarry consent is reproduced here for reference as *Figure 4.5*.

During the construction phase, revegetation and restoration works are to commence in the designated land south of the extraction area shown on *Figure 4.5* and described in the Quarry Vegetation Management Plan, *Appendix E* of this QEMP. This work will be ongoing through the life of the quarry and is therefore presented in detail in section 5 of the QEMP dealing with site operations.

# 4.2.11 Rehabilitation

In the context of construction work, rehabilitation refers to making good land that is disturbed for construction that will not be further disturbed during ongoing operations. Disturbed surfaces will be stabilised as described in the erosion and sediment control plan or landscaped as described in the landscape plan.

Long term site rehabilitation and closure, referred to in conditions 39, 40 and 41 of the Quarry consent and condition 34 of the Access road consent, will be an operational matter and is presented in section 5 of the QEMP dealing with site operations.

# **4.2.12** *Dilapidation Surveys* (Quarry Consent: schedule 4, condition 51)

With the consent of the landowners, baseline dilapidation surveys are to be carried out on the residences on the adjoining Figtree Hill land and the "Belmont" property. Condition 51 requires the surveys to be undertaken at least prior to the commencement of each stage of extraction. The first dilapidation survey is to be completed before the end of the construction phase of the development.

Because of the need for ongoing surveys this item reappears as an operational requirement in section 5 of the QEMP.

# 4.2.13 Monitoring Equipment

Additional dust measuring devices as discussed below will be installed prior to or during the construction phase. The locations are shown on *Figure 7.1*. Existing







100m

monitoring equipment including boreholes, flow gauges, dust gauges, blast monitor, weather station and air sampler, will continue to be maintained and data gathered.

The Dust Management Plan (Quarry consent: schedule 4, condition 20) requires that a telemetering system be fitted to the existing weather station to notify the quarry manager when winds in excess of 5.4 metres per second are experienced for more than 15 minutes. The plan also requires, subject to owner agreement, that a real time light scattering monitor with telemetering capability be temporarily installed near *The Cottage* on the Figtree Hill land for six continuous months of monitoring at various stages during the quarry life (refer to section 7). The existing high volume air sampler is to be fitted with a PM<sub>10</sub> size selective inlet. A third dust deposition gauge is to be installed within the company's land near the access road to *Belmont*.

The blast monitoring plan requires that the existing blast monitor near *The Cottage* on the Figtree Hill land be permanently installed and fitted with a remote communications link. This will be carried out subject to landowner agreement.

# 4.3 CONSTRUCTION ENVIRONMENTAL MANAGEMENT

During construction work the following environmental management controls are to be implemented in accordance with conditions of consent and as required to minimise environmental impacts.

**4.3.1** *Hours of Construction* (Quarry consent: schedule 4, conditions 5 and 6; Access road consent: conditions 17 and 18)

Construction work is restricted to the following hours:

Monday to Friday:	7 am to 5:30 pm
Saturdays:	7 am to 1 pm
Sundays & holidays:	No work

# 4.3.2 Construction Noise (2003 EIS)

Construction of the quarry noise/sight bund will be the most significant activity with regard to construction noise. Noise from this temporary activity was modelled for the EIS and shown to exceed the noise goal for the site. For this reason, the EIS specifies that a construction noise management plan be developed in consultation with affected residents. It is proposed to manage construction noise as follows:

undertake the work as quickly as possible to shorten the period of disturbance;

- select plant and equipment with sound power levels that do not exceed levels used in noise modelling (refer to *Appendix D*);
- operate and maintain plant and equipment to minimise noise;
- limit construction to the approved hours of 7 am to 5.30 pm Monday to Friday and 7 am to 1 pm Saturday; and
- monitor construction noise to confirm objectives in the management plan are being met.

Prior to the commencement of construction work the occupants of the Figtree Hill property are to be contacted and the sequence of construction work discussed together with the likely noise implications. The construction noise management plan includes the above listed measures and any additional matters agreed with the residents following that consultation.

# 4.3.3 Dust Controls

Earthworks associated with construction work are subject to standard dust control practices contained in the Dust Management Plan. In particular:

- the haulage route for material used in constructing the noise/sight bund will be kept moist whilst in use;
- vehicles hauling materials across the site will be confined to a single route; and
- to minimise wind blown dust, the bunds will be stabilised with mulch and revegetated as soon as practicable following completion of earthworks.

# 4.3.4 Soil and Water Management

Construction works will be protected with erosion and sediment controls as described in section 4.2.1 above. The installed devices and drains are to be regularly maintained as specified in the Erosion and Sediment Control Plan.

Embankments and other disturbed areas that are not subject to quarrying will be stabilised within seven days of formation as described in the Erosion and Sediment Control Plan.

# 4.4 VERIFICATION OF CONSTRUCTION COMPLIANCE

(Quarry consent: schedule 3, clause 13; Access road consent: condition 3)

Prior to the commencement of quarry operations, an independent person or organisation is to certify in writing to the satisfaction of the Director-General that all

conditions of the development consent have been complied with up to that point. The independent person is to be approved by the Director-General in writing.

Prior to commencing use of the access road, the Principal Certifying Authority (Shellharbour City Council) must issue a certificate verifying all conditions have been satisfied.

# 5

# ENVIRONMENTAL MANAGEMENT

The environmental management requirements included in this section of the QEMP are auditable at each scheduled external audit and should be reported upon in the annual environmental management report (refer to section 8). References to the "Quarry consent" refer to the development consent for the quarry issued by the Land and Environment Court on 21 February 2006. References to the "Access road consent" refer to the development consent for the access road determined by Shellharbour City Council on 10 May 2007.

### 5.1 BOUNDARY OF OPERATIONAL AREA (Quarry consent: schedule 3, condition 1)

The approved limit of extraction is shown on the survey plan *Figure* 2.2. A full sized copy of this plan is available. The boundaries are to be clearly and permanently marked at all times in a manner that is obvious to operating staff and inspecting officers. Audit reports should verify that the boundaries remain clearly marked and that extraction remains within the boundaries.

### 5.2 STAGING

### 5.2.1 Stages 1 to 4 (Quarry consent: schedule 3, condition 5)

*Figure 5.1* shows the six stages of the quarry as proposed in the 2003 EIS, adjusted to show the southern boundary as modified by the consent, the 10 metre buffer along the northern boundary and the minor alteration in alignment of the access road deriving from the subsequent Council consent. Development consent for the quarry has been issued for stages 1 to 4 only.

## 5.2.2 Stages 5 and 6

A separate development approval will be required before proceeding into stages 5 and 6. Until that approval is received the area of land affected by stages 5 and 6 is to be fenced off from stages 1 to 4 and not used for any purpose associated with the quarry, except for access to the noise/sight bund in the north-east corner, the revegetation/restoration area to the south of the site and monitoring devices. Audit reports are to verify that this is thecase.





 Development approval for stages 5 and 6 does not require a separate development application. Instead a report is to be submitted to the Minister as described in Schedule 3, Condition 6 of the quarry consent.

**5.3 DURATION OF OPERATIONS** (Quarry consent: schedule 3, condition 7; Access road consent: condition 12)

The quarry development consent lapses 30 years after the date of determination. The consent was determined on 21 February 2006.

The access road consent provides that the use of the land for quarry access and haul road shall cease 30 years after the date of determination of the quarry consent. The road may be used for a further five years for the purposes of rehabilitation.

# 5.4 **PRODUCTION LIMIT**

## 5.4.1 Performance Objective

Source	-	Quarry consent: schedule 3 , conditions 8 and 9
Requirement	-	Production of quarry products from the quarry is limited to a maximum of 400,000 tonnes per annum.
Verification	-	Annual production data is to be provided to the Department of Primary Industries and included in the annual environmental management report.

The Environment Protection Licence places no further restriction. The licence applies to hard rock quarrying producing from 100,000 to 500,000 tonnes per year.

# 5.5 NOISE LIMITS

# 5.5.1 Performance Objective

Source - Quarry development consent: schedule 4, conditions 4, 8 and 9; Access road consent: conditions 16, 17 and 18. (identical)

Requirement	-	Operational noise generated by the development must not exceed
		criteria specified in Table 5.1 under conditions of wind speeds (10
		metres above ground) of up to 0.5 metres per second and under
		temperature gradients of up to 0°C per 100 metres (Condition 4).

- Verification Noise measurement to be undertaken at the most affected point on the receptor boundary or within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary. Measurements to be undertaken by a qualified person within eight weeks of commencing extraction and annually thereafter. Results to be submitted to DECC and the Director-General within three months (Condition 8). Noise monitoring procedures are included in the noise monitoring plan and summarised in section 7 of this QEMP.
- Notification Within seven days of detecting an exceedence of a noise limit in *Table 5.1*, the exceedence is to be reported to DECC, the Director-General and the owner of the property. (refer to Condition 9 for details).

# Table 5.1NOISE LIMITS

Receiver Locations	Noise Limits L <sub>Aeq15minute</sub>		
	Stages 1-2	Stages 3-4	Stages 5-6
"The Hill" residence (Dunster premises)	35	38	35
"The Cottage" residence (Dunster premises)	35	38	35
Approved rural worker's dwelling (Dunster premises)	35	38	35
Greenmeadows residential estate	41	41	41

# 5.5.2 Design Features

(i) A noise/sight bund, 350 metres long and approximately three metres high, is to be constructed at the north-eastern corner of the extraction area along the northern and eastern boundary. This bund is designed to attenuate noise transmission in the direction of the residences and approved rural worker's dwelling on the Figtree Hill property.

# 5.5.3 Management Procedures

- (i) Confine work to the approved operating hours (see 5.6 below)
- (ii) Maintain plant and equipment so that sound power levels specified in *Appendix D* are not exceeded.

**5.6 OPERATING HOURS** (Quarry consent: schedule 4, conditions 5 and 6; Access road consent: conditions 17 and 18)

Operating hours for all external activities except blasting (where there are more stringent controls) are limited as follows: (Condition 5):

- **7.00 am to 5:30 pm Monday to Friday;**
- **7.00 to 1.00 pm Saturdays;**
- no operation on Sundays or public holidays.

Exceptions to the above limits are as follows (Condition 6):

- delivery of materials as requested by the police or other authorities for safety reasons;
- emergency work to avoid loss of life, property or to prevent environmental harm;
- workshop activities and other maintenance work inaudible at the nearest affected receiver.

## 5.7 BLASTING

### 5.7.1 *Performance Objective*

- Source Quarry development consent: schedule 4 ,conditions 10, 11 and 12 and Blast Management Plan (Condition 14)
- Requirement Airblast overpressure and peak particle velocity from blasting must not exceed criteria specified in *Table 5.2*. Blasting may only take place between 9 am and 5 pm Monday to Friday and is limited to one blast per day unless otherwise approved by DECC.
- Verification Blast monitoring procedures are described in the Blast Management Plan and summarised in section 7 of this QEMP.

Maximum Airblast Overpressure dB(Lin Peak)	<b>Maximum Peak Particle</b> <b>Velocity</b> mm/s	Allowable Exceedence
1. At any point located at	t least 3.5 metres from any resider	nce on privately owned land
115	5	5% of the total number of blasts over any 12 month reporting period.
120	10	0%
2. At the southern bound	ary of the Figtree Hill land	
135	200	0%

## Table 5.2BLASTING LIMITS

## 5.7.2 Design Features

- (i) Blasting is offset from the northern property boundary by the 10 metre planted buffer.
- (ii) For the initial stages of extraction the haul road is located close to the northern boundary of the extraction area further separating blasting from the property boundary (refer to the sketch in Appendix 3 of the quarry development consent subsequent redesign of the access road has provided greater separation from the boundary).

## 5.7.3 Management Procedures

- (i) The following blast design parameters are to be implemented for each blast, subject to review as indicated in (vi) below:
  - Direction of detonator initiation is away from nearest residence;
  - All blast faces are to be oriented generally to the south;
  - Each hole is to have 1.5 metres of solid decking;
  - Two or more columns of explosives of equal length per blast hole;
  - **u** Two detonators per blast hole;
  - Explosive columns are to be initiated from the bottom;
  - Blast holes are to be 76 mm diameter;
  - Minimum stemming depth is 2.2 metres;
  - Subdrill 1.2 metres for both production and overburden blasts;
  - Bench height is to be between 7 and 12 metres;
  - Minimum front row burden is to be 2.2 metres;
  - Minimum spacing is 2.2 metres.

(ii) For the first 20 blasts the maximum instantaneous charge (MIC) is to be restricted according to the lower result derived from the following formulae:

MIC (kg) =  $[(Distance to nearest receiver (m))/152.8]^3$ 

MIC (kg) = (Distance to nearest receiver (m))<sup>2</sup>/4,719

- (iii) Blast emissions data collected from the first 20 blasts are to be used to revise the predicted blast emissions site laws included in the Blast Management Plan to generate more accurate site laws based on the measured characteristics of the site.
- (iv) Thereafter MIC for each blast is to be calculated in accordance with the revised blast emissions site laws.
- (v) Blast emissions site laws will be further revised over the life of the quarry using blast emissions data from completed blasts.
- (vi) Blast design will be refined from time to time using the updated site laws, particularly when operating close to the northern property boundary.
- (vii) For blasting within 60 metres of the northern property boundary, the MIC from each blast is to be restricted to below 18 kilograms or as otherwise indicated by the revised site laws, to maintain airblast overpressure below 135 dB(Lin) at the boundary.
- (viii) To minimise flyrock, the front row of blast holes is to be "boretraked" to identify any areas of unsatisfactory burden. Any such blast holes are to be filled with inert material rather than explosives.
- (ix) Also to minimise flyrock, aggregate will be used as the stemming material rather than drill dust.
- (x) When blasting within 20 metres of the northern boundary, a one metre layer of overburden will be left in place on top of each shot and blast mats will be installed over the blast.
- (xi) Meteorological data is to be evaluated as close as possible to the time of blasting to determine if blasting should proceed.
- (xii) Blasting is to be avoided where possible if winds are blowing towards the nearest receptor at sufficient strength to enhance impacts, if there is heavy low level cloud or where a temperature inversion is present.
- (xiii) All affected landowners or occupiers within 500 metres of a blast are to be notified of the expected time of firing by telephone on the morning of the blast.
- (xiv) When planning a blast within 50 metres of the northern boundary, the owners of the Figtree Hill land are to be notified in writing at least 48 hours prior to firing and again by telephone on the morning.

(xv) Blasts will be conducted at the same time each day where possible. Should Readymix be blasting on the same day, the blasts shall be adequately separated in time.

# 5.8 AIR QUALITY

## 5.8.1 *Performance Objective*

Source - Quarry development consent: schedule 4 ,conditions 16, 17 and 18 and Dust Management Plan (Condition 20); Access road consent conditions 19, 20 and 21.

- Requirement Air quality criteria specified in *Table 5.3* must not be exceeded at any sensitive receiver or residence on privately-owned land. The site must be maintained in a condition that minimises dust emission, including prompt and effective rehabilitation of all disturbed areas. Unsealed roadways, quarry floor and stockpiles are to be watered as necessary to minimise dust impacts on the natural and built environment.
- Verification Dust monitoring procedures are described in the Dust Management Plan and summarised in section 7 of this QEMP.

*Table 5.3* DUST LIMITS

Pollutant	Averaging	Criterion		
	Period			
Total suspended particulate matter (TSP)	Annual	90 µg/	m <sup>3</sup>	
Particulate matter < $10 \ \mu m \ (PM_{10})$	Annual	30 µg/m <sup>3</sup>		
Particulate matter <10 µm (PM <sub>10</sub> )	24-hour*	50 μg/m <sup>3</sup>		
		Maximum increase	Total	
Deposited Dust	Annual	2 g/m²/month	4 g/m²/month	

\*Note: For continuous  $PM_{10}$  monitoring purposes, the Dust Management Plan derives a one-hour average  $PM_{10}$  limit of 125  $\mu$ g/m<sup>3</sup>.

# 5.8.2 Design Features

- (i) The access road follows a route leading away from residences.
- (ii) All traffic to or from the quarry passes through the existing processing plant where dust control measures are already implemented.

- (iii) The access from public roads to the site is sealed as far as the processing plant weighbridge.
- (iv) Where the quarry access road crosses the ridge top it is located in cut, giving some protection from the wind in this exposed area.

## 5.8.3 Management Procedures

- (i) Permanent or long term stockpiles are to be revegetated.
- (ii) When south-westerly winds average above 5.4 m/s (critical winds) water sprays will be directed onto any exposed stockpiles on the quarry site.
- (iii) A telemetry system is to be fitted to the weather station to notify the Quarry Production Manager when critical winds are sustained for 15 minutes.
- (iv) Only one work face shall be permitted on a materials stockpile, where practicable, and shall be wetted down before working.
- (v) Stockpiles within the quarry shall not exceed the height of the bund in the north-eastern corner.
- (vi) Tipping drop heights will be minimised and waters sprays used on excavator buckets and truck trays during dry and dusty conditions.
- (vii) Fine mist sprays will operate when blasting occurs.
- (viii) The haul road is to be kept damp at all times when in use, spraying a minimum of 2 litres/ $m^2$ /hour with a chemical additive to break the surface tension, if needed.
- (ix) All vehicles on site are to be confined to designated roads with a signposted speed limit.
- (x) Trucks leaving the site to the public road system are to have covered loads, with tailgates effectively sealed.
- (xi) Miscellaneous dust sources such as spillages from trucks and silt from sediment controls are to be regularly cleaned up.
- (xii) Burning is not permitted on the site.

# 5.9 WATER MANAGEMENT

# 5.9.1 *Performance Objective*

Source - Quarry development consent: schedule 4 ,conditions 22, 23, 24, 25, 26 and Surface Water and Groundwater Management Plan and Soil and water Management Plan (Conditions 27 to 32);
 Access road consent conditions 22 and 23.

Requirement	-	Section 120 of the Protection of the Environment Operations Act
		1997 must be complied with at all times.
	-	Any discharges from licensed discharge points must have total

- suspended solids of not more than 50 mg/litre and pH within the range 6.5 to 8.5.
- The stormwater system is to be designed to capture polluted runoff from a 10 year ARI, 24 hour duration storm (225 mm in 24 hours) Within five days of a rainfall event, stormwater basins are to be
- treated and emptied to maintain storage capacity.
   Written approval from DECC is required to use a flocculent other
- than gypsum

Verification - Monitoring and environmental site audit

# 5.9.2 Design Features

- (i) Erosion and sediment controls for the access road and first stage of the quarry are included in the erosion and sediment control plan (refer *Figure* 4.2).
- (ii) Long term water storage for operational purposes is designed to occur in the base of the excavation, which is not free draining.
- (iii) During the early years of operation and during dry spells water will be sourced from the large dam associated with the existing quarry and processing plant.
- (iv) When collected water is available, water is to be periodically released from the quarry to the creek system to mirror natural pre-quarry flows.
- (v) Collected water is to be reinjected to groundwater should monitoring show that groundwater levels are declining as a result of quarrying. An infiltration trench is to be installed for this purpose (refer to *Figure 4.1* and the Surface Water and Groundwater Management Plan Golders 2005)

# 5.9.3 Management Procedures

- (i) Install and maintain erosion and sediment controls in accordance with instructions on the approved plans.
- (ii) Inspect erosion and sediment controls after each major rain event, repair any damage and ensure correct functioning.
- (iii) Remove accumulated silt periodically from sediment traps/basins.
- (iv) Refuel plant and equipment at least 100 metres from any water storage.
- (v) Test and if necessary, treat water prior to release to the creek system.
- (vi) Regularly collect and remove waste and litter from the quarry site.

(vii) Limit fertiliser use on rehabilitation works to minimise nutrient runoff.

# 5.10 VEGETATION AND FAUNA MANAGEMENT

# 5.10.1 Performance Objective

Source	-	Quarry development consent: schedule 4 , conditions 35, 36,
		Vegetation Management Plan (condition 37) and Vegetation
		Clearing Protocol (condition 34)
Requirement	-	Conserve and maintain the southern areas of remnant vegetation
		marked on the map in Appendix 1 of the consent.
	-	Revegetate the areas marked "Area to be planted" on the map.
	-	Restore the area marked "Weed control to promote natural
		vegetation" on the consent map.
	-	Periodically release water from the quarry storage for
		environmental purposes
Verification	_	Environmental site audit.

## 5.10.2 Design Features

- (i) The area to be returned to native forest is to be fenced off from the remainder of the property with a plain wire stock fence to prevent stock access and to ensure that vehicles cannot enter the area randomly without passing through a gate which is signposted to deter entry.
- (ii) In the *restoration area*, the primary management objective is to enhance native vegetation by controlling weeds and allowing natural regeneration of native plants to take place.
- (iii) In the *revegetation area*, the primary management objective is to establish native vegetation by planting and nurturing native species, being vegetation that is indigenous to the site.

# 5.10.3 Management Procedures

- (i) Spoil or other materials are not to be stored within the area fenced off for protection of vegetation to the south of the quarry.
- (ii) Topsoil may be used to improve the growing area in the revegetation area but is not to be used in the restoration area.
- (iii) Prior to fencing, all foreign material including dumped rubbish, old fences and farming debris is to be removed from the restoration/revegetation area.

- (iv) An induction is to be given to all personnel working on the site stressing that access within the fenced area should normally be on foot and that the area is not to be driven over or disturbed other than where essential for maintenance or monitoring of the restoration/revegetation.
- (v) Signs are to be erected on the fence to make it clear the land beyond is being restored/revegetated and that there should be no unauthorised vehicle entry.
- (vi) Soil disturbance is to be minimised in the restoration area but may occur in the revegetation area for the purpose of revegetation and weed control.
- (vii) Chemical weed control is not to be used in the restoration area, except for painting lantana stumps, but may be used in the revegetation area.
- (viii) Plant stock of selected species listed in the Vegetation Management Plan is to be obtained from a nursery that has propagated them from material obtained on the site or in the local area.
- (ix) Weeds identified in the Vegetation Management Plan are to be controlled in the restoration/revegetation areas with particular emphasis on African Box Thorn, Lantana and Prickly Pear.
- (x) The planting method is as follows:
  - plants shall be tubestock or similar small stock;
  - water-holding crystals and two tablets of slow-release fertiliser shall be placed in the hole.
  - plants shall be watered at the time of planting, with follow-up watering at least weekly until the plants are established.
  - **u** plants shall be individually bagged but not staked.
  - trees and shrubs are to be planted no more than two metres apart and ground cover plants at a density of two plants per square metre, avoiding any geometric pattern.
  - the area around each plant is to be mulched at the time of planting using mulch from the site that is free from viable weed propagation material.
- (xi) The following maintenance activities are to be carried out at least quarterly:
  - check that fencing is intact;
  - □ carry out weed control;
  - water plants as required;
  - replace dead plants;
  - □ remove any rubbish;
  - Let treat any erosion or siltation;

- address the impact of animals.
- (xii) To maintain the riparian environment in the creek system leading from the quarry, water is to be released from the quarry storage to the creek on a varied basis, mirroring rainfall as far as possible to approximate prequarrying conditions.

# 5.11 REHABILITATION

# 5.11.1 Performance Objective

Source	-	Quarry development consent: schedule 4, condition 39 and Rehabilitation Management Plan (condition 40); Access road consent: condition 34.
Requirement	-	Progressively rehabilitate the disturbed areas of the quarry site in accordance with the process outlined below, which is the initial rehabilitation management plan. Rehabilitate the access road when it is no longer required.
Verification	-	Environmental site audit

# 5.11.2 Design Features

- Following completion of construction works described in section 4 of the QEMP the remaining disturbed areas on the site for which rehabilitation will be required include the access road formation and the active quarrying area.
- (ii) A separate rehabilitation management plan has been prepared for the access road and is included in *Appendix E*.
- (iii) Access road rehabilitation will be undertaken at the end of quarrying, in about 30 years, if the road is no longer approved for access to the property.
- (iv) Quarry rehabilitation will be undertaken progressively, commencing when the quarrying has moved to the Stage 2 quarrying area, after year 5.

# 5.11.3 Medium and Long Term Quarry Rehabilitation Measures

- (i) In consultation with Shellharbour Council identify the most suitable future use for the land.
- (ii) Progressively backfill exhausted areas of the quarry to establish a landform consistent with the agreed future use for the land and to achieve a free draining structure.

- (iii) On the sides of the amphitheatre, aim for a final gradient of about one in four with a series of terraces to break up the slope and provide for future access.
- (iv) As each area of the backfilled quarry reaches final grade, spread available topsoil and stabilise the surface.
- (v) Determine specific surface finishes such as grass, hardstand or vegetation in as appropriate for the agreed final land use and detail them in future revisions of this plan.

## 5.11.4 Short Term Rehabilitation Measures

It is not anticipated that quarry rehabilitation will commence within the first five years as the Stage 1 extraction area will be in full operation during this period. Rehabilitation will commence when extraction moves into the Stage 2 area in years 6 to 10. This QEMP will be updated to include detailed proposals when land becomes available for rehabilitation, consistent with the development consent.

# 5.12 TRAFFIC AND TRANSPORT

## 5.12.1 Performance Objective

Source	- Quarry development consent, schedule 4: conditions 45 to 50; Access road consent conditions 36 to 39.
Requirement	<ul> <li>All site access is to be via the roundabout at East-West Link Road</li> <li>Do not cause any heavy vehicle movements on Dunsters Lane, except in an emergency</li> <li>Ensure that all loaded vehicles leaving the site are covered</li> <li>Prevent spillage of quarry material to the public road system.</li> </ul>
Verification	- Environmental site audit

## 5.12.2 Design Features

- (i) The existing access to the quarry/processing plant connects with the East-West Link road at a roundabout.
- (ii) The access road from the roundabout to the processing plant weighbridge is sealed.

## 5.12.3 Management Procedures

- (i) Personnel are to be instructed that the quarry site is not to be accessed via Dunsters Lane.
- (ii) If Dunsters Lane has to be utilised in an emergency, inform Shellharbour City Council and the Director-General of Planning as soon as possible.
- (iii) Sufficient parking is to be available on site for all quarry-related vehicles.
- (iv) All loaded vehicles entering or leaving the site to the public road system are to be covered.
- (v) Vehicles leaving the site are to be free from material that may fall to the public roadway.

# 5.13 HERITAGE

# 5.13.1 Performance Objective

Source	-	Quarry development consent, schedule 4 ,conditions 51 and 52 Access road consent condition 40
Requirement	-	Relocation of dry stone walls and baseline dilapidation surveys will occur in the construction phase and are addressed in section 4. If any identified relic is likely to be disturbed, firstly obtain an appropriate permit under the Heritage Act or National Parks and Wildlife Act as may be applicable.
Verification	-	Environmental site audit to confirm dilapidation survey

# 5.13.2 Management Procedures

- (i) Repeat the baseline dilapidation survey of residences on the Figtree Hill land and *Belmont* prior to the commencement of each stage of quarrying.
- (ii) Should any artefact be encountered during quarrying that may be of European cultural significance, offer the material to Shellharbour City Council for retention in a museum or as appropriate.
- (iii) Should any material be discovered which is suspected to be an Aboriginal artefact, leave the material in situ and have it examined by a qualified archaeologist before determining further action.

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# 5.14 VISUAL IMPACT

## 5.14.1 Performance Objective

Source	-	Quarry development consent, schedule 4, conditions 54 to 57 Access road consent conditions 42 to 45.
Requirement	-	Minimise visual impact from the quarry and access road.
Verification	-	Environmental site audit.

## 5.14.2 Design Features

(i) During the construction phase a visual bund, screen planting and landscaping will be provided consistent with the landscape plans, as described in section 4.

## 5.14.3 Management Procedures

- (i) Continue to nurture and maintain vegetation planted on visual bunds and elsewhere for screening and landscaping purposes.
- (ii) Augment or renew screening vegetation should its effectiveness deteriorate over time.

# 5.15 WASTE MANAGEMENT

# 5.15.1 Performance Objective

Source-Quarry development consent, schedule 4, conditions 58 to 59Requirement-Minimise waste generation and avoid the site becoming<br/>contaminated as a result of waste being disposed thereon.

Verification - Environmental site audit.

## 5.15.2 Management Procedures

- (iii) Waste of any type or quantity that requires a licence issued by DECC for its transport or disposal is not to be brought to the site.
- (iv) Waste generated on the site shall be removed to a facility licensed to receive the waste.

# 5.16 EMERGENCY AND HAZARDS MANAGEMENT

## 5.16.1 Performance Objective

Source	- Quarry development consent, schedule 4, conditions 61 to 65 Access road consent conditions 46 to 47.
Requirement	<ul> <li>Store, handle and transport dangerous goods in accordance with relevant Australian standards.</li> <li>Secure the site to ensure public safety.</li> <li>Minimise the risk of pollution in the event of a significant threat to the environment.</li> <li>Alert relevant agencies and the affected community in the event of significant pollution.</li> <li>Ensure that employees are familiar with emergency procedures.</li> <li>Integrate emergency management procedures for the quarry with Cleary Bros emergency management plans</li> </ul>
Verification	- Environmental site audit.

# 5.16.2 Significant Threats

Significant events at the quarry that may threaten the environment or public health include excessive rainfall, fire, fuel spillage on the access road, blasting mishap, unauthorised access or major truck accident. Other potential occurrences such as landslip, power failure, pump failure, excess flocculation or spillage within the quarry would be unlikely to present a threat to the environment or public health as the effects would be contained within the quarry, allowing rectification to be planned and implemented in a co-ordinated manner.

Should a major pollution incident occur affecting the external environment, DECC will be advised by telephone (131555) as soon as possible and provided with written details within seven days.

# 5.16.3 Excessive Rainfall

Excessive rainfall means rainfall generating runoff that floods part of the site or exceeds the design capacity of the drainage and sediment control system and creates a potential for severe erosion and for sediment laden water to be released into the environment.

## 5.16.3.1 Access Road

From the time of first disturbance, earthworks on the site will be protected by erosion and sediment controls. The Erosion and Sediment Control Plan provides for three sediment basins to be constructed beside the access road to collect dirty water and settle suspended matter. These basins have a designed holding capacity based on 225 millimetres of rainfall in 24 hours as specified in condition 24 of the quarry consent. This rainfall equates to a once in ten year 24 hour storm.

On occasions when heavy rainfall produces runoff in excess of the basin design volume, provision is included to spill the excess stormwater after it passes through the basin. The excess runoff will generally have a lesser sediment load than the first flush and will drop much of this material within the basin, reducing sediment carry over to the spillway. The response to excessive rainfall is to monitor the drainage and sediment control system and effect any repairs or maintenance as soon as possible.

In the unlikely event that a sediment basin wall is overtopped or gives way this would be a serious environmental incident requiring notification to DECC as required under section R2 the licence.

## 5.16.3.2 Quarry Workings

Once extraction has commenced, the quarry excavation will be capable of retaining runoff from all rainfall within its catchment. While excess water may flood the workings and be a hindrance to operations it will not be an emergency situation. The excess will be flocculated if necessary and released as soon as sampling has indicated that it is appropriate to do so.

## 5.16.3.3 Management Procedures

When excessive rainfall is experienced:

- (i) Cease quarrying at the lowest level;
- (ii) Check the drainage and sediment control structures for integrity and make any urgent repairs;
- (iii) Relocate mobile machinery and moveable plant not required for emergency work, to higher ground, clear of any part of the quarry likely to become inundated;
- (iv) Should a major pollution incident occur to the external environment advise DECC as indicated above.

After a major rainfall event:

- (i) Inspect erosion and sediment controls and undertake any repairs or maintenance;
- (ii) Return mobile plant and clean deposited debris from the access road and operational area of the site;
- (iii) Flocculate the storage in the quarry base using gypsum and test for suitability for discharge. If the sediment load is less than 50 mg/litre, pH in the range 6.5 to 8.5 and no visual evidence of hydrocarbons, pump water to natural drainage until a satisfactory working level is reached;
- (iv) As time permits, restore any damage to the operational area and rehabilitation works.

## 5.16.4 Fire

The threat from fire includes equipment fires and grass fires occurring within the property and bushfires threatening the property from external sources. The risk from fire is significantly reduced because the quarry and its access road create extensive fire breaks and hardstand areas.

## 5.16.4.1 Precautionary Measures

The following steps are taken to minimise the risk of fire and fire damage:

- (i) Fire fighting equipment is stored at the site;
- (ii) Extinguishers are kept on all mobile plant;
- (iii) Staff are trained in fire response procedures;
- (iv) No fuel, explosives or other highly combustible material is kept in the quarry;
- (v) Cattle grazing is permitted to continue on grassland areas of the site as far as practicable to prevent a high fuel load from developing in those areas;
- (vi) The company's work instructions include emergency response procedures, applicable during a fire emergency:
  - equipment available on the premises;
  - responsibilities of personnel;
  - **u** Rural Fire Service contact details;
  - weekly visual check and quarterly testing of equipment;
  - signposting for fire fighting equipment;
  - staff training for fire emergencies.

The bushland area of the property is located downslope of the approved quarry and generally along the creek line. This area contains endangered ecological communities. Under the terms of the development consent the bushland is required to be protected and in some places augmented and restored. In view of the sensitivity of this area and the firebreaks provided by the quarries (Cleary Bros and Readymix) and grazed grassland it is not proposed to undertake hazard reduction activities in the bushland area.

### 5.16.4.2 *Response to Fire Incident*

- (i) Any fires, such as equipment fires, ignited within the quarry will be controlled in the first instance by trained quarry staff using available fire fighting equipment including fire extinguishers and the water cart. Should the Quarry Manager consider that the fire cannot be readily controlled or in the event of a fire presenting a threat to land outside the working area of the quarry, the Rural Fire Service will be called to assist.
- (ii) In the event of a bushfire threatening the quarry from external land the company will assist the Rural Fire Service as far as possible to prevent the fire spreading onto the site.

### 5.16.5 Fuel Spill

The only fuel within the quarry extension area will be within plant and equipment. Fuel will not be stored in the quarry. Fuel trucks will visit the site as required for refuelling purposes. The following protocols apply to fuel spillages:

- (i) Refuelling is to be carried out more than 100 metres from any water storage that could receive spillage;
- (ii) In the event of a spillage, appropriate steps are to be taken to contain the spill and prevent fuel reaching the water storage;
- (iii) Spilt fuel is to be collected if possible;
- (iv) Should fuel reach the water storage, it is to be skimmed from the surface and removed as liquid waste;
- (v) Should a significant quantity of loose surface material become contaminated with spilt fuel it is to be collected and removed for disposal to a licensed landfill.
- (vi) Should a major pollution incident occur to the external environment, advise DECC as indicated above.
## 5.16.6 Blasting Mishap

Extensive precautions are in place to prevent any incident occurring during blasting (refer to section 5.7). Should an incident occur where flyrock is believed to have left the quarry area, the owners of any affected neighbouring property will be contacted, notified of the occurrence and asked to report any damage.

### 5.16.7 Unauthorised Access

The following measures are in place to maintain security of the site:

- (i) All personnel entering the site along the quarry access road are required to report to the office;
- (ii) Vehicular access to the site is locked at times when the site is unattended;
- (iii) Fencing is to be maintained along the property boundary to the north of the quarry and the gate on the access road to *Belmont* will be kept closed when not in use.
- (iv) Signs warning of the deep excavation are to be displayed along the extractive area boundary fencing with the adjoining dairy property at 50 metre intervals.

#### 5.16.8 Major Truck Accident

Potential vehicle accidents on the site include collisions and runaway accidents on the steep access road. Should a vehicle be involved in a major accident on the premises, staff will initially attend to the needs of any injured personnel. If there is a spill of fuel, emergency response procedures will be initiated as described above. Should there be a spill of extracted material, steps will be taken to recover the material as far as practicable. The Department of primary Industries will be notified of any accident on the site in accordance with requirements.

Should a runaway vehicle leave the access road and enter the bushland on Lot 23 DP 1039967 Shellharbour Council and DECC shall be notified as soon as possible.

## 5.16.9 Emergency Procedures

A copy of Cleary Bros existing staff work instruction for emergency procedures at the Albion Park quarry in included as *Appendix H*.

## 6

# COMPLAINTS MANAGEMENT

### 6.1 OVERVIEW

This complaints management system contains the following elements:

- advertised telephone number, postal address and email address for complaints;
- system for logging and investigating complaints;
- **u** process for recording the outcome of investigations and action taken; and
- feedback to complainants following investigation.

## 6.2 CONTACT DETAILS

#### 6.2.1 Telephone Hot-line

The 24-hour telephone number for use by the public when making complaints is

## 0408 322 213.

This number is used to receive complaints specifically for Albion Park quarry. The number will be made known to the public by:

- (i) inclusion in future telephone directory listings for Cleary Bros;
- (ii) direct advice to councils, DECC and any persons who may contact the company regarding a complaint by mail or using existing phone numbers;
- (iii) printing on business cards and fridge magnets for issue to interested persons as the opportunity arises; and
- (iv) inclusion on a sign at the property entrance.

The telephone number is answered by Cleary Bros Quarry Manager. If the manager is on leave the phone will be diverted to the acting manager.

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## 6.2.2 Post and Email

Complaints may also be lodged to Cleary Bros by post or email as follows:

Albion Park Quarry Complaints Cleary Bros (Bombo) Pty Ltd PO Box 210 PORT KEMBLA NSW 2505

email: environmentalengineering@clearybros.com.au

## 6.3 COMPLAINTS LOGGING

When a complaint is received by Cleary Bros, details will be recorded on a Customer Feedback Form. These forms are designed to be used to record complaints from purchasers of the company's products as well as members of the community with a complaint about the company's operations. Unused copies of these forms will be kept by the quarry manager and in the site office and divisional office at all times and will be issued to on-call staff. A copy of a Customer Feedback Form is included in *Appendix I*.

Completed forms will be sequentially numbered and filed at the company's divisional office in numerical order. A copy will be retained in the site office and may be inspected by authorised persons from regulatory bodies.

## 6.4 COMPLAINTS INVESTIGATION

The following procedures will be followed whenever complaints are received:

- (i) Every complaint is to be investigated as far as practicable, a response given to the complainant and a record created of the response.
- (ii) The procedure for investigating complaints and responding is to be explained to the complainant at the time the complaint is recorded.
- (iii) If the complaint is received by staff while an incident is claimed to be occurring, the location of the incident is to be visited, immediately if practicable, to verify and record details.
- (iv) If the complaint is received after the incident when the grievance is no longer occurring, or if it is not practical to visit the location, full details are to be obtained from the complainant and recorded.

- (v) A record is to be made of the company's activities at the location of the incident during the period leading up to the time of the incident.
- (vi) If the matter relates to dust, noise or blasting, the wind strength and direction are to be obtained from the weather station data for the period of about one hour prior to the incident.
- (vii) The complainant is to be contacted within two working days of the complaint being lodged to provide details of the investigations and other action taken in response to the complaint.
- (viii) The Customer Feedback Form is to be completed to summarise all actions taken to investigate the complaint including:
  - time, date and location of incident;
  - name and address of complainant (if provided);
  - name of the person conducting the investigation;
  - activities at the location during the hour preceding the incident;
  - average wind strength and direction during hour preceding a noise or dust incident;
  - any observations as to the possible cause of the incident;
  - summary of information given to complainant in follow up call.
- (ix) Anonymous complaints are to be recorded and investigated but in the absence of contact details, a personal response to the complainant will not be possible.

## 7

# ENVIRONMENTAL MONITORING PROGRAM

#### 7.1 MONITORING PARAMETERS

Monitoring will be carried out as required by the development consents and environment protection licence applying to the site (refer to appendices). These documents require monitoring of meteorology, noise, blasting, air quality and water quality.

## 7.2 WEATHER MONITORING

The site weather station was set up in 2005 to monitor temperature, wind and rainfall data as detailed in *Table 7.1*. The data are continuously recorded and averaged over one-hour intervals. The location of the weather station is shown on *Figure 7.1*.

#### Table 7.1WEATHER MONITORING PARAMETERS

Parameter	Units	
Temperature at 2 metres	K	
Temperature at 10 metres	K	
Total Solar Radiation at 10 metres	W/m <sup>2</sup>	
Wind direction at 10 metres	Compass points	
Wind speed at 10 metres	m/s	
Sigma theta at 10 metres	degrees	
Rainfall	mm/hr	

Meteorological data may be retained in the form of a digital file but shall be accessible on request from representatives of the Department of Planning or DECC. A summary of meteorological data collected at the site during the year shall appear in the Annual Environmental Management Report (refer to section 8) together with progressive long term averages. Auditors should verify that data collection is ongoing and that the telemeter system works to notify the quarry manager when the wind velocity exceeds 5.4 metres per second for more than 15 minutes.



FIGURE 7.1 Location of Monitoring Devices

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## 7.3 NOISE MONITORING

#### 7.3.1 Source

Noise monitoring requirements are detailed in the Noise Monitoring Programme/Blast Management Plan (Heggies Australia 2006) and summarised below.

## 7.3.2 Location

Noise monitoring locations are as follows:

Location Type	Monitoring Location		
Reference location	"Belmont" (Cody Residence)		
Residential Assessment Location	"The Cottage" (Dunster Residence)		
Residential Assessment Location	Greenmeadows Residential Estate		

Operator attended monitoring and unattended noise logging shall be carried out at all of the above locations, except as detailed in 7.3.3 below.

## 7.3.3 Frequency

Operator attended noise monitoring is to be undertaken on one day per calendar quarter for the first 12 months after commencement of works and then at yearly intervals and at the commencement of any significant operational event.

Unattended noise logging is to be carried out for a minimum period of seven days on a quarterly basis for the first 12 months after commencement of works and then at yearly intervals.

The Greenmeadows estate is affected by noise from the processing plant which is unlikely to change unless the plant is altered. Once compliance has been established, further quarterly noise monitoring at this location is not required, although annual monitoring will continue.

## 7.3.4 Method

Operator attended monitoring shall quantify and characterise the maximum ( $LA_{max}$ ) and the average ( $LA_{eq15min}$ ) intrusive noise from quarrying over a 15 minute measuring period.

Unattended continuous noise logging shall be conducted to quantify overall ambient noise amenity levels resulting from quarrying and processing emissions and other environmental noise sources.

Measurements will be taken with acoustic instrumentation carrying current NATA or manufacturer calibration certificates. Instrument calibration will be checked before and after each measurement survey.

All noise measurements will be accompanied by qualitative and quantitative measurements of prevailing local weather conditions. The operator shall record any significant quarry generated noise sources and obtain the operating logs for quarry plant and equipment during the measurement period.

## 7.3.5 *Performance Targets*

Performance targets are summarised in section 5.5 of this QEMP.

## 7.3.6 Assessment

Operator attended residential measurements are designed to confirm that noise generated by the development does not exceed the noise limits specified in the development consent (see section 5.5 of this QEMP).

Unattended noise logger data shall be correlated with weather data and quarry operating conditions, with data from periods of unstable weather deleted. The results shall be presented graphically.

## 7.3.7 Reporting and Review

The results of noise monitoring are to be included in the Annual Environmental Management Report.

In the event of any exceedence of relevant criteria, the matter will immediately be brought to the attention of the Quarry Production Manager, who will report the exceedence as required in section 7.7 of this QEMP.

After every noise monitoring occasion, the Quarry Production Manager and Environmental Officer will examine the results, compare them with previous results and look for any trends. Should declining performance be indicated, the reasons will be explored and appropriate corrective action taken. Follow-up noise monitoring may be undertaken to confirm the validity of any suspect results or to test the effectiveness of corrective action.

## 7.4 BLAST MONITORING

#### 7.4.1 Source

Blast monitoring requirements are detailed in the Noise Monitoring Programme/Blast Management Plan (Heggies Australia 2006) and summarised below.

### 7.4.2 Location

A blast monitor for airblast and vibration is located at "The Cottage" on Figtree Hill land, being the closest inhabited residence. This monitor is to be permanently installed and fitted with a remote communications link.

When blasting within 40 metres of the northern boundary of the quarry property, a portable blast monitor will be located at the property boundary at the point closest to the blast.

## 7.4.3 Frequency

Every blast is to be monitored.

## 7.4.4 *Performance Targets*

Performance targets are summarised in section 5.7 of this QEMP.

#### 7.4.5 Reporting and Review

The results of blast monitoring are to be included in the Annual Environmental Management Report.

After every blast, the Quarry Production Manager and Environmental Officer will examine the results, compare them with previous results and look for any trends. Should declining performance be indicated, the reasons will be explored and appropriate corrective action taken.

In addition to confirming that performance targets are being met, blast monitoring will provide data to allow periodic review and revision of the blast emissions site laws for the quarry. To maximise the benefits of the blast monitoring process, the significant design parameters, location co-ordinates, emission levels and meteorological data shall be collated and maintained by the quarry in a blast design record for each blast event. The Blast Management Plan contains a suitable format for this record which should be audited.

## 7.5 AIR QUALITY MONITORING

#### 7.5.1 *Source*

Air quality monitoring requirements are detailed in the Dust Management Plan (Heggies Australia 2006) and summarised below.

#### 7.5.2 Location

Five dust monitoring devices have been set up and a sixth will be installed subject to landowner agreement at the following locations:

Monitor Type	Monitoring Location
Deposition gauge	Dunsters Lane, south west of <i>The Cottage</i> ;
Deposition gauge	Readymix property, north west of Kyawana;
Deposition gauge (new)	Northern property boundary, east of the gate to <i>Belmont</i> ;
Deposition gauge	West of the administration area of the existing processing plant;
High Volume Sampler	Ridge top, south of <i>Belmont</i>

The location of dust monitoring devices is shown on *Figure 7.1*.

#### 7.5.3 Frequency

Dust deposition gauges will be changed every 30 days with an allowance of plus or minus two days.  $PM_{10}$  is to be assessed on a one-day-in-six cycle using the high volume sampler and will continue for a minimum of one year from the start of quarrying in the extension area.

PM<sub>10</sub> monitoring using the high volume sampler is to be conducted as follows:

- Stage 1 of quarry production six continuous months;
- Stage 5 of quarry production six continuous months;
- **Each** other stage of quarry production three continuous months.

### 7.5.4 Method

The method to be used for dust deposition sampling and analysis is as defined in Australian Standard AS 3580.10.1-1991 – *Particulates - deposited matter - gravimetric method*. Samples are to be analysed for insoluble solids, ash residue and combustible matter. The monthly results are to be given in grams per square metre and will be averaged over a 12-month period.

High volume air sampling shall be conducted by an independent consultant in accordance with AS 3580.9.6-1990. The high volume air sampler shall be fitted with a  $PM_{10}$  size selective inlet.

## 7.5.5 Performance Targets

Performance targets are summarised in section 5.8 of this QEMP. A dust deposition limit of four grams per square metre per month (annual average) applies at the nearest residence. This limit will be initially taken to apply at the deposition gauges. If the company wishes, it may subsequently commission dispersion modelling using on-site wind data to predict the level of dust deposition at the gauges that corresponds to  $4 \text{ g/m}^2/\text{mth}$  at the nearest residence. This would enable the performance target for the gauges to be adjusted accordingly.

## 7.5.6 Reporting and Review

The results of air quality monitoring are to be included in the Annual Environmental Management Report.

The Quarry Production Manager and Environmental Officer will examine dust monitoring results to confirm that the performance target is being met. Should the results indicate a trend towards non-compliance on an annual average basis, dust control measures on the site will be enhanced.

In the event that non-compliance with the instantaneous air quality goal occurs, correlated with wind direction, the Quarry Production Manager will investigate and address the likely cause by implementing appropriate dust suppression measures as described in section 5.8. Should repeated non-compliance occur, a review of work practices and dust suppression measures will be instigated in accordance with section 12 of the Dust Management Plan.

## 7.6 WATER MONITORING

#### 7.6.1 Source

Water monitoring requirements are detailed in the Surface Water and Groundwater Management/Monitoring Plan (Golder Associates 2005) and summarised below.

## 7.6.2 Location

Water monitoring locations are shown on *Figure 7.1*. Three monitoring wells have been established to the south of the extraction area in the land to be revegetated. Two of the wells contain shallow and deep monitoring points, while the third contains only a deep monitor.

There are two gauging stations in the natural watercourses south of the extraction area. One of these is located in the watercourse currently draining the extraction area (watercourse 1) and the other is in the main watercourse entering the property from the west (watercourse 2). The gauging stations correspond to surface water quality monitoring points.

## 7.6.3 Method

Groundwater and surface water is sampled and analysed as follows:

	Groundwater	Surface Water
Field measurement	Water level, electrical conductivity, pH and temperature	Electrical conductivity, pH and temperature
Laboratory testing	pH, TDS, TSS, Na, K, Ca, SO <sub>4</sub> , Cl, NO <sub>3</sub> , NO2, alkalinity, TKN, CO <sub>3</sub> /HCO <sub>3</sub> , oil and grease, BOD, TOC, ammonia, total phosphorus and dissolved metals.	Fortnightly – pH, EC, turbidity All other – pH, TDS, TSS, Na, K, Ca, alkalinity, SO <sub>4</sub> , Cl, CO <sub>3</sub> /HCO <sub>3</sub> , oil and grease and dissolved metals.

Surface water flow is logged every 15 minutes from transducers in each of the two watercourse monitoring stations. At each location the instrumentation is powered by a 12 volt 10 amp hour battery charged by a 10 watt solar panel.

## 7.6.4 Frequency

As recommended by Golder Associates, groundwater is being sampled three monthly for the first two years and six monthly thereafter. Groundwater level monitoring began in September 2004 and sampling and analysis in December 2004.

Results for surface water samples are available for the upper section of watercourse 2 since August 2003 (collected by Readymix). Fortnightly sampling with limited analysis commenced within the property in September 2004. Full analysis of three-monthly samples commenced in December 2004.

Flow monitoring in the watercourses commenced in May 2005. One of the transducers was subsequently disturbed by cattle and has since been replaced. Data from the loggers is downloaded periodically and retained at the quarry.

## 7.6.5 *Performance Targets*

The initial purpose of water monitoring is to establish over several years the normal range of variability of the parameters being monitored. Subsequently, with the quarry operating any unusual variation may be relevant for investigation. There are no targets for these parameters measured external to the site.

## 7.6.6 Reporting and Review

The results of water quality monitoring are to be tabulated and included in the Annual Environmental Management Report produced for the site.

## 7.7 ECOLOGICAL MONITORING

## 7.7.1 Source

Ecological monitoring requirements have been derived from the Quarry Vegetation Management Plan (see Appendix E) and the 2003 EIS (Perram & Partners).

## 7.7.2 Restoration/Revegetation Area

The restoration/revegetation area is to be inspected by a qualified ecologist once per year and a report prepared of the progress in returning this area to native vegetation. The report shall comment on:

- success of planted stock in the regeneration area;
- **n** natural seeding and growth of native vegetation in the restoration area;
- weed control;
- absence of spoil or rubbish;
- any damage caused by animals or human interference; and
- **u** recommendations for remedial action, if needed.

The ecologist's report including recommendations shall be included in the Annual Environmental Management Report.

## 7.7.3 Riparian Bushland

The riparian strip of bushland immediately downhill from the quarry that could potentially be impacted by changes to groundwater or surface water patterns shall be inspected annually by a qualified ecologist. The findings are to be discussed with the Quarry Production Manager and reviewed in light of water management practices during the past year. The ecologist's report shall recommend any changes to surface water release or groundwater injection protocols for the coming year and shall be included in the Annual Environmental Management Report.

## 7.8 NOTIFICATION OF EXCEEDENCE

## 7.8.1 Exceedence of any Criterion

Condition 1 of Schedule 5 of the Land and Environment Court consent for the quarry provides as follows:

If the results of monitoring required in schedule 4 identify that emissions generated by the development are greater than the criteria in schedule 4, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of quarry owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 4.

This condition is self-explanatory. Criteria provided in schedule 4 of the consent are for noise, blasting and dust and are reproduced in the relevant parts of section 5 of this QEMP.

#### 7.8.2 Further Requirement for Noise Exceedence

Condition 9 of schedule 4 of the Land and Environment Court consent for the quarry provides as follows:

Within 7 days of detecting any exceedance of the noise limits in Table 1, the Applicant shall report the exceedance to the DECC and Director-General and to the owner of the property at which there is an exceedance. This report must include details of the date and time of the exceedance, the operational cause of the exceedance, the response initiated, and the measures proposed to ensure ongoing compliance with the noise limits.

The above action is required to be undertaken in addition to providing quarterly monitoring results described in section 7.7.1.

8

# AUDITING AND REPORTING

### 8.1 INDEPENDENT AUDIT

Independent environmental audits shall be commissioned every three years with the first to take place prior to February 2008, provided production has commenced before that time.

Environmental audits will be undertaken in accordance with Cleary Bros' environmental management system and be compliant with ISO 19011:2002 – *Guidelines for Quality and/or Environmental Systems Auditing*. The name of the nominated auditor must be submitted to the Department of Planning for approval prior to an audit commencing. Should a different auditor be proposed for any future audit, the new name must be submitted for approval.

The audit is to include the following actions:

- □ assess the environmental performance of the quarry and its effects on the surrounding environment;
- □ assess whether the quarry is complying with the relevant standards, performance measures, and statutory requirements;
- review the adequacy of this Quarry Environmental Management Plan (including environmental strategy and monitoring program); and, if necessary,
- recommend measures or actions to improve the environmental performance of the quarry, and/or the environmental management and monitoring systems.

An audit report is to be prepared and submitted to the Director-General within three months of commissioning the audit. The submission is to contain the company's response to recommendations contained in the audit report.

#### 8.2 **REPORTING**

An Annual Environmental Management Report (AEMR) is to be prepared and submitted to the following agencies:

- Department of Planning (for Director-General);
- Department of Environment and Climate Change;

- Department of Natural Resources (or successor);
- □ Shellharbour City Council;
- Department of Primary Industries (Mineral Resources)

The initial report is to be submitted within 12 months of the commencement of works authorised by the development consents.

The AEMR is to respond to the following requirements (schedule 6, condition 5):

- (i) identify the standards and performance measures that apply to the development;
- (ii) describe the works carried out in the last 12 months;
- (iii) describe the works that will be carried out in the next 12 months;
- (iv) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
- (v) include a summary of the monitoring results for the development during the past year
- (vi) include an analysis of these monitoring results against the relevant;
  - impact assessment criteria;
  - monitoring results from previous years; and
  - predictions in the EIS;
- (vii) identify any trends in the monitoring results over the life of the development;
- (viii) identify any non-compliance during the previous year; and
- (ix) describe what actions were, or are being, taken to ensure compliance.

## 9

# COMMUNITY RELATIONS

## 9.1 COMMUNITY CONSULTATIVE COMMITTEE

#### 9.1.1 Purpose

The purpose of the community consultative committee (CCC) is to oversee the environmental performance of the quarry. In particular the committee has the following functions:

- **u** review and provide advice on the environmental performance of the quarry;
- **u** review the QEMP, monitoring results, audit reports or complaints;
- review each annual environmental management report submitted to DECC and make submissions to DECC if desired.

#### 9.1.2 Membership

The committee membership is as follows:

- two Cleary Bros representatives, one of whom is the environmental officer;
- one representative of Shellharbour Council;
- two community representatives (at least), one of whom represents the Figtree Hill land; and
- an independent chairman.

The appointment of all members, including any replacement for members who resign, is to be approved by the Director-General. It is the responsibility of Cleary Bros to establish the committee, invite membership including any replacement or additional members and obtain the Director-General's approval for the company's nominees.

## 9.1.3 Meetings

The CCC meets at least twice per year. Cleary Bros has the following responsibilities with respect to committee meetings:

- **u** provide the venue and secretarial support to produce agendas and minutes;
- arrange site inspections when warranted;

- make minutes available for public inspection within 14 days of a meeting, or as the committee agrees;
- □ respond to advice or recommendations from the committee regarding environmental performance of the quarry; and
- forward to the Director-General a copy of the minutes and any responses to committee recommendations within one month of the committee accepting the minutes.

## 9.2 COMMUNITY INFORMATION

The following environmental information regarding the quarry is to be made available to the community:

- this QEMP and each management plan required under the consent which has been produced as a separate document and approved by the Director-General, including:
  - Survey Plan
  - Blast Management Plan/Noise Monitoring Program
  - Dust Management Plan
  - Water Management Plan
  - Vegetation Clearing Protocol
  - Vegetation Management Plan
  - Rehabilitation Management Plans
  - Heritage Management Plan
  - Landscape Plan for visual/noise bunds
- any revision to the above plans;
- □ reports from independent audits;
- each annual environmental management report;
- a summary of the results of all monitoring required under the consent, updated at least every six months;

The above documents are to be made available within one month of approval, or where approval is not required, within one month of being created. The means of making the material available is as follows:

- □ provide a copy to the CCC;
- provide a copy to DECC, Shellharbour Council, DNR or RTA, where it is relevant to their responsibilities (Council will receive all documents);
- make a copy available for inspection by the public at Cleary Bros Port Kembla office;
- □ place a copy on the web site for the quarry.

## 9.3 INDEPENDENT REVIEW

The Director-General may initiate the independent review process after considering a written request from a landowner, other than a quarry owner. This would occur if the landowner believed that the performance goals specified in the development consent and reproduced in section 5 of this QEMP were being exceeded.

If requested by the Director-General, within three months Cleary Bros is to consult with the landowner, commission an independent review and submit the outcome to the Director-General. The review is to be conducted by an independent expert approved by the Director-General. The expert is to conduct monitoring to determine if the performance criteria are being met and if not, the source of the exceedence. Having regard to the possibility of cumulative impacts from more than one quarry, the expert is also required to ascertain the contribution from Cleary Bros' quarry to the exceedence.

If the criteria are found not to be exceeded the independent review can be discontinued with the approval of the Director-General. If exceedence is confirmed then Cleary Bros is to take all practicable measures to bring the quarry into compliance and conduct further monitoring to confirm that this has been achieved or enter a written agreement with the landowner allowing the exceedence to continue to the satisfaction of the Director-General. If agreement cannot be reached either party may refer the matter to the Director-General for resolution.

Should it be discovered that more than one quarry is responsible for an exceedence, Cleary Bros is required to prepare a cumulative management plan for noise, blasting or dust, as the case may be with the agreement of the landowner and the other quarry. The plan is to be implemented by both quarries. If agreement cannot be reached with the other quarry or the landowner over this approach, then either Cleary Bros or the landowner may refer the matter to the Director-General for resolution.

## 9.4 DISPUTE RESOLUTION

Should the Director-General be unable to resolve a dispute within 21 days then the Director-General is to refer the matter to an independent dispute resolution process for which an indicative outline appears in Appendix 2 of the quarry consent.

# APPENDICES

## Appendix A

# QUARRY DEVELOPMENT CONSENT



## Land and Environment Court of New South Wales

CITATION :	
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#### Figtree Hill v Cleary Bros and others (No 2) [2006] NSWLEC 63

PARTIES :

APPLICANT Figtree Hill Pty Limited

FIRST RESPONDENT Cleary Bros (Bombo) Pty Limited

SECOND RESPONDENT Minister for Infrastructure and Planning

FILE NUMBER(S) :

.

CORAM:

Hussey C; Brown C

10639 of 2005

**KEY ISSUES:** 

Development Application :- the extension to an existing hard rock quarry - written submissions on conditions

DATES OF HEARING: Written submissions 27/01/06

DATE OF JUDGMENT : 21/02/2006

LEGAL REPRESENTATIVES: APPLICANT Ms J Reid, solicitor SOLICITORS Pike, Pike and Fenwick

FIRST RESPONDENT Ms A Penklis, solicitor SOLICITORS Sparke Helmore

SECOND RESPONDENT No submissions

## THE LAND AND ENVIRONMENT COURT OF NEW SOUTH WALES

#### Hussey C with Brown C

#### 21 February 2006

#### 10639 of 2005 F

#### Figtree Hill Pty Limited (Applicant) v

Cleary Bros (Bombo) Pty Limited (First Respondent) and

Minister for Infrastructure and Planning (No.2) (Second Respondent)

#### JUDGMENT

- 1 **COMMISSIONERS**: The appeal is made pursuant to s 98 of the *Environmental Planning and Assessment Act 1979* (the EPA Act) where an objector who is dissatisfied with the determination of a consent authority to a development application for designated development may appeal to the Court.
- 2 The appeal relates to the granting of development consent by the then, Minister for Infrastructure and Planning (the Minister) of DA No. 466-11-2003 on 27 May 2005 for the extension to an existing hard rock quarry at Croom, approximately 2.5 kilometres east of Albion Park and 4 kilometres west of Shellharbour (the site).
- 3 The appeal was heard on 8, 9, and 12 December 2005. On 13 January 2006 the findings on the merits were provided to the parties (*Figtree Hill v Cleary Bros and others* [2006] NSWLEC 9) and required the parties to

-1-

amend the conditions based on the findings in the judgement. The Directions (at pars 94 and 95) stated:

The conditions of consent require amendment to those provided to the Court based on the findings in the preceding paragraphs and the need for further discussions between the parties. We propose to make directions for the parties to confer and produce amended conditions of consent within 14 days based on the findings in the judgment .i.e., by 27 January 2006. If the amended conditions are not received by this date the Court will make final Orders without further reference to the parties.

Leave is also granted for the parties to restore the matter on 48 hours notice if no agreement can be reached on the conditions. Any leave to restore the matter must be within a time to allow final Orders to be made immediately after 27 January 2006.

4 Notwithstanding the Direction to confer, it appears that little if any
discussion has taken place between the parties so we have addressed the areas still in dispute based on the submissions and evidence provided by the parties.

#### Schedule 2 Definitions

5 We accept the amendment to the definition of "Fig Tree Hill Land" proposed by the Applicant as it is less ambiguous and reflects the findings in the judgement.

#### Schedule 4 - Condition 2:

6 We accept the amendment proposed by the Applicant as the total requirements for the buffer on the northern boundary are more appropriately contained within the condition rather than as a separate note to the condition.

#### Schedule 4 - Condition 14(d)(iv).

7 This condition relates to the Blast Management Plan and the Respondents seek to limit the operation of this plan to the "rural use" of land whereas the Applicant submits that the condition should relate to the land in general. We accept the Applicants submission on this condition as it provides appropriate protection for the future use of the Applicants land. We however, accept the Respondents submission that there should be "general" compliance with the Blast Management Plan as this provides a limited amount of flexibility in its operation.

#### Schedule 4 - Condition 20

8

This condition relates to management and monitoring of air quality and the Respondents seek to retain the word "generally" when considering the Dust Management Plan. For the reasons mentioned in the preceding paragraph we accept this submission.

#### Schedule 4 - Conditions 46 and 47

9 These conditions relate to site access and the previous findings specifically required discussion between parties to addresses the conflict. Despite this direction no discussion appears to have taken place. Based on the site view, the evidence and submissions we accept the Applicants submission. In our view Dunsters Lane is inappropriate for traffic associated with the quarry (except in an emergency) because of its construction, alignment and proximity to dwellings on the Fig Tree Hill Land.

#### Schedule 4 – Condition 52

10 This condition relates to the requirement for dilapidation surveys. While not raised by either party, the condition requires the owners of the Fig Tree Hill Land to supply to the Second Respondent, three nominees to undertake this work within a "reasonable" period of time. Due to the uncertainty associated with this requirement the nominees should be provided to the Second Respondent within three months.

#### Schedule 4 – Condition 56

11 This condition requires that the trees required by the landscaping plans to be replaced if they die. The condition required these trees to be replaced within a " reasonable" time whereas the Applicant requires this to be more

-3-

specific and nominates a period of 28 days. We accept the Applicants submission.

Schedule 5 - Environmental Management, Monitoring, auditing and Reporting Condition 8(e)

- 12 The inclusion of this condition is consistent with the findings in par 88 of the Courts previous judgement.
- 13 The Orders of the Court are:

1. The appeal is dismissed.

6

2. The extension to an existing hard rock quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom, is approved subject to the conditions in Annexure A.

3. The exhibits are returned with the exception of Exhibits C, L, 3 and 101.

R R Hussey Commissioner of the Court

G T Brown Commissioner of the Court

## In the Land and Environment Court of New South Wales

No.10639 of 2005	The orders of the Court are:		
	1. The appeal is dismissed.		
Figtree Hill Pty Limited	2. The extension to an existing hard rock quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom, is approved subject to the conditions in Annexure A.		
Cleary Bros (Bombo) Pty Limited	<ol> <li>The exhibits are returned with the exception of Exhibits C, L, 3 and 101.</li> </ol>		
First Respondent			
Minister for Infrastructure and Planning			
Second Respondent	Ordered: 21 February 2006		
Order	NEW SOUTH WALES Rectistrar		

#### ANNEXURE A

#### Figtree Hill Pty Limited v Cleary Bros (Bombo) Pty Limited & Minister for Planning

#### Land and Environment Court Proceedings No. 10639 of 2005

#### CONDITIONS OF CONSENT '

#### SCHEDULE 1

Application made by:

To:

Land:

**Proposed Development:** 

**Development Application:** 

State Significant Development:

Integrated Development:

Designated Development:

Commencement of Consent:

Lapse of Consent:

Cleary Bros (Bombo) Pty Ltd. Minister for Infrastructure and Planning

Lot 1 DP 858245 and Lot 23 DP 1039967, Dunsters Lane, Croom.

Extension of hard rock quarry

DA 466-11-2003, lodged with the Department of Infrastructure, Planning and Natural Resources on 10 November 2003

The proposal is classified as State significant development under section 76A(7) of the *Environmental Planning and Assessment Act 1979*, as it meets the criteria specified in a declaration made by the Minister for Planning on 3 September 1999

The proposal is classified as integrated development under section 91 of the *Environmental Planning and Assessment Act* 1979, because it requires additional approvals under the:

- Protection of the Environment Operations Act, 1997; and
- Rivers and Foreshores improvement Act, 1948.

The proposal is classified as designated development under section 77A of the *Environmental Planning and Assessment Act* 1979 because it meets the extractive Industry criteria in schedule 3 of the *Environmental Planning and Assessment Regulation 2000.* 

Pursuant to section 83(2) of the Environmental Planning and Assessment Act 1979, this consent operates from the date of determination.

Pursuant to section 95 of the Environmental Planning and Assessment Act 1979, this development consent is liable to tapse five years after the date from which it operates unless the use of any land, building or work the subject of the consent is actually commenced before the date on which the consent would otherwise lapse.



Appeal No 10839 of 2005

#### SCHEDULE 2 DEFINITIONS

AEMR Applicant BCA Council DA DEC Department **Design** Event **Director-General** DPI Dust EIS EMS EP&A Act EPL Fig Tree Hill Land GTA

GTA Heavy vehicle Land

Minister POEO Act Privately owned land

Regulation RTA Site Stage

Annual Environmental Management Report Cleary Bros (Bombo) Pty Ltd **Building Code of Australia** Shellharbour City Council **Development Application** Department of Environment and Conservation Department of Planning 90 percentile, 5 day rain event Director-General of the Department Planning, or delegate Department of Primary Industries Any solid material that may become suspended in air or deposited **Environmental Impact Statement** Environmental Management Strategy Environmental Planning and Assessment Act 1979 Environment Protection Licence issued under the Protection of the Environment Operations Act, 1997 Lots 4 and 5 in deposited plan 3709 in their present or succeeding titles] General Terms of Approval Any vehicle with a gross vehicle mass of 5 tonnes or more Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this development consent Minister for Planning, or delegate Protection of the Environment Operations Act 1997 Land not owned by the Applicant or its related companies or where a private agreement does not exist between the Applicant and the land owner Environmental Planning and Assessment Regulation 2000 The Roads and Traffic Authority Land to which the DA applies The quarry development stages as described in the EIS



#### SCHEDULE 3 ADMINISTRATIVE CONDITIONS

#### Obligation to Minimise Harm to the Environment

1. The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

#### Scope of Development

- 2. The Applicant shall carry out the development in accordance with:
  - a) DA No. 466–11-2003;
  - b) The EIS titled Proposed Quarry Extension Albion Park, dated October 2003, and prepared by Perram & Partners; and
  - c) Conditions of this consent.
- If there is any inconsistency between the above, the conditions of this consent shall prevail to the extent of the inconsistency.
- The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's essessment of:
  - a) Any reports, plans or correspondence that are submitted in accordance with this consent; and
  - b) The implementation of any actions or measures contained in these reports, plans or correspondence.

Note: Amandment of any environmental management plan, strategy or monitoring program required under this consent shell be prepared and approved in accordance with the consultation and approvel requirements of the original environmental management plan, strategy or monitoring program, unless otherwise authorised by the Director-General.

#### Staged Development

- 5. Under section.80(4) of the Act, this consent is issued for Stages 1 to 4 of the development only.
- Under section 80(5) of the Act, Stages 5 and 6 must be the subject of another development consent.

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of 'The Fig Tree Hill Land', and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to in subclause (b) above;
- assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public and notify the objectors to the original proposal by letter;
- seek independent expert advice on the report if deemed to be warranted;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public.

#### Period of Approval

7. This consent lapses 30 years after the date it commences.

Note: Conditions of this consent may require activities to be carried out by the Applicant beyond the period of approval for hard rock extraction, processing, and rehabilitation on the project site.

#### Limits on Production

- The production of guarry products from the guarry shall not exceed 400,000 tonnes per annum.
- 9. The Applicant shall:
  - Provide annual production data to the DPI using the standard form for that purpose; and
  - b) Include a copy of this data in the AEMR.



#### Protection of Public Infrastructure

- 10. The Applicant shall:
  - Repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
  - B) Relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

#### **Operation of Plant and Equipment**

- 11. The Applicant shall ensure that all plant and equipment at the site, or used in connection with the development, are:
  - a) Maintained in a proper and efficient condition; and
  - b) Operated in a proper and efficient manner.

#### Demolition

12. The Applicant shall ensure that all demolition work is carried out in accordance with AS 2601-2001: The Demolition of Structures, or its latest version.

#### Compliance

13:

14

Prior to commencement of operations, the Applicant shall commission an independent person(s) or organisation(s), approved by the Director-General, to certify in writing to the satisfaction of the Director-General, that the Applicant has complied with all conditions of this consent applicable prior to that event.

At least two weeks prior to the commencement of any works, the Applicant shall notify the owners of the Fig Tree Hill Land, in writing, of the date of commencement of works authorised by this consent.



#### SCHEDULE 4 SPECIFIC ENVIRONMENTAL CONDITIONS

#### **IDENTIFICATION OF BOUNDARIES**

- Prior to the commencement of works, the Applicant shall;
  - engage a registered surveyor to mark out the boundaries of the approved limits of extraction;
  - b) submit a survey plan of these boundaries to the Director-General; and
  - c) ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

Note: The limit of extraction includes the area described in the EIS, as amended by the 'Quarry Area' shown on the plan in Appendix 1 (southern boundary), and as amended by the conditions below.

#### BUFFER

1.

#### NOISE

#### **Construction of Noise/Visual Bunds**

 The Applicant shall complete construction of the noise/visual bunds prior to commencing extraction of production material, and shall make all reasonable efforts to complete construction of the bunds within 26 weeks of commencement.

#### Noise Limits

 <sup>1</sup>The Applicant shall ensure that noise generated by the development does not exceed the criteria specified in Table 1.

	Noise Limits dB(A) Ladar smootel at 4
Receiver Locations	Stages 1.2 Stages 3-4 J. Stages 5-6
The Hill residence (Dunster premises)	35 - 25 - 25 - 25 - 25 - 25 - 25 - 25 -
The Cottage residence (Curster precesses).	35 align - a 38 align - 35
Approved rural workers dwelling (Durister premises)	5 1185 State 38 11 11 11 25 11 11
Gleenmeadows Residential Estate	41 64 544

Table 1: Noise Criteria for the Development

#### Notes:

- Staging as depicted in Figure 3.5 of the EIS prepared by Perram and Partners, dated October 2003.
   Receiver locations pominated in Table 5.12 of the report prepared by Richard Hermie and Associates.
  - Receiver locations nominated in Table 5.12 of the report prepared by Richard Heggle and Associates Report No. 30-1079R1 titled 'Noise and Blasting Impact Assessment – Cleary Bros Albion Park Quarry' (13 December 2002). At the time of the DA the above were the nearest affected residences.
- 3. The receiver locations and noise limits in the above table may be varied in the instance that negotiated agreements are entered into by the licensee and affected residents/occupiers or if existing agreements become void, or the nearest receiver location changes due to urban encroachment. These limits may be subject to change with an EPL variation.
- 4. Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Table 1. Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- 5: The noise emission limits in Table 1 apply under meteorological conditions of;
  - Wind speeds up to 0.5m/s in any direction at 10 metres above ground level; or
  - Temperature gradient (environmental lapse rate) conditions of less than or equal to 0°C/100m (lapse).

#### **Operating Hours**

5. <sup>2</sup>The Applicant shall comply with the operating hours in Table 2.

The second s			12. S. B. C. B.	
Activity		Days of the W	eek	Time
			2	
<ul> <li>Unling Yock preaking, loading an</li> </ul>	o naulage o 🔛	A Mondav - Eric	av 7.00	am - 530 pm
material from quarty to processing	plant			
<ul> <li>processing and stockpilling, overbilling, ov</li></ul>	urden state i	Salindaw	2008 37 00	
strippingrand other stage preparat	IOTV works which	A		
all site construction activities refu	hilitation	194 - S. 196 - 195 - 195 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 - 196 -		NO. WARDEN CONTRACTOR
	an a			
Won Singer et al Oranisa To Transcent				
strocessing, crushing and screening	nd audit 🖓 🖓			
<ul> <li>product transfer to stockpiles;</li> </ul>			S. S. B. P. 15	机必须建筑性学

Table 2: Operating Hours for the Development

- 6. <sup>3</sup>The following activities may be carried out at the premises outside the hours specified in Table 2:
  - a) the delivery of materials as requested by Police or other authorities for safety reasons;
  - b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm;
  - c) workshop activities and other maintenance work inaudible at the nearest affected receiver.

#### Noise Monitoring Program

7. Within 3 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Noise Monitoring Program for the development, in consultation with the DEC, and to the satisfaction of the Director-General. The Program shall include:

- a) noise impact assessment criteria and approved hours of operation;
- b) provision for a combination of attended and unattended noise monitoring;

c) a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this consent; and

d) a protocol for the investigation, notification and mitigation of identified exceedances of the noise impact assessment criteria.

Note: The program shall be generally in accordance with the draft plan titled 'Albion Park Quarry Extension, Noise Monitoring Programme/Blast Management Plan' dated 10 February 2006 and prepared by Heggles Australia Pty Ltd.

#### Noise Compliance Assessment Report

Within 8 weeks of the date of commencement of extraction of production rock, and annually thereafter, the Applicant shall:

commission a suitably qualified person to assess whether the development is complying with

the noise criteria in Table 1 (or as modified), in general accordance with the NSW Industrial Noise Policy and AS 1055-1997: Description and Measurement of Environmental Noise; and

provide the results of this assessment to the DEC and Director-General within 3 months of commissioning the assessment.

#### Noise Limit Exceedance Report

a}

Ъ)

9. Within 7 days of detecting any exceedance of the noise limits in Table 1, the Applicant shall report the exceedance to the DEC and Director-General and to the owner of the property at which there is an exceedance. This report must include details of the date and time of the exceedance, the operational cause of the exceedance, the response initiated, and the measures proposed to ensure ongoing compliance with the noise limits.

#### **BLASTING AND VIBRATION**

#### Alrblast Overpressure Criteria

10. <sup>5</sup>The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 3 at any point that is located at least 3.5m from any residence or other sensitive receiver on privately owned land.

Airblast overpressure Allowable exceedance/ level [dB(Lin Peak)]

4 HZJ/HZJ/DSYD/1774673714

NEW SOUTH WALES

<sup>&</sup>lt;sup>2</sup> Incorporates DEC GTA

<sup>&</sup>lt;sup>3</sup> Incorporates DEC GTA

<sup>&</sup>lt;sup>4</sup> Incorporates DEC GTA

<sup>&</sup>lt;sup>5</sup> Incorporates DEC GTA


#### Ground Vibration Criteria

11. <sup>6</sup>The Applicant shall ensure that the peak particle velocity from blasting at the development does not exceed the criteria in Table 4 at any point that is located at least 3.5m from any residence or other sensitive receiver on privately-owned land.

Peak particle velocity : (mm/s)	Allowable exceedance	
Дайсан Балан Салан	5% of the total number of blasts over any 12 month report	ing period
1. S. 199		

Table 4: Ground Vibration Limits

#### **Blasting Restrictions**

- Blasting operations on the premises may only take place:
  - a) between 9.00am and 5.00pm Monday to Friday inclusive;
  - b) are limited to 1 blast each day; and
  - at such other times as may be approved by the DEC (EPA).

#### **Public Notice**

- 13. During the life of the development, the Applicant shall:
  - a) operate a blasting hotline, to enable the public to get up-to-date information on blasting operations at the development. The hotline shall be manned during operational hours with an answering service outside of operational hours, unless otherwise approved by the Director-General; and
  - b) notify landowners within 2 kilometres of the site about this hotline on an annual basis, using methods agreed to by the Director-General. Notification shall include, as minimum;
    - (i) signage at the entrance to the site;
    - (ii) written notification on an annual basis; and
    - (iii) publication on the Applicant's website.

#### Blast Management Plan

- 14. <sup>8</sup>Prior to the commencement of operations in each stage of the development after Stage 1, the Applicant shall prepare, and subsequently implement, a Blast Management Plan for the development in consultation with the landowner(s) of The Fig Tree HIII Land and to the satisfaction of the Director-General and DEC. This plan must:
  - a) Include a summary of monitoring results for the previous quarry stage;
  - b) Describe the objectives for noise and blasting for that stage;
  - c) Describe the proposed blasting design for that stage, and demonstrate that the design will meet the blast criteria listed in Tables 3 and 4; and
  - d) Describe the measures that would be implemented to:
    - (i) meet the blast criteria referred to in this consent, and additional blast criteria at the boundary of the site;
      - avoid and/or minimise any blasting impacts, including flyrock, of the development on The Fig Tree Hill Land, or the continued rural use of that land,;
      - (iii) monitor the blasting impacts of the development on The Fig Tree Hill Land; and
      - (iv) mitigate, remediate or compensate for any blasting impacts of the development on the residences on The Fig Tree Hill Land' or the use of that land.

Note: The plan shall be generally in accordance with the draft Blast Management Plan titled 'Albion Park Quarry Extension, Noise Monitoring Program/Blast Management Plan' dated 10 February 2006 and prepared by Heggies ...Australia Pty Ltd.

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#### Blast Monitoring

- 15. <sup>9</sup>To determine compliance with the blast criteria listed in Tables 3 and 4, the Applicant shall prepare, and subsequently implement, a Blast Monitoring Program for the development to the satisfaction of DEC and the Director-General. This program must address:
  - monitoring the airblast overpressure and ground vibration levels for all production blasts carried out on the site;
  - b) the undertaking of monitoring in accordance with AS 2187.2:1993, or as updated; and
  - c) maintenance of a written record which includes:
    - (i) the time and date of each blast;
    - (ii) the station(s) at which the blast was measured;
    - (iii) the ground vibration for each blast;
    - (iv) the airblast overpressure for each blast;
    - evidence that during the past 12 month period, a calibration check had been carried out on each blast monitor to ensure accuracy of the reported data; and
    - (vi) the waveform for the ground vibration and overpressure for each blast that exceeds a ground vibration of 5mm/s (peak particle velocity) or an air blast overpressure of 115dB(L).

#### AIR QUALITY

#### Air Quality Criteria

16. The Applicant shall ensure that the air pollution generated by the development does not cause exceedances of the ambient air quality standards and goals listed in Tables 5, 6, and 7 at any sensitive receiver or residence on privately-owned land.

Polluta	nt 🖓 🖓 sta	Averaging pe	riod	Criterion
Total suspended part	liculate (TSP) met	ler Annual		90 µg/m i
Particulate matter * 1	ю.µm (РМњ),	Annual		30.pg/m

Table 5: Long Term impact Assessment Criteria for Particulate Matter

	Pollutant		i , A	veraging period	Criter	លា 🥾 🖓
Parti	culate matter < 10 ur	n (PMia)		24 hour	50 ug/	m

Table 6: Short Term Impact Assessment Criterion for Particulate Matter

				_										
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Deposited dust.	Annual		10.10	100	100	2.g/	m*/mbnth.			*4	ma	nont		

Table 7: Long Term Impact Assessment Criteria for Deposited Dust

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-1991: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

#### Management and Monitoring

- 17. <sup>10</sup> The site must be maintained in a condition that minimises or prevents the emission of dust from the site, including the prompt and effective rehabilitation of all disturbed areas.
- Internal unsealed roadways, quarry floor and stockpiles are to be watered as required to minimise dust generation impacting on the natural or built environment.
- 19. <sup>11</sup>The Applicant shall monitor (by sampling and obtaining results by analysis) the concentration of each pollutant in Table 8 to the satisfaction of the DEC and the Director-General, using the specified unit of measure, averaging period, frequency, sampling method and minimum number of locations.

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Pollutant	Stand Drift of Stand	Averaging	r Fre	puency.	ampling -	Locations
	Measure	Period			Method	<u>Settine</u>
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Table 8: Sampling of Air Pollutants

20. Within 3 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Dust Management Plan for the development, in consultation with the DEC, and to the satisfaction of the Director-General. The plan shall include:

- a) baseline data on existing air quality in the locality;
- b) air quality impact assessment criteria;
- c) details of the measures that would be undertaken to minimise dust emissions associated with the development;
- d) an air quality monitoring program; and
- a protocol for the investigation, notification and mitigation of identified exceedances of the air quality impact assessment criteria.

Note: The plan shall be generally in accordance with the draft Dust Management Plan titled 'Albion Park Quarry Extension Dust Management Plan', dated 22 November 2005 and prepared by Heggies Australia Ply Limited.

#### METEOROLOGICAL MONITORING

21. The Applicant shall establish a permanent meteorological station at a location approved by the DEC, and to the satisfaction of the Director-General, to monitor the parameters specified in Table 9, using the specified units of measure, averaging period, frequency and sampling method.

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Table 9: Meteorological Monitoring

<sup>1</sup>NSW EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

#### SURFACE & GROUND WATER

Note: The Applicant is required to obtain licences and permits for the development under the Protection of the Environment Operations Act 1997, Water Management Act 2000, and the Rivers & Foreshores Improvement Act 1948.

#### Pollution of Waters

22. <sup>12</sup>Except as may be expressly provided by a Environment Protection Licence, the Applicant shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.

#### Water Discharge Limit

 Except as may be expressly provided by an Environmental Protection Licence, the Applicant shall ensure that the discharges from any licensed discharge point/s comply with the limit in Table 10;

<sup>2</sup> incorporates DEC GTA

Pollutant	Units of Measure	Maxi	ຠຩຠຩຏຓຏ ຉ	
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Table 10: Water Discharge Pollution Limits

#### Storm Water Management System

- 24. <sup>13</sup>The Applicant shall ensure that the stormwater management system for the development is designed, constructed and operated to capture and treat polluted waters from storm event(s) of less than, and including a 1:10 year, 24 hour duration, average recurrence interval (that is 225 mm of total rainfall within the 24 hour period).
- 25. <sup>14</sup>Within 5 days of a rainfall event, the Applicant shall ensure that the basins in the storm water management system are treated and emptied to maintain the required storage volume.

#### **Flocculant Management**

 <sup>15</sup>The Applicant shall not use a flocculant, other than gypsum, without the written approval of the DEC.

#### Monitoring and Management

- 27. Within 12 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Water Management Plan for the development, in consultation with the DEC and DIPNR (Natural Resources) and to the satisfaction of the Director-General. This plan must be prepared by a qualified hydrogeologist and include:
  - a) a Water Balance;
  - b) an Erosion and Sediment Control Plan;
  - c) a Surface Water Monitoring Program;
  - d) a Ground Water Monitoring Program; and
  - e) an Integrated Water Management Strategy, if the water balance shows a potential demand for water above that which can be collected from rainfall.
- 28. <sup>16</sup> The Water Balance shall include:
  - a) consideration of the existing quarry and processing site, existing water storage dam and the proposed quarry and haul road;
  - b) the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;
  - c) the estimated water use demand in wet, average and drought years.
- 29. <sup>17</sup>The Eroslon and Sediment Control Plan shall:
  - a) be consistent with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual;
  - b) didentify activities that could cause soil erosion and generate sediment;
  - describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters
  - describe the location, function, and capacity of erosion and sediment control structures; and
  - e) describe what measures would be implemented to maintain the structures over time.
- 30. The Surface Water Monitoring Program shall include:
  - a) detailed baseline data on surface water flows and quality;
  - b) surface water impact assessment criteria;
  - c) a program to monitor surface water flows and quality;
  - d) a program to manage water releases from the site;
  - e) a program to monitor bank and bed stability;
  - a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria; and
  - g) a program to monitor the effectiveness of the Erosion and Sediment Control Plan.

<sup>14</sup> Incorporates DEC GTA

<sup>17</sup> Incorporates DIPNR GTA



<sup>&</sup>lt;sup>13</sup> Incorporates DEC GTA

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- 31. The Ground Water Monitoring Program shall include:
  - a) detailed baseline data on ground water levels and quality, based on statistical analysis;
  - b) ground water impact assessment criteria;
  - c) a program to monitor regional ground water levels and quality;
  - a program to monitor ground water level effects on vegetation, and on ground water supply to adjoining properties; and
  - a protocol for the investigation, notification and mitigation of identified exceedances of the groundwater impact assessment criteria.
- 32. <sup>18</sup>The Integrated Water Management Strategy shall include:
  - a) exploration of a range of options for a sustainable resource alternative for water supply to the site;
  - b) identification of all possible and available sources of water;
  - c) consistency with Government Water Reform initiatives and policies;
  - d) quality of water to meet usage requirements including any possible effects on product;
  - e) costs of supply;
  - f) health and environmental impacts;
  - g) legislative requirements;
  - h) assessment of the feasibility, benefits and costs of options;
  - i) a process to identify and evaluate preferred options for implementation; and
  - j) the identification of a timetable for implementation of the selected options.

#### Reporting

- 33. Each year, the Applicant shall:
  - review the Water Management Plan;
  - b) update each sub-plan; and
  - c) report the results of this review in the AEMR, Including:
  - d) the results of monitoring;
  - e) details of the review for each sub-plan;
  - f) amendments to the sub-plans; and
  - g) details of the measures undertaken/proposed to address any identified issues.

#### FLORA & FAUNA

#### Vegetation Clearing Protocol

- 34. Prior to the commencement of works, the Applicant shall prepare a Vegetation Clearing Protocol for the development in consultation with Shellharbour City Council and the DEC (NPWS), and to the satisfaction of the Director-General. This plan shall:
  - a) delineate the areas of remnant vegetation to be cleared; and
  - b) describe the procedures that would be implemented for:
    - pre-clearance surveys;
    - progressive clearing;
    - fauna management;
    - · conserving and reusing topsoil;
    - collecting seed from the site;
    - salvaging and reusing material from the site; and
    - · controlling weeds.

#### Southern Remnant Vegetation and Revegetation Area

- 35. The Applicant shall conserve and maintain the southern areas of remnant vegetation marked on the map in Appendix 1.
- 36. The Applicant shall revegetate/rehabilitate and maintain the areas marked 'Area to be Planted' and 'Weed Control to Promote Natural Vegetation' on the map in Appendix 1. Revegetation shall be in accordance with the Vegetation Management Plan described in Condition 37.
  - Note: Other revegetation areas shall be covered in the Vegetation Management Plan referred to in Condition 37 below.

#### Vegetation Management Plan

37. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Vegetation Management Plan for the development in consultation with Shellharbour City Council and the DEC (NPWS), and to the satisfaction of the Director-

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General. The plan shall be prepared by a suitably qualified ecologist / bush regenerator, and shall address:

- a) establishment of baseline data for existing vegetation and habitat in the area;
- b) vegetation management on all areas of the site outside the working area of the quarty;
   c) conservation, maintenance and enhancement of threatened communities, including
- 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands';
- conservation, maintenance and enhancement of threatened plant species, including Cynanchum elegans (White Cynachum), Daphnandra sp.aff micrantha (Illawarra Socketwood), and Zieria granulaia (Illawarra Zieria);
- e) establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed flying fox;
- f) ongoing weed control and maintenance;
- a program for how the performance of the measures described in (b) to (f) above would be monitored over time;
- a program for monitoring the effect of quarrying, including water management, on vegetation communities.

#### Reporting

 The Applicant shall include a progress report on the Implementation of the Vegetation Management Plan in the AEMR.

#### REHABILITATION

#### Rehabilitation

39. The Applicant shall progressively rehabilitate the site to the satisfaction of the Director-General.

#### **Rehabilitation Management Plan**

- 40. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Rehabilitation Management Plan for the site in consultation with Shellharbour City Council and the DEC (NPWS), and to the satisfaction of the Director-General: This plan must:
  - a) identify the disturbed area at the site;
  - b) describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site;
  - c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site; and
  - describe how the performance of these measures would be monitored over time.
- 41. Within 5 years of providing the Rehabilitation Management Plan to the Director-General, and every 5 years thereafter, the Applicant shall review and update the plan to the satisfaction of the Director-General.

#### **Rehabilitation Bond**

- 42. Within 6 months of the date of this consent, the Applicant shall lodge a suitable rehabilitation and conservation bond for the development with the Director-General. The sum of the bond shall be calculated at:
  - a) \$2.50/m<sup>2</sup> for the total area of disturbance at the development; and
  - b) \$3.00/m<sup>2</sup> for the total area of the revegetation area, .

to the satisfaction of the Director-General.

Notes:

- If the rehabilitation and revegetation area is completed to the satisfaction of the Director-General, the Director-General will release the rehabilitation and conservation bond.
- If the rehabilitation and revegetation area is not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the rehabilitation and conservation bond, and arrange for the satisfactory completion of these works.

Within 3 years of lodging the rehabilitation and conservation bond with the Director-General, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall review, and the necessary revise, the sum of the rehabilitation bond to the satisfaction of the Director-General Number review must consider:

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- a) / the effects of inflation;
- b) any changes to the total area of disturbance; and
- c) the performance of the revegetation area.

#### Reporting

 The Applicant shall include a progress report on the Rehabilitation Management Plan in the AEMR.

#### TRAFFIC AND TRANSPORT

#### Right of Way

45. Prior to the commencement of works, the Applicant shall formalise the Right of Way for the haulage road, to the satisfaction of the Director-General.

#### Site Access

46. All access to the site is to be via the roundabout at East-West Link Road, except in an emergency, as agreed by the Director General in consultation with the Council.

47. Deleted

#### Parking

 The Applicant shall provide sufficient parking on-site for all quarry-related traffic to the satisfaction of the Director-General.

#### Road Haulage

- 49. The Applicant shall ensure that all loaded vehicles entering or leaving the site are covered.
- 50. The Applicant shall ensure all loaded vehicles leaving the site are cleaned of materials that may fail on the road before they are allowed to leave the site.

#### HERITAGE

- 51. Within 3 months of the date of this consent, and prior to the disturbance of any relic, the Applicant shall prepare and subsequently implement a Heritage Management Plan for the development, in consultation with NSW Heritage Office and Shellharbour City Council, and to the satisfaction of the Director-General. The plan shall be prepared by a suitably qualified heritage consultant and must include:
  - a program for baseline dilapidation surveys of residences on The Fig Tree Hill Land and the 'Belmont' property (with the consent of the landowners). Surveys shall be undertaken at least prior to the commencement of each quarrying stage;
  - b) archival recording of 'Kyawana' and 'Belmont' properties, the dry stone walls and other heritage elements affected by the development;
  - a plan for the salvage and on-site reconstruction of the dry stone walls affected by the proposal, in accordance with a conservation and interpretation strategy;
  - a plan for the conservation and maintenance of the dry stone wall on the eastern boundary of the allotment;
  - a plan for providing Council the opportunity to salvage any relic proposed to be destroyed by the development, including 'Kyawana';
  - f) a procedure for obtaining permits under the Heritage Act prior to disturbance of any relic, and permits under the National Parks and Wildlife Act prior to disturbance of any Aboriginal objects or archaeological remains.
- 52. The dilapidation surveys required under Condition 51 shall be conducted by a suitably qualified, experienced and Independent engineer, whose appointment has been approved by the Director-General. The owners of the Fig Tree Hill land are to supply the applicant with three suggested nominees within 3 months from the grant of this consent. The applicant will submit one engineer from that list to be put forward by the applicant for approval by the Director General.

#### Reporting

53. The Applicant shall include a progress report on the Heritage Management Plan in the AEN

# VISUAL IMPACT

#### Visual Amenity

54

The Applicant shall minimise the visual impacts of the development to the satisfaction of the Director-General.

AND

NEW SOUTH

- 55. The visual/noise bunds and screen plantings shall be designed and established in accordance with a Landscape Plan prepared in consultation with Shellharbour City Council, and to the satisfaction of the Director-General. The Landscape Plan shall be prepared by a suitably qualified landscape architect with heritage experience, and shall have regard to the cultural landscape of Wentworth Hills. The plantings shall be commenced prior to the commencement of extraction and completed within six months of the date of this consent.
- 56. The Applicant shall ensure that the trees in the bund are maintained, and that in the event that trees die that they are replaced within 28 days to the satisfaction of the Director- General.
- 57. Following construction of the visual/noise bunds, the Applicant shall undertake an independent review of their effectiveness, and undertake any improvements to the satisfaction of the Director-General.

#### WASTE MANAGEMENT

#### Waste Minimisation

58. The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Director-General.

#### Waste Classification

59. <sup>19</sup>All liquid and non liquid wastes resulling from activities and processes at the site must be assessed, classified and managed in accordance with the EPA's Environmental Guidelines; Assessment, Classification and Management of Liquid and Non-liquid Wastes (1999), or any other EPA document superseding this guideline.

#### Reporting

60. The Applicant shall describe what measures have been implemented to minimise the amount of waste generated by the development in the AEMR.

#### EMERGENCY AND HAZARDS MANAGEMENT

#### Dangerous Goods

61. The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.

#### Safety

62. The Applicant shall secure the development to ensure public safety to the satisfaction of the Director-General.

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#### **Emergency Management**

- 63. Within 6 months of the date of this consent, the Applicant shall document, and subsequently implement, measures to minimise the environmental impacts of any emergency situations that could arise as a result of the operation of the quarry to the satisfaction of the DEC and the Director-General. This documentation must:
  - a) identify any significant threats to the environment and/or public health that could arise from activities associated with the operation of the quarry or construction works associated with the production increase. These threats may include excessive rainfall, pump failures, excess flocculation, power or other utility failure, natural disaster, landslip, accidental spills and discharges, spillage from trucks, fire etc;
  - b) identify any subsequent direct or indirect environmental effects as a result of the threats;
  - identify the pollution that would result due to these threats and impacts on operations and what impact the pollution would have on the health of the community and the environment;
  - develop actions to effectively respond to the disruption of operations so the risk of pollution is minimised;
  - e) develop a communications strategy for alerting relevant agencies and the potentially affected community in the event of the disruption to operations leading to significant pollution;
  - f) ensure that all relevant employees are familiar with the documentation; and

<sup>19</sup> Incorporates DEC GTA

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 g) when developing this documentation, identify any opportunities to integrate with Cleary Bros Emergency plans.

#### **BUSHFIRE MANAGEMENT**

- 64. The Applicant shall:
  - a) ensure that the development is suitably equipped to respond to any fires on-site;
  - b) assist the Rural Fire Service and emergency services as much as possible if there is a fire on-site.
- 65. Within 6 months of the date of this consent, the Applicant shall prepare a Bushfire Management Plan for the development, to the satisfaction of Council and the Rural Fire Service. The plan must have regard to the management of fire regimes and hazard reduction activities so as to avoid negative impacts to threatened species and habitat, endangered communities and populations as well as any cultural assets that may be present.



#### SCHEDULE 5 ADDITIONAL PROCEDURES

#### NOTIFICATION OF LANDOWNERS

1. If the results of monitoring required in schedule 4 identify that emissions generated by the development are greater than the criteria in schedule 4, then the Applicant shall notify the Director-General and the affected landowners and/or existing or future tenants (including tenants of quarry owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 4.

#### INDEPENDENT REVIEW

3.

4.

 If a landowner (excluding quarry owned properties) considers that the operations of the quarry are exceeding the criteria in schedule 4, then he/she may ask the Director-General in writing for an independent review of the Impacts of the development on his/her land.

If the Director-General is satisfied that an Independent review Is warranted, the Applicant shall within 3 months of the Director-General advising that an independent review is warranted:

- a) consult with the landowner to determine his/her concerns;
- b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to determine whether the development is complying with the relevant criteria in schedule 4, and identify the source(s) and scale of any impact on the land, and the development's contribution to this impact; and

c) give the Director-General and landowner a copy of the independent review.

If the independent review determines that the quarrying operations are complying with the relevant criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the quarrying operations are not complying with the relevant criteria in schedule 4, then the Applicant shall:

- take all practicable measures, in consultation with the landowner, to ensure that the development complies with the relevant criteria; and
- b) conduct further monitoring to determine whether these measures ensure compliance; or
   c) secure a written agreement with the landowner to allow exceedances of the relevant criteria
  - in schedule 4,

to the satisfaction of the Director-General.

If the additional monitoring referred to above subsequently determines that the quarrying operations are complying with the relevant criteria in schedule 4, then the Applicant may discontinue the independent review with the approval of the Director-General.

If the Applicant is unable to finalise an agreement with the landowner, then the Applicant or landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 2).

If the independent review determines that the quarrying operations are not complying with the relevant criteria in schedule 4, but that several quarries are responsible for this non-compliance, then the Applicant shall, with the agreement of the landowner and other quarry(s), prepare and implement a Cumulative Noise, Blasting and/or Air Quality Impact Management Plan to the satisfaction of the Director-General. This plan must provide details of the joint approach to be adopted by the Applicant and other quarry(s) to manage cumulative air quality and/or noise impacts at the landowner's dwelling.

If the Applicant is unable to finalise an agreement with the landowner and/or other quarry(s), and/or prepare a Cumulative Noise, Blasting and/or Air Quality Impact Management Plan, then the Applicant or landowner may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to an Independent Dispute Resolution Process (see Appendix 2).

If the landowner disputes the results of the independent review, either the Applicant or the landowner AND ENI may refer the matter to the Director-General for resolution.

If the matter cannot be resolved within 21 days, the Director-General shall refer the matter to Independent Dispute Resolution Process (see Appendix 2).

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#### SCHEDULE 6

#### ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

#### ENVIRONMENTAL MANAGEMENT STRATEGY

- Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, an Environmental Management Strategy for the development to the satisfaction of the Director-General. This strategy must:
  - (a) provide the strategic context for environmental management of the development;
  - (b) Identify the statutory requirements that apply to the development;
  - (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
  - (d) 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;
    - manage cumulative impacts; and
    - respond to emergencies; and
  - (e) describe the role, responsibility, authority, and accountability of all the key personnel involved in environmental management of the development.
- Within 14 days of receiving the Director-General's approval for the strategy, the Applicant shall:
  - (a) send copies of the approved strategy to the relevant agencies and Council; and
  - (b) ensure the approved strategy is made publicly available during the development.

#### ENVIRONMENTAL MONITORING PROGRAM

- 3. Within 6 months of the date of this consent, the Applicant shall prepare an Environmental Monitoring Program for the development, in consultation with the relevant agencies, and to the satisfaction of the Director-General. This program must consolidate the various monitoring requirements in schedule 4 of this consent into a single document.
- 4. Within 3 months of the completion of each independent Environmental Audit, the Applicant shall review, and if necessary update, the Environmental Monitoring Program to the satisfaction of the Director-General.

#### ANNUAL REPORTING

- 5. The Applicant shall prepare and submit an Annual Environmental Management Report (AEMR) to the Director-General and the relevant agencies. This report must:
  - (a) identify the standards and performance measures that apply to the development;
    - (b) describe the works carried out in the last 12 months;
  - (c) describe the works that will be carried out in the next 12 months;
  - (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
  - (e) include a summary of the monitoring results for the development during the past year;
    - Include an analysis of these monitoring results against the relevant:
      - impact assessment criteria;
      - monitoring results from previous years; and
      - predictions in the EIS;
  - (g) identify any trends in the monitoring results over the life of the development;
  - (h) identify any non-compliance during the previous year; and
  - (i) describe what actions were, or are being, taken to ensure compliance.

#### INDEPENDENT ENVIRONMENTAL AUDIT

- 6. Within 2 years of the date of this consent, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
  - (a) be conducted by a suitably qualified, experienced, and independent person whose appointment has been endorsed by the Director-General;
  - (b) be consistent with ISO 19011:2002 Guidelines for Quality and/or Environmental Systems Auditing, or updated versions of this guideline;
  - (c) assess the environmental performance of the development, and its effects on the surrounding environment;



#### Appeal No 10839 of 2005

- (d) assess whether the development is complying with the relevant standards, performance measures, and statutory requirements;
- (e) review the adequacy of the Applicant's Environmental Management Strategy and Environmental Monitoring Program; and, if necessary,
- (f) recommend measures or actions to improve the environmental performance of the development, and/or the environmental management and monitoring systems.
- 7. Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, with a response to the recommendations contained in the audit report.

#### COMMUNITY CONSULTATIVE COMMITTEE

- Within six (6) months of the date this consent, the Applicant shall establish a Community Consultative Committee to oversee the environmental performance of the development. This committee shall:
  - (a) be comprised of:
    - 2 representatives from the Applicant, including the person responsible for environmental management at the mine;
    - 1 representative from Council (if available); and
    - at least 2 representatives from the local community, including one representative for the Fig Tree Hill Land (if available).

whose appointment has been approved by the Director-General in consultation with the Council;

- (b) be chaired by an independent chairperson, whose appointment has been endorsed by the Director-General;
- (c) meet at least twice a year, with the first meeting to be held within six months of the date of this consent; and
- (d) review and provide advice on the environmental performance of the development, including any construction or environmental management plans, monitoring results, audit reports, or complaints.
- (e) review any document submitted to the DEC in satisfaction of condition 5 of schedule 6 and provide submissions to the DEC.
- 9. The Applicant shall, at its own expense:
  - (a) ensure that 2 of its representatives attend the Committee's meetings;
  - (b) provide the Committee with regular information on the environmental performance and management of the development;
  - (c) provide meeting facilities for the Committee;
  - (d) arrange site inspections for the Committee, if necessary;
  - (e) take minutes of the Committee's meetings;
  - (f) make these minutes available to the public for inspection within 14 days of the Committee meeting, or as agreed to by the Committee;
  - (g) respond to any advice or recommendations the Committee may have in relation to the environmental management or performance of the development;
  - (h) forward a copy of the minutes of each Committee meeting, and any responses to the Committee's recommendations to the Director-General within a month of acceptance of the minutes by the Committee.

Note: The Applicant may implement the reporting and consultation requirements under Schedule 5 of this consent in an integrated manner with similar and corresponding requirements under the consent to DA-467-11-2003, to the satisfaction of the Director-General.

#### ACCESS TO INFORMATION

10. Within 1 month of the approval of any management plan/strategy or monitoring program required under this consent (or any subsequent revision of these management plans/strategies or monitoring programs), the completion of the independent audits required under this consent, or the completion of the AEMR, the Applicant shall:

- a) provide a copy of the relevant document/s to the relevant agencies and the CCC;
- b) ensure that a copy of the relevant documents is made publicly available at the Applicant's regional office; and
- c) put a copy of the relevant document/s on the Applicant's website (once established), to the satisfaction of the Director-General.



## Appeal No 10839 of 2005

11.

During the life of the development, the Applicant shall: a) make a summary of the results of all monitoring required under this consent publicly available at the Applicant's regional office and on the Applicant's website; and

b) update these results on a regular basis (at least every 6 months), to the satisfaction of the Director-General.

Note: The Applicant's environmental management plans/protocols should specify the reporting provisions for each environmental aspect.

R R Hussey **Commissioner of the Court** 

T Brown

**Commissioner of the Court** 



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**APPENDIX 1 REVEGETATION/REHABILITATION AREA** 





APPENDIX 3 LANDSCAPE BUND, HAUL ROAD AND BATTERS

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# Appendix B

# ACCESS ROAD DEVELOPMENT CONSENT

SSC



1 1 MAY 2007



All communication addressed to: General Manager Sheliharbour City Council PO Box 155, Sheliharbour City Centre NSW 2529

PHONE: 02 4221 6111 FAX: 02 4221 6016 DX 26402 Shellharbour City Centre EMAIL: records@shellharbour.nsw.gov.au WEB: www.shellherbour.nsw.gov.au

The Manager Cleary Bros (Bombo) Pty Ltd PO Box 210 PORT KEMBLA N/3W 2505

# NOTICE OF DETERMINATION OF A DEVELOPMENT APPLICATION

Issued under the Environmental Planning and Assessment Act 1979 Section 81 (1)(a)

Being the applicant of Development Application No. 614/2006 for consent to the following development:

## **CONSTRUCT QUARRY ACCESS & HAUL ROAD**

LOTS: 1 & 2 DP: 858245 DUNSTERS LANE, CROOM

&

LOT: 23 DP: 1039967 PRINCES HIGHWAY, CROOM

BUILDING CODE DF AUSTRALIA BUILDING CLASSIFICATION: Not Applicable

1 0 MAY 2007

Determination date of consent.

In accordance with Section 80 of the Act the Development Application has been determined by the GRANTING OF CONSENT UNDER DELEGATED AUTHORITY SUBJECT TO THE CONDITIONS DESCRIBED BELOW.

#### **CONSTRUCTION CERTIFICATE & PCA NOTIFICATION**

- Before any site works, building, demolition or use is commenced, the person having the benefit of the development consent must:
  - a. obtain a construction certificate from Shellharbour City Council or an accredited certifier (S81A)
  - b. appoint a principal certifying authority (S81A).

ADMINISTRATION CENTRE; Lamerton House Lamerton Crescent Shellharbour City Centre

COUNCIL MEETING CHAMBER: Cor Shellharbour & Lake Entrance Roads, Warilla - 2 -

#### Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

#### LEGISLATION

2. The development must be erected in strict conformity with the plans, specifications and conditions approved by Council and in compliance with the requirements of the Environmental Planning Instruments.

# COMPLETION OF DEVELOPMENT

3. All conditions of consent must be complied with prior to the use of the access/haul road. The Principal Certifying Authority must issue a certificate verifying all conditions have been satisfied.

### EASEMENTS

No part of any structure must encroach onto any easement.

#### ESTABLISHMENT OF RIGHT OF CARRIAGEWAY

 The quarry access/haul road must be formalised to the satisfaction of Shellharbour City Council as a Right of Way whereby Lot 2, DP 858245 is burdened and Lot 1, DP 858245 and Lot 23, DP 1039967 are benefited by the development.

#### ERECTION OF SIGNS

6. The principal contractor and the Principal Certifying Authority will need to have a sign (or signs) erected and maintained on the development site that provides their name and contact telephone number (during and outside work hours for the principal contractor), and stating that unauthorised entry to the site is prohibited.

The principal contractor and Principal Certifying Authority can have separate signs or they can both use one sign if they choose.

#### QUARRY ACCESS/HAUL ROAD REQUIREMENTS

#### Structural Details

7. Full engineering/construction details must be submitted to the Principal Certifying Authority prior to the commencement of any work.

#### **ADMINISTRATIVE CONDITIONS**

#### **Obligation to Minimise Harm to the Environment**

8. The applicant must implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the development.

#### Scope of Development

- 9. The applicant must carry out the development generally in accordance with:
  - a. DA No. 614/2006 and accompanying documentation
  - b. Conditions of this consent.
- 10. If there is any inconsistency between the above, either the conditions of this consent or the most recent document shall prevail to the extent of the inconsistency.

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#### Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

- 11. The applicant must comply with any reasonable requirement/s of Shellharbour City Council arising from assessment of;
  - a. any reports, plans or correspondence that are submitted in accordance with this consent, and
  - the implementation of any actions or measures contained in these reports, plans or correspondence.

#### Period of Approval

12. The use of the land for quarry access and haul road shall cease 30 years after the date of the development consent for the Croom hard rock quarry approved by the Land and Environment Court in *Figtree Hill Pty Limited v Cleary Bros (Bombo) Pty Limited and the Minister for Infrastructure and Planning,* Proceedings No. 10639 of 2005, dated 21 February 2006, and thereafter, may only be used for a further 5 years for the purposes of rehabilitation.

#### Protection of Public Infrastructure

- 13. The applicant must:
  - a. repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development, and
  - b. relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

#### **Operation of Plant & Equipment**

- 14. The applicant must ensure that all plant and equipment at the site, or used in connection with the development are:
  - a, maintained in a proper and efficient condition, and
  - operated in a proper and efficient manner.

#### ENVIRONMENTAL PERFORMANCE

#### Identification of Boundaries

- 15. Prior to the commencement of works, the applicant must:
  - a. engage a registered surveyor to mark out the boundaries of the haul road corridor
  - b. submit a survey plan of these boundaries to Shellharbour City Council, and
  - ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

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#### Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunstern Lane & Lot 23, DP 1039967, Princes Highway, Croom

#### Noise Limits

16. The applicant must ensure that noise generated by the development does not exceed the criteria specified in Table 1 of Development Application No. 466-11-2003 approved by the Land and Environment Court in *Figtree Hill Pty Limited v Cleary Bros (Bombo) Pty Limited and the Minister for Infrastructure and Planning*, Proceeding No. 10639 of 2005, dated 21 February 2006.

#### **Operating Hours**

17. The applicant must comply with the operating hours in Table 1.

Activity	Days of the Week	Time
Haulage of material from quarry to processing plant, all site construction	Monday - Friday	7.00am – 5.30pm
activities, rehabilitation works, general plant and maintenance.	Saturday	7.00am – 1.00pm

Table 1: Operating Hours for the Development

- 18. The following activities may be carried out at the premises outside the hours specified in Table 1:
  - the delivery of materials as requested by Police or other authorities for safety reasons
  - emergency work to avoid the loss of lives, property and/or to prevent environmental harm
  - workshop activities and other maintenance work inaudible a the nearest affected receiver.

#### AIR QUALITY

## Air Quality Criteria

 The applicant must ensure that the air pollution generated by the development does not cause exceedances of the ambient air quality standards and goals listed in Tables
 3 & 4 at any sensitive receiver or residence on privately owned land.

Pollutanit	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 pg/m <sup>3</sup>
Particulate matter < 10pm (PM <sub>10</sub> )	Annual	30 pg/m <sup>3</sup>

Table 2: Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion	
Particulate matter < 10pm	24 hour	50 pg/m <sup>3</sup>	
(PM <sub>10</sub> )			

Table 3: Short Temi Impact Assessment Criterion for Particulate Matter

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#### Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Groom

Pollutant	Averaging Period	Maximum Increase In Deposited Dust Level	Maximum Total Deposited Dust Level
Deposited dust	Annual	2 g/m²/month	4g/m <sup>2</sup> /month

Table 4: Long Term Impact Assessment Criteria For Deposited Dust

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia 2003, AS 3580.10.1 – 1991:Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method.

#### Management

- 20. The site must be maintained in a condition that minimises or prevents the emission of dust from the site, including the prompt and effective rehabilitation of all disturbed areas.
- The haulage road and unsealed surfaces are to be watered as required to minimise dust generation impacting on the natural or built environment. Dust generating activity must cease in strong winds.

#### SURFACE & GROUND WATER

#### Pollution of Waters

22. Except as may be expressly provided by a Environment Protection Licence, the applicant must comply with Section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.

#### Management

- 23. Within 12 months of the date of this consent and prior to the commencement of works, the applicant must prepare and subsequently implement an *Erosion* & *Sediment Control Plan* for the development, to the satisfaction of Shellharbour City Council. The plan must:
  - a. be consistent with the requirements of the Department of Housing's 'Managing Urban Stormwater: Soils & Construction Manual'
  - b. identify activities that could cause soil erosion and generate sediment
  - describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters
  - describe the location, function and capacity of erosion and sediment control structures, and
  - describe what measures would be implemented to maintain the structures over time.

#### Reporting

- 24. Each year, the applicant must
  - a. review the Erosion & Sediment Control Plan

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Development Application No. £14/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

- b. update the plan, and
- report the results of this review in the Annual Environmental Management Report (AEMR) as required by DA 466-11-2003, including:
  - i. the results of any monitoring
  - ii. details of the review of the plan
  - iii. amendments to the plan, and
  - iv. details of the measures undertaken/proposed to address any identified issues.

#### FLORA & FAUNA

#### Vegetation Clearing Protocol

- 25. Prior to the commencement of works, the applicant must prepare and subsequently implement a Vegetation Clearing Protocol for the development in consultation with the Department of Environment & Conservation (NPWS) and to the satisfaction of Shellharbour City Council. This plan must:
  - a. delineate the areas of remnant vegetation to be cleared, and
  - b. describe the procedures that would be implemented for:
    - pre-clearance surveys
    - progressive clearing
    - fauna management
    - conserving and reusing topsoil
    - collecting seed from the site
    - salvaging and reusing materials from the site, and
    - controlling weeds

#### Protection of Flora & Fauna

- 26. The route of the access road which has been designed, located and approved to minimise the removal of indigenous trees, must be strictly adhered to.
- 27. The stand of large iForest Red Gum trees near to the haul road route, as shown on Figure 2, Vegetation Map within the Flora & Fauna Assessment of the Statement of Environmental Effects by Perram & Partners, November 2006 112R3, must be fully protected by robust fencing, prior to the commencement of any construction of the haul road. The position of the fencing must be located and certified by a suitably qualified ecological and environmental consultant.
- 28. The two Fig Trees near to the haul road route must be retained and fully protected by robust barrier fencing prior to the commencement of any earthworks associated with the haul road construction. Earthworks must be carried out in a manner that protects the tree root systems and must be supervised and certified by a suitably qualified ecological and environmental consultant.
- 29. The area where the endangered vine Cynanchum elegans occurs must be protected against construction machinery by robust fencing prior to the commencement of any works on the haul road. The position of the fence must be determined and certifled before construction commences by a suitably qualified ecological and environmental consultant.

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## Development Application No. 614/2006

#### Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

- 30. The location of the regionally rare species Alchorina ilicifolia and Abutilon oxycarpum must be determined by a suitably qualified person and the area fenced if deemed necessary by a suitably qualified ecological and environmental consultant.
- 31. The exact location of specimens of *Geijera salicifolia* var. *latifolia* must be determined and illustrated on a map which must be submitted to Council prior to any works commencing. Individual plants to be removed must be clearly marked as such, whilst individual plants to be retained must also be clearly marked as such and fenced if deemed necessary. The position of the fencing is to be determined by a suitably gualified ecological and environmental consultant.
- 32. Throughout the entire project site, no fill is to be placed in such a way that it is against or around any tree, specifically the Forest Red Gum Woodland and the two Fig Trees.
- 33. Adequate sediment and erosion control must be put in place before construction and maintained throughout the project. Following completion of the project, suitable stabilisation and screening of exposed soil must be undertaken with locally indigenous species.

### REHABILITATION

#### **Rehabilitation Management Plan**

- 34. Within six months of the date of this consent, the applicant must prepare and subsequently implement a *Rehabilitation Management Plan* for the site in consultation with Shellharbour City Council. This plan must:
  - a. identify the discurbed area at the site
  - b. describe in general the short, medium and long term measures that would be implemented to rehabilitate the site (including the decommissioning of the haul road the return to the natural ground levels a the expiration of the quarrying process)
  - describe in detail the measures that would be implemented over the next five years to rehabilitate the site, and
  - d. describe how the performance of these measures would be monitored over time.

#### Reporting

35. The applicant must include a progress report on the *Rehabilitation Management Plan* in the AEMR.

#### TRAFFIC & TRANSPORT

#### Site Access

- 36. All access to the quarry extension site (following construction of the haul road) is to be via the roundabout at East/West Link Road.
- 37. The applicant must not cause any heavy vehicle movements along Dunsters Lane, except in an emergency, as agreed by the Director/General of the Department of Planning in consultation with Shellharbour City Council.

Development Application No. 614/2006

Lots 1 & 2, DP 658245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

#### Road Haulage

- 38. The applicant must ensure that all loaded vehicles entering or leaving the site are covered.
- 39. The applicant must ensure all loaded vehicles leaving the site are cleaned of materials that may fall on the road before they are allowed to leave the site.

#### HERITAGE

- 40. Within three months of the date of this consent and prior to the disturbance of any relic, the applicant must prepare and subsequently implement a *Heritage Management Plan* for the development, in consultation with NSW Heritage Office and to the satisfaction of Shellharbour City Council. The plan must include:
  - a. archival recording of the 'Kyawana' property and other heritage elements affected by the development, in accordance with the NSW Heritage Office Manual.
  - a plan for providing Council the opportunity to salvage any relic proposed to be destroyed by the development, including 'Kyawana'.
  - c. should any indigenous archaeological material be located or disturbed during construction, measures to immediately mitigate any potential or proposed impacts on the heritage site. The plan must include options or alternatives to modification for especially sensitive or culturally significant sites.
  - d. a procedure for obtaining permits under the Heritage Act prior to disturbance of any relic and permits under the National Parks & Wildlife Act prior to disturbance of any Aboriginal objects or archaeological remains located or identified during the haul road construction.

#### Reporting

41. The applicant must include a progress report on the *Heritage Management Plan* in the AEMR.

#### VISUAL IMPACT

#### Visual Amenity

- 42. The applicant must minimise the visual impacts of the development to the satisfaction of Shellharbour City Council.
- 43. The haul road batters and screen plantings must be designed and established in accordance with a landscape plan prepared in consultation with Shellharbour City Council. The landscape plan must be submitted with the Construction Certificate documentation and must be prepared by a suitably qualified landscape architect with heritage experience and must have regard to the cultural landscape of Wentworth Hills. The plant list within the Statement of Environmental Effects must be used for plant selection.
- 44. Following construction of any visual/noise bund, the applicant must undertake a review of its effectiveness with Shellharbour City Council and undertaken any improvements as required by Council.

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#### Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039957, Princes Highway, Croom

45. Any bund on Lot 2, DP 858245 or Lot 23, DP 1039967 must be constructed in a manner to compliment the existing landscape. In this regard, the bund must be shaped and planted/seeded with grass and/or indigenous plants so that it blends with the existing hillside.

### EMERGENCY & HAZARDS MANAGEMENT

#### **Dangerous Goods**

46. The applicant must ensure that the storage, handling and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS 1940 and AS 1596 and the *Dangerous Goods Code*.

#### Safety

47. The applicant must secure the development to ensure public safety to the satisfaction of the Principal Certifying Authority.

#### ENGINEERING

48. Detailed engineering plans of proposed road and associated drainage, prepared by an appropriately qualified engineer, must be submitted as part of the Construction Certificate application. The detailed plans must be to the satisfaction of the Principal Certifying Authority and must be certified by the design engineer that the pavement is adequate for the expected traffic loadings from a development of this size and type.

#### **REASONS FOR THE IMPOSITION OF CONDITIONS**

- 1. To minimise any possible adverse environmental impacts of the proposed development.
- To ensure that the amenity and character of the surrounding area is protected.
- To ensure that the design and siting of the development complies with the provisions of Environmental Planning Instruments and Council's Codes and Policies.
- To ensure that the development does not conflict with the public interest.

#### SUPPLEMENTARY ADVICE

- 1. This development consent is subject to the prescribed conditions under Part 7 of the Environmental Planning & Assessment Regulation 1998.
- Failure to comply with any of the conditions of consent may result in a Penalty Infringement Notice of \$600 being issued against the owner/applicant/builder.

#### NOTES:

- In accordance with Section 95 of the Environmental Planning & Assessment Act 1979, the development approval lapses five years after the approval date unless building, engineering or construction work relating to the building has physically commenced.
- 2. Right of Appeal

If you are dissatisfied with this decision, Section 97 of the Environmental Planning & Assessment Act 1979, gives you the right to appeal to the Land & Environment Court within 12 months after the date on which you receive this notice.

Section 97 of the Environmental Planning & Assessment Act 1979 does not apply to the determination of a development application for state significant development or local designated development that has been the subject of a Commission of Inquiry.

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Development Application No. 614/2006

#### Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

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#### 3. Review of determination

If you are dissatisfied with this decision, Section 62A of the *Environmental Planning & Assessment Act,* 1979, provides that you may request Council to review its determination. The request cannot be made after the time limit for making of an appeal under Section 97 expires.

Section 82A of the Environmental Planning & Assessment Act, 1979, does not apply to:

- a. a determination to issue or refuse to issue a complying development certificate
- a determination in respect of designated development
- c. a determination in respect of integrated development
- a determination made by the Council under Section 116E in respect of an application made by the Crown.
- 4. The plans and/or conditions of this consent are binding and may only be varied upon application to Council under Section 96 of the Environmental Planning & Assessment Act 1979. The appropriate fee must accompany the application and no action shall be taken on the requested variation unless and until the written authorisation of Council is received by way of an amended consent.

#### 5. Prescribed Payment System Tax Obligations

You may have a taxation obligation under the Prescribed Payment System. For more information, contact the Australian Taxation Office on telephone 132868.

#### 6. Erection of Signs

A maximum penalty of 10 penalty units (\$1,100) applies for failure to erect and maintain sign(s) detailing principal contractor and principal centifying authority identification.

#### 7. Critical Stage Inspections

In the case of a Class 5, 6, 7, 8 or 9 building, the development site must be inspected:

- i. at the commencement of the building work
- i). prior to covering any stormwater drainage connections
- ili, after the building work has been completed and prior to any occupation certificate being issued in relation to the building

#### 8. Altered Position of Haul Road

The altered position of the haul road for the Croom hard rock quarry consent granted by the Land and Environment Court: Figthe Hill v Cleary Bros (Bornbo) Pty Limited and the Minister for Infrastructure and Planning, Proceedings No. 10639 of 2005, dated 21 February 2006 may need to be the subject of an application to vary consent.

Graham Mitchell Manager Development Services

On behalf of Brian A Weir, General Manager

# Appendix C

# ENVIRONMENT PROTECTION LICENCE

Licence - 299

Licence Details	
Number:	299
Anniversary Date:	30-September
Review Due Date:	11-Jul-2010

## **Licensee**

CLEARY BROS (BOMBO) PTY LTD PO BOX 210 PORT KEMBLA NSW 2505

# Licence Type

Premises

# <u>Premises</u>

CLEARY BROS (BOMBO) PTY LTD LOT 3 PRINCES HIGHWAY ALBION PARK RAIL NSW 2527

## Scheduled Activity

Concrete Works Extractive Industries Mines

# Fee Based Activity

Concrete Batching (30) Hard-Rock Gravel Quarrying (36) Mining (Other than Coal) (64)

# **Region**

Metropolitan Level 3, NSW Govt Offices, 84 Crown Street WOLLONGONG NSW 2500 Phone: 02 4224 4100 Fax: 02 4224 4110

PO Box 513 WOLLONGONG EAST NSW 2520

Scale
> 13000 - 25000 m3 produced
> 100000 - 500000 T obtained
> 100000 - 500000 T obtained

Department of Environment & Climate Change NSW

Department of Environment & Climate Change NSW

Licence - 299

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Licence - 299



# Information about this licence

# Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

# **Responsibilities of licensee**

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

# Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

# Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

# Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

# Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees.

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The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

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Usually the licence fee period is the same as the reporting period.

# Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

# Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

# This licence is issued to:

CLEARY BROS (BOMBO) PTY LTD PO BOX 210 PORT KEMBLA NSW 2505

subject to the conditions which follow.

# **1** Administrative conditions

# A1 What the licence authorises and regulates

- A1.1 Not applicable.
- A1.2 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, feebased activity classification and the scale of the operation.

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Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity		
Concrete Works		
Extractive Industries		
Mines		

Fee Based Activity	Scale
Concrete Batching (30)	> 13000 - 25000 m3 produced
Hard-Rock Gravel Quarrying (36)	> 100000 - 500000 T obtained
Mining (Other than Coal) (64)	> 100000 - 500000 T obtained

A1.3 Not applicable.

# A2 Premises to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
CLEARY BROS (BOMBO) PTY LTD
LOT 3 PRINCES HIGHWAY
ALBION PARK RAIL
NSW
2527
LOT 3 DP 858245, LOT 1 DP 359108, TEMPORARY
ACCESS TO A PORTION (11540 SQ. METRES) OF
LOT 2 DP 858245 AS SHOWN ON PLAN REF:
KF106208 DATED: 25-6-04.

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**Premises Details** 

# A3 Other activities

A3.1 Not applicable.

# A4 Information supplied to the EPA

- A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.
  - In this condition the reference to "the licence application" includes a reference to:
  - (a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
  - (b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

# 2 Discharges to air and water and applications to land

# P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

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Air

EPA Identi- fication no.	Type of Monitoring Point	Type of Discharge Point	Description of Location
1	Dust deposition monitoring		APD 1 - approximately 200 metres west of the crushing and screening plant and labelled as APD1 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
2	Dust deposition monitoring		APD 2 - approximately 100 metres east of quarry area and labelled as APD2 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
3	Dust deposition monitoring		APD 3 - approximately 150m south east of main holding and sedimentation dam and and labelled as APD3 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.

- P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.
- P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

## Water and land

EPA identi- fication no.	Type of monitoring point	Type of discharge point	Description of location
4	Effluent Quality Monitoring - Discharge to waters	Effluent Quality Monitoring - Discharge to waters	Outlet of main holding and sedimentation pond and labelled as 'sampling DP1' on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
5	Effluent Quality Monitoring - Discharge to waters	Effluent Quality Monitoring - Discharge to waters	See drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
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## 3 Limit conditions

### L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

### L2 Load limits

- L2.1 Not applicable.
- L2.2 Not applicable.

### L3 Concentration limits

- L3.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.
- L3.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.
- L3.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

#### Water and Land

#### **POINT 4**

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
Total suspended solids	milligrams per litre				50

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#### POINT 5

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
Oil and Grease	milligrams per litre				30
Total suspended solids	milligrams per litre				50
Biochemical oxygen demand	milligrams per litre				150

### L4 Volume and mass limits

L4.1 Not applicable.

#### L5 Waste

L5.1 Not applicable.

#### L6 Noise Limits

- L6.1 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not:
  - (a) Exceed 5mm/sec for more than five per cent of the total number of blasts carried out on the premises within the 12 months annual reporting period.
- L6.2 The overpressure level from blasting operations on the premises must not:
  - (a) Exceed 115dB(L) for more than five per cent of the total number of blasts carried out on the premises within the 12 months annual reporting period.

The airblast overpressure values stated above apply when the measurements are performed with equipment having a lower cut-off frequency of 2Hz or less. If the instrumentation has a higher cut-off frequency then a correction of 5dB should be added to the measure value. Equipment with a lower cut-off frequency exceeding 10Hz should not be used for the purpose of measuring airblast overpressure.

L6.3 Blasting operations at the premises may only take place between 8:30am – 5:00pm Monday to Friday. Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority.

## 4 Operating conditions



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### O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- (a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- (b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

### O2 Maintenance of plant and equipment

- O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
  - (a) must be maintained in a proper and efficient condition; and
  - (b) must be operated in a proper and efficient manner.

#### O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust.

#### O4 Effluent Re-use

O4.1 The quantity of effluent/solids applied to the utilisation area must not exceed the capacity of the area to effectively utilise the effluent/solids.

For the purpose of this condition, 'effectively utilise' includes the use of the effluent/solids for pasture or crop production, as well as the ability of the soil to absorb the nutrient, salt, hydraulic load and organic material. If weather or soil condition preclude irrigation, the holding tanks must not overflow and effluent must be tankered away and disposed of in a manner which does not pollute waters.

O4.2 A minimum of 2500 square metres must be retained for use as the wastewater utilisation area.

## 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:

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- (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

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- (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.

### M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

#### POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Ash	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991
Insoluble solids	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991

#### POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Ash	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991
Insoluble solids	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991

#### POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Ash	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991
Insoluble solids	grams per square metre per month	Monthly	Australian Standard 3580.10.1- 1991

#### **POINT 4**

Pollutant	Units of measure	Frequency	Sampling Method
Total suspended solids	milligrams per litre	Each overflow event	Grab sample

#### POINT 5

Pollutant	Units of measure	Frequency	Sampling Method
Biochemical oxygen demand	milligrams per litre	Quarterly	Grab sample
Oil and Grease	milligrams per litre	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

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### M3 Testing methods - concentration limits

- M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
  - (a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
  - (b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
  - (c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The Protection of the Environment Operations (Clean Air) Regulation 2002 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

### M4 Recording of pollution complaints

- M4.1 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.
- M4.2 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.
- M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

### M5 Telephone complaints line

M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose

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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.

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- M5.2 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.
- M5.3 Conditions M5.1 and M5.2 do not apply until 3 months after:
  - (a) the date of the issue of this licence or
  - (b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

### M6 Requirement to monitor volume or mass

M6.1 Not applicable.

### M7 Requirement to monitor blasting

- M7.1 Each production blast must be monitored and recorded at the permanent station established near the Dunster residence.
- M7.2 To determine compliance with Conditions L6.1 and L6.2:
  - (a) Airblast overpressure and ground vibration levels must be measured for all production blasts carried out in or on the premises; and
  - (b) The written record must include:
    - (i) the time and date of each blast;
      - (ii) the station(s) at which the noise was measured;
      - (iii) the ground vibration for each blast;
      - (iv) the airblast overpressure for each blast;
      - (v) evidence that during the past 12 month period, a calibration check had been carried out on each blast monitor to ensure accuracy of the reported data; and
    - (vi) the waveform for the ground vibration and overpressure for each blast that exceeds a ground vibration of 5mm/sec (peak particle velocity) or an airblast overpressure of 115dB(L).
  - (c) Instrumentation used to measure the airblast overpressure and ground vibration levels must meet the requirements of Australian Standard 2187.2 of 1993.

## 6 Reporting conditions

### R1 Annual return documents

### What documents must an Annual Return contain?

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- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
  - (a) a Statement of Compliance; and
  - (b) a Monitoring and Complaints Summary.

A copy of the form in which the Annual Return must be supplied to the EPA accompanies this licence. Before the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

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#### Period covered by Annual Return

- R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.
- Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.
- R1.3 Where this licence is transferred from the licensee to a new licensee:
  - (a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
  - (b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.
- Note: An application to transfer a licence must be made in the approved form for this purpose.
- R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
  - (a) in relation to the surrender of a licence the date when notice in writing of approval of the surrender is given; or
  - (b) in relation to the revocation of the licence the date from which notice revoking the licence operates.

### Deadline for Annual Return

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

### Notification where actual load can not be calculated

R1.6 Not applicable.

#### Licensee must retain copy of Annual Return

R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

#### Certifying of Statement of Compliance and signing of Monitoring and Complaints Summary

R1.8 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:



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- (a) the licence holder; or
- (b) by a person approved in writing by the EPA to sign on behalf of the licence holder.
- R1.9 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

### R2 Notification of environmental harm

- Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.
- R2.1 Notifications must be made by telephoning the EPA's Pollution Line service on 131 555.
- R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

### R3 Written report

- R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
  - (a) where this licence applies to premises, an event has occurred at the premises; or
  - (b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,

and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
  - (a) the cause, time and duration of the event;
  - (b) the type, volume and concentration of every pollutant discharged as a result of the event;
  - (c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
  - (d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
  - (e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
  - (f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
  - (g) any other relevant matters.
- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it

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is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

### R4 Reporting of blasting monitoring

R4.1 The results of the blast monitoring required by Condition M7.2 must be submitted to the EPA on a weekly basis.

## **General conditions**

- G1 Copy of licence kept at the premises
- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

## **Pollution studies and reduction programs**

U1.1 Not applicable.

## **Special conditions**

E1 Not applicable.

## Dictionary

### **General Dictionary**

In this licence, unless the contrary is indicated, the terms below have the following meanings:

**3DGM [in relation to a concentration** Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or

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limit]	more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
АМ	Together with a number, means an ambient air monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.
flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
industrial waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
inert waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
reprocessing of waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
тм	Together with a number, means a test method of that number prescribed by the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales.
treatment of waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements

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utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste code	Means the waste codes listed in Appendix 5 of the EPA document A Guide to Licensing Part B.
waste type	Means Group A, Group B, Group C, inert, solid, industrial or hazardous waste

Mr Nigel Sargent

**Environment Protection Authority** 

(By Delegation)

Date of this edition - 16-Mar-2006

End	I Notes
1	Licence varied by notice 1003792, issued on 17-Jul-2002, which came into effect on 11-Aug-2002.
2	Licence varied by notice 1038336, issued on 30-Jun-2004, which came into effect on 05-Jul-2004.
3	Licence varied by change to DEC Region allocation, issued on 16-Mar-2006, which came into effect on 16-Mar-2006.

## Appendix D

# EQUIPMENT SOUND POWER LEVELS

### EQUIPMENT SOUND POWER LEVELS

Equipment used in the quarry operation will be selected and maintained to achieve the sound power levels in the following table. These levels were determined from measurements of equipment in use at Cleary Bros Albion Park quarry in 2001. The sound power levels were then used for modelling noise impacts from the quarry extension. The validity of the modelling and noise predictions is dependent upon the sound power levels of quarry equipment not exceeding the levels in the table.

Equipment	Sound Power Levels
Processing Plant	
Primary crusher	112 dBA
Secondary crushers and screens	116 dBA
Pug mill	115 dBA
Mobile Equipment	
CAT 773 dump truck	114 dBA
CAT 627 scraper*	111 dBA
CAT 245 face shovel	117 dBA
CAT 992 loader	118 dBA
Rock drill	118 dBA
Water cart	109 dBA
CAT D8L dozer	116 dBA
235C hammer excavator*	112 dBA
CAT 980C loader	114 dBA

*Source:* Noise and Blasting Impact Assessment, Cleary Bros Albion Park Quarry – Richard Heggie Associates, December 2002.

Appendix E

# QUARRY VEGETATION MANAGEMENT PLAN

# VEGETATION MANAGEMENT PLAN

## ALBION PARK HARD ROCK QUARRY CLEARY BROS (BOMBO) PTY LIMITED

a report prepared by

KEVIN MILLS & ASSOCIATES ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS

October 2007 05/044

## VEGETATION MANAGEMENT PLAN

ALBION PARK HARD ROCK QUARRY CLEARY BROS (BOMBO) PTY LIMITED

report prepared by

## **KEVIN MILLS & ASSOCIATES**

ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS 114 NORTH CURRAMORE ROAD JAMBEROO NSW 2533 ABN 346 816 238 93

for

CLEARY BROS (BOMBO) PTY LIMITED PO BOX 210 PORT KEMBLA NSW 2505

> October 2007 05/044

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## VEGETATION MANAGEMENT PLAN ALBION PARK HARD ROCK QUARRY CLEARY BROS (BOMBO) PTY LIMITED

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# VEGETATION MANAGEMENT PLAN

## ALBION PARK HARD ROCK QUARRY CLEARY BROS (BOMBO) PTY LIMITED

## PART 1. INTRODUCTION

## 1 INTRODUCTION

## 1.1 BACKGROUND

This report was prepared by Kevin Mills & Associates, Ecological and Environmental Consultants, on behalf of Cleary Bros (Bombo) Pty Limited, the owners and operators of the Albion Park hard rock quarry at Albion Park in the City of Shellharbour. The document was prepared in response to conditions of consent attached to an application to expand the existing hard rock quarry onto the nearby land.

## 1.2 PURPOSE OF THE DOCUMENT

The purpose of this Vegetation Plan of Management is to provide a detailed guide for the protection, management and enhancement of the native vegetation and habitats on the Albion Park hard rock quarry. In particular, the Plan aims to address the following matters listed in the Conditions of Consent for the quarry.

## "37. Vegetation Management Plan

Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Vegetation Management Plan for the development in consultation with Shellharbour City Council and the DEC (NPWS), and to the satisfaction of the Director-General. The plan shall be prepared by a suitably qualified ecologist/bush regenerator, and shall address:

a) establishment of baseline data for existing vegetation and habitat in the area;

- b)vegetation management on all areas of the site outside the working area of the quarry;
- c) conservation, maintenance and enhancement of threatened communities, including 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands';
- d) conservation, maintenance and enhancement of threatened plant species, including *Cynanchum elegans* (White Cynanchum), *Daphandra* sp. *aff. micrantha* (Illawarra Socketwood), and *Zieria granulata* (Illawarra Zieria);
- e)establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed flying-fox;
- f) ongoing weed control and maintenance;
- g) a program for how the performance of the measures described in (b) to (f) above would be monitored over time;
- h)a program for monitoring the effect of quarrying, including water management, on vegetation communities.

### 38. <u>Reporting</u>

The Applicant shall include a progress report on the implementation of the Vegetation Management Plan in the AEMR."

The following areas to be covered by the Vegetation Management Plan are set out in the conditions of consent.

"35. Southern Remnant Vegetation and Revegetation Area

The Applicant shall conserve and maintain the areas of remnant vegetation marked on the map in Appendix 1.

36. The Applicant shall revegetate/rehabilitate and maintain the areas marked 'Area to be Planted' and 'Weed Control to Promote Natural Vegetation' on the map in Appendix 1. Revegetation shall be in accordance with the Vegetation Management Plan described in Condition 37."

The management actions are set out in the next section as a 'work instruction', the format most familiar to quarry staff at Cleary Bros (Bombo). The work instruction is presented at the beginning of the document for ease of use on the site. Management actions are derived from the issues discussed later in this report.

The "map in Appendix 1" referred to in conditions 35 and 36 above is included in the work instruction.

Cleary Bros (Bombo) Pty Limited – Quarry Division Albion Park Hard Rock Quarry – Work Instruction

## RESTORATION AND REVEGETATION OF NATIVE VEGETATION

## 1.0 Purpose and Scope

This work instruction describes the methods to be employed in the restoration and revegetation of native vegetation to the identified area around the Albion Park hard Rock Quarry Extension.

### 2.0 References

- 2.1 2006 Development Consent for the Albion Park Hard Rock Quarry Extension (L & E Court).
- 2.2 Environmental Impact Statement for the Albion Park Quarry Extension (Perram & Partners 2003).
- 2.3 Flora and Fauna Study for the Albion Park Quarry Extension (Kevin Mills & Associates 2003).
- 2.4 Vegetation clearing protocol and vegetation conservation plan, access road for Albion Park hard rock quarry, Cleary Bros (Bombo) Pty Limited (Kevin Mills & Associates 2007).

## 3.0 Definitions

### 3.1 *Quarry Area*

The area containing the quarry extension and adjacent land within Cleary Bros property delineated as the *identified area*.

## 3.2 Identified Area

The area adjoining the quarry shown on the attached plan and defined in the Conditions of Consent for the quarry extension.

## 3.3 *Restoration Area*

The areas identified on the accompanying plan where the primary management objective is to control weeds and allow natural regeneration of native plants to take place.

## 3.4 *Revegetation Area*

The areas identified on the accompanying plan where the primary management objective is to undertake plantings of native species and to control weeds and undertake other measures to ensure they successfully grow.

## 3.5 Native Vegetation

Vegetation that is indigenous to the site, i.e. occurs there naturally; this includes plant species and communities,

## 3.6 *Threatened Species*

Threatened species, including plant and animal species, populations and ecological communities that are identified under the *Threatened Species Conservation Act* 1995 (NSW).

## 3.7 *Responsible Staff Member*

The on-site staff person or persons given the task by Cleary Bros (Bombo) Pty Limited of ensuring that the provisions in this Vegetation Management Plan are satisfactorily implemented.

## 4.0 Objectives

4.1 Ensure that the development of the quarry, haul road and associated works do not impact upon the existing stands of native vegetation outside the quarry area.

4.2 Successfully rehabilitate and expand the existing areas of Illawarra Subtropical Rainforest and Illawarra Lowlands Grassy Woodland on the identified land adjoining the quarry.

4.3 Successfully control problem weeds in the area, particularly noxious weeds and weeds that are impacting significantly upon the native vegetation and rehabilitation efforts.

4.4 Implement other measures to ensure the success of the restoration and revegetation of the identified land.

## 5.0 Delineation and Protection of the Identified Land

5.1 The responsible staff officer will ensure that the interface between the quarry and the existing vegetation and proposed revegetation areas is fenced; i.e. along the boundary of the identified area. The location of this fencing is indicated on the plan accompanying the consent conditions. This fence will be a four-strand plain wire fence, with gate access as required for maintenance vehicles. If

necessary, this fence will be temporarily highlighted (e.g. with orange plastic fencing) while excavation work is being undertaken in that particular area to alert machine operators of its existence.

5.2 The responsible staff member will ensure that storage of spoil or other material does not occur within the above fenced area. To improve the growing area "topsoil" may be used in some locations within the revegetation area but not the restoration areas to improve the growing area. This will be at the discretion of the bush regenerators working on the site.

5.3 The responsible staff officer will ensure that storage of materials, spoil or stockpiles is not permitted close to the fence where it may impact on the fenced area; erosion control structures such as silt fences may be required in such circumstances.

5.4. Prior to the construction of the above fence, all foreign material, for example dumped rubbish, old fences, etc, is to be removed from the identified land.

5.5 All personnel working on the site will undergo an induction program that includes stressing that the fenced identified land is a "no go" zone for vehicles or disturbance under any circumstances.

5.6 Signs will be erected at 100 metre intervals along the fenced boundary to indicate the identified land and that there should be no unauthorised vehicle entry or disturbance to the area.

## 6.0 Restoration and Revegetation

6.1 Detailed information on the native vegetation in the identified area is contained in the reports by Kevin Mills & Associates referenced herein; these should be perused for background information.

6.2 <u>Site treatment - Restoration Zone</u>. The aim within the restoration zone is to minimise unnecessary disturbance to the soil and the existing native vegetation growing there. Other than painting Lantana stumps with an approved herbicide, no chemicals are to be used within this zone. Primarily, the aim is to allow the existing native plants that are colonising the area to grow unencumbered by weeds. The main action within this zone, then, is the removal of weeds and allow the natural regeneration of the natives to occur.

6.3 <u>Site treatment - Revegetation Zone</u>. This zone is mainly covered in exotic grasses and herbaceous species. The main aim is to undertake plantings of suitable local native plants and to control weeds that would compete with these plantings.

6.4 <u>Plants to be used</u>. The native plants to be used have been selected from those listed in Appendix 1 and are recommended in sections 6.7 and 6.8 below. These plants should be sourced from the approved nursery.

6.5 <u>Obtaining plant stock</u>. Plants of the selected species will be obtained from a nursery that has propagated them from plant material obtained in the local area or, alternatively, has propagated them from plant material obtained on site, under contract from the company. Depending on the weather conditions at the time, it may be possible to transplant some small plants and seedlings from the quarry expansion site, which is to be cleared.

6.6 <u>Weed control</u>. The most important weeds on the quarry site are listed below. The most important weeds are declared noxious within the City of Shellharbour under the *Noxious Weeds Act 1993*; the landowner has a legal responsibility to control these weeds. Other weeds, termed environmental weeds, may also become important within the restoration and revegetation areas.

Noxious Weeds	
African Box-thorn	Lycium ferocissimum
Shrub	Noxious (W2). Rare on the site.
Blackberry	Rubus fruticosus
Scrambling shrub	Noxious (W2). Scattered small patches.
Prickly Pear	Opuntia stricta
Succulent herb	Noxious (W4). Rare on the site.
Environmental Weeds	
Castor Oil Plant	Ricinus communis
Large herb	Mostly on disturbed ground; can form large colonies if
	not treated. Occasional on the site.
Crofton Weed	Ageratina adenophora
Large herb	Significant weed of moist places.
Lantana	Lantana camara
Scrambling shrub	Rampant invasive species, forms large thickets if
	left unchecked. Common on the site.
Large-leaved Privet	Ligustrum lucidum
Small tree	Occasional in treed areas.
Madeira Vine	Anredera cordifolia
Vine	Occasional to common amongst Lantana.
Mist Flower	Ageratina riparia

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Shrub	Common in moist areas.
Moth Vine	Araujia sericiflora
Vine	Common amongst Lantana.
Noogoora Burr	Xanthium occidentale
Large herb	Mainly on disturbed areas.
Small-leaved Privet	Ligustrum sinense
Shrub, small tree	Occasional in treed areas.

6.7 <u>Plantings - Restoration Zone</u>. The restoration management zone is delineated on the attached plan. The principal works required in this management zone are set out below.

<u>a. Weeds</u>

Remove the following weeds, if present:

African Box Thorn

Lantana

Prickly Pear

<u>b. Plantings</u>

Planting of the following species would be appropriate, although the purpose of this zone is to allow natural regeneration once weeds have been removed. Note that a full list is provided in Appendix 1.

Acmena smithii

Acronychia oblongifolia

Alphitonia excelsa

Brachychiton acerifolius

Dendrocnide excelsa

Elaeodendron australe

Ficus macrophylla

Ficus rubiginosa

Guioa semiglauca

Livistona australis

Melia azedarach

Pittosporum undulatum

Planchonella australis

Toona ciliata

Eucalypt Woodland

Eucalyptus bosistoana Eucalyptus quadrangulata Eucalyptus tereticornis Melaleuca styphelioides 6.8 <u>Plantings - Revegetation Zone</u>. The revegetation management zone is delineated on the attached plan. The principal works required in this management zone are set out below.

<u>a. Weeds</u>

Remove the following weeds as soon as possible, if present:

African Box Thorn

Lantana

Prickly Pear

<u>b.Plantings</u>

Planting of the following species would be appropriate, these have been selected as they are relatively hardy and will grow in open situations. Note that a full list is provided in Appendix 1. Planting of other species to be undertaken when some tree cover is established (see above).

Acacia binervata

Acmena smithii Alphitonia excelsa Commersonia fraseri Ficus macrophylla Ficus rubiginosa Glochidion ferdinandi Melia azedarach Myoporum acuminatum Pittosporum undulatum Rapanea variabilis Streblus brunonianus

6.9 <u>Watering</u>. The need for watering will depend upon local rainfall. The initial plantings will be planted with water-holding crystals and watered once at the time of planting. Follow-up watering will occur at least once per week, depending on rainfall. The need for watering will be reduced by the use of water-holding crystals and by mulching around each plant. Watering will cease or be curtailed when the plants are large enough to survive without; this will encourage deeper root growth and better plant health.

6.10 <u>Fertilising</u>. The use of strong fertilisers is generally avoided in native planting projects. However, a couple of tablets of a slow-release fertiliser in the hole at the time of planting can be beneficial.

6.11 <u>Protection from grazing animals</u>. Grazing stock will be excluded from the site by fencing. Grazing by rabbits and possibly swamp wallabies may have to be addressed; bagging individual plants should provide enough protection.

6.12 <u>Planting Methods</u>. The following planting methods will be used.

### Plant Spacing

Trees and shrubs will be planted at a spacing of no more than two (2) metre centres. Ground cover plants will be planted at a density of two plants per square metre.

## Plant Protection

The staking of individual plants will be avoided, as it requires much effort and may be detrimental to the plant, which should be left to grow naturally. Placing plastic bags or 'Grow Tubes' around each plant can improve the success rate. These plant guards are used to protect the plant from grazing animals, reduce weed competition, reduce wind and frost effects, and lower evaporation rates around the plant. Treating individual plants can be high maintenance, but the results are usually worth the effort.

## <u>Plant Size</u>

Tubestock or similar sized plants will be used for all plantings. Advanced plants are not usually successful in this type of project and should not be used.

## Planting Configuration

For aesthetic reasons, the plants should not be planted in rows, lines or grid patterns. The plantings should be at random, with an average density as set out above.

### Individual Planting Method

Each plant will be placed in a hole of suitable size. Two slow-release fertiliser tablets will be placed at the bottom of the hole, and a handful of water-holding crystals placed around the plant as the hole is filled in. A tree guard (e.g. plastic bag) will be placed around the planted trees and shrubs, although this may not be necessary for the ground cover plants. Each plant will be watered immediately after planting. The area around the plant will be mulched as soon as possible after planting, as each section is completed.

6.13 <u>Use of mulched debris</u>. All trees and shrubs cleared from the construction area to be mulched on site, the mulch to be utilised on site in landscaping or forest restoration works. Mulch containing weed propagation material (e.g. seeds) must be heap composted to ensure this material is rendered unviable.

6.14 <u>Vehicle Access</u>. Vehicles are not permitted within the restoration zones. All work is to be carried out by hand within this zone. Vehicle access to the revegetation zones is permitted, but only for management activities.

## 7.0 Maintenance

7.1 At all times the responsible officer is responsible for the success of the restoration and revegetation works. The officer will ensure that the plantings, weed removal and other necessary actions are undertaken in an environmentally sensitive, efficient and timely manner.

7.2 The following maintenance activities will be undertaken as regular intervals.

- check that the fencing is intact;
- carry out weed control;
- water plants as required;
- replace dead plants;
- remove rubbish (e.g. litter blown onto site);
- treat erosion should this occur; and
- address the impact of grazing animals, if required.

## 8.0 Environmental monitoring and reporting program

8.1 During the construction period, a qualified ecologist is to inspect the area and prepare a written report on the effectiveness of the environmental management actions, once every six months. The report to be included in the annual Environmental Management Report will cover matters such as compliance with this management plan and any adverse environmental impacts, any recommendations and any additional mitigation measures considered necessary. The responsible officer is responsible for the engagement of the ecologist.



Kevin Mills & Associates

## PART 3. SITE AND NATURAL RESOURCE INFORMATION

## 3 SITE DESCRIPTION

## 3.1 LOCATION AND CHARACTER OF THE SITE

The Albion Park Quarry land is known as Lot 1 DP 858245 at Albion Park in the City of Shellharbour. The land has a total area of 40 hectares and is about 400 metres from the southern and south-eastern boundaries of Cleary Bros' existing Albion Park quarry operations. The proposed quarry does not cover the whole of this land. A separate Vegetation Management Plan has been prepared for the quarry access road (Kevin Mills & Associates 2007).

The proposed area for the quarry is mostly cleared, although large areas of native vegetation, mainly rainforest, are still present on other parts of the properties. Most of the bushland occurs on the steep slopes and along gullies, while the gentler slopes and flat land have been almost totally cleared and are used for grazing purposes.

Farming and quarrying are the main land uses in the vicinity of the study area. There has been a long history of farming at Albion Park, dating from 1817 when the first land grants were made. There are several quarries in the area, and the hard rock quarry operated by Cleary Bros. (Bombo) Pty Limited has been operating for about 35 years.

The study area is located on a ridge system composed of the Permian Gerringong Volcanics, a unit of which, the Bombo Latite, is the objective of the proposed quarry. It receives an estimated rainfall of approximately 1,120 mm per year. The altitude of the study area ranges from about 70 metres to 130 metres.

## 3.2 EXISTING VEGETATION AND HABITATS

### Quarry Site

The vegetation on the quarry site is largely non-native (introduced) grassland, used for many years for the grazing of stock. The only significant vegetation on the site are small patches of rainforest plants. These are described in the Flora and Fauna Report in the EIS (Kevin Mills & Associates 2003). The following description is taken from that report: "1. Subtropical Rainforest (Closed Forest)

Structure: The height of the trees and shrubs varies from 5 to 35 metres, depending on location. Stands of relatively undisturbed closed forest, with continuous closed canopy and mature trees occur along the main creekline and gully to the south of the study area. Stands on hill-slopes generally consist of a few over-mature individuals, surrounded by regrowth native tree species and, often, an outer band of Lantana. Ground cover is absent to sparse, usually consisting of ferns or small soft-wooded perennials. Lianas are plentiful, especially near edges.

Occurrence: Continuous stands occur along two sections of the main creekline, extending from the adjoining quarry, through a gully described by QEM (1994) as the Cody property. Small patches occur on the eastern slopes of quarry site. Floristics: Mills and Jakeman (1995) describe Subtropical Rainforest Ficus -Planchonella - Baloghia - Streblus as occurring on "...the steep rocky slopes on the latite rock outcrops of the Gerringong Volcanics...". This vegetation type approximates Floyd's (1990) classification of Dry Rainforest Suballiance 23.

Common tree species include Black Plum *Diospyros australis*, Red-fruited Olive Plum *Cassine australis*, Sweet Pittosporum *Pittosporum undulatum*, Whalebone Tree *Streblus brunonianus*, Muttonwood *Rapanea variabilis* on hill slopes and Lilly Pilly *Acmena smithii*, Murrogun *Cryptocarya microneura*, Bolly gum *Litsea reticulata* and Brush Cherry *Syzgium australe* in gullies. Common emergent trees are figs *Ficus* spp. in remnant stands and Red Ash *Alphitonia excelsa* in regrowth stands.

Common weed species along edges and along drainage lines include Lantana Lantana camara, Blackberry Rubus fruticosus, Mist Flower Ageratina riparia, Moth Vine Araujia sericiflora and Madeira Vine Andredera cordifolia. Common native species of the edges include Native Hibiscus Hibiscus heterophyllus, Whalebone Tree Streblus brunonianus, Cockspur Thorn Maclura cochinchinensis, Tree Violet Hymenanthera dentata and Breynia Breynia oblongifolia.

Ferns occasionally occur in moist sites, including Climbing Fishbone Fern Arthropteris tenella, Giant Maidenhair Adiantum formosum, Necklace Fern Asplenium flabellifolium, Prickly Rasp Fern Doodia aspera and Rock Felt Fern Pyrrosia rupestris."

In addition to the removal of these rainforest patches, four large old fig trees would be removed. The small dams on the quarry site support some native wetland plants. The only other vegetation present are patches of Lantana *Lantana camara*.

## Vegetation Management Area

This is the area to the south of the quarry site containing the rainforest in the gully and the buffer area between it and the proposed quarry. The vegetation consists of intact rainforest, a dense Lantana fringe and the exotic grassland in

the buffer area. The rainforest is similar to that described above for the quarry site, although more diverse and in better condition. The stands of Lantana contain many rainforest species. In the east, near the side gully, there is a small stand of eucalypt woodland. A full description of this vegetation is provided in the Environmental Impact Statement.

## 3.3 CONSERVATION VALUES

### 3.3.1 Threatened and Regionally Significant Plants

Several plant species of conservation importance were found in the study area and nearby during this and previous studies in the area. These species are listed in Table 1.

Table 1							
Plant Species of Conservation Importance Endangered or Vulnerable Plant Species							
<i>Daphnandra</i> sp. 'C' (Illawarra)	Illawarra Socketwood	Tree					
Zieria granulata	Illawarra Zieria	Shrub					
Regionally Significant Plant Specie	S						
Actephila lindleyi	Actephila	Shrub/small tree					
Alchornea ilicifolia	Native Holly	Shrub					
Austromyrtus acmenoides	Scrub Ironwood	Small tree					
Canthium coprosmoides	Coast Canthium	Small tree					
Cinnamomum oliveri	Oliver's Sassafras	Tree					
Deeringia amaranthoides	Deeringia	Shrub					
Dodonaea viscosa subsp. augustifoli	a Hopbush	Shrub					
Geijera latifolia	Brush Wilga	Tree					
Omalanthus stillingifolius	Small Bleeding Heart	Shrub					

### Endangered or Vulnerable Plant Species

Three plant species that occur in the study area are classified by the Briggs and Leigh (1996) as having national conservation significance; all three are threatened species in New South Wales (*Threatened Species Conservation Act 1995*). These species are all endangered: *Cynanchum elegans*, *Daphnandra* sp 'C' (Illawarra) and *Zieria granulata*,.

## Cynanchum elegans

Status: This species is listed as endangered. The species has a relatively small geographic range and occurs only in small populations that are mainly restricted to highly specific and localised habitats. Protected areas where this species occurs include Goulburn River National Park (Matthes & Nash 1993), Woko National Park

and Camels Hump Nature Reserve (Briggs & Leigh 1996). Harden (1992) states that the species is rare, recorded from rainforest gullies, scrub and scree slopes from the Gloucester district to the Wollongong area and inland to Mt Dangar. Recent local recordings of this species include creeklines in Farmborough Heights and in the Keira Green Corridor. Individuals have also been recorded in small remnant stands at Cobbitty and Fairfield (NPWS 1997). In all cases only one individual or a very small population has been recorded.

A recovery plan for this species includes the following observations (Matthes & Nash 1993):

"None of the populations recorded in the Illawarra are protected and all are under some degree of immediate threat. If these threats are successful then *C. elegans* may become extinct in the Illawarra within ten years. At this stage, until we understand more about the population dynamics of *C. elegans* every individual must be considered important for the long term survival of the species.

Populations in the Study Area: Fourteen specimens of *Cynanchum elegans* were recorded by QEM (1994) on the Rinker land in the area adjoining the present study area. Of these individuals recorded, two occur within the study area of this report. Three specimens were recorded on the "Cody gallery rainforest". No further disturbance has taken place in this area, so these plants are expected to still be present.

## *Daphnandra* sp. 'C' (Illawarra)

Illawarra Socketwood is the only tree species that is endemic to the Illawarra rainforests (Fuller & Mills 1985), and is listed as endangered. This species is a small tree and is described by Harden (1990) as a very rare small tree, confined to the Illawarra area. Small populations or individuals have been recorded between Scarborough and Berry, generally in closed forest. Distribution appears to be restricted to sites below 200 metres above sea level. Most recorded populations of this species appear to be ramets (clones) from a single individual and in most cases sexual reproduction does not appear to be taking place.

Harden (1990) describes the globose shape of the fruiting receptacle as a distinguishing feature. It is possible that this globose fruiting body is a false fruit, as the globose fruiting bodies do not appear to contain seeds.

Mills and Jakeman (1995) have proposed that this species have a conservation rating of 2VCi, and observe that the only known conservation area in which the species occurs is in Budderoo National Park, in the gorge at Minnamurra Falls. This species occurs in the gorge to the south of the quarry development area, well within the rainforest remnant.

## Zieria granulata

Status: This species is endangered. The code indicates that the species has a geographic range of less than 100 kilometres, is not presently endangered but is at risk from disappearing from the wild over the next 20-50 years and is reserved, but not adequately, in Budderoo National Park and in Killalea State Recreation Area. This species is listed as vulnerable in a national context in Part 2 Schedule 1 of the TSC Act (1995). Mills and Jakeman (1993) describe the distribution of *Zieria granulata* as extending from Broughton Village to Albion Park. The Dunmore area accounts for an estimated 80% of the total known population and the stands occurring in the study area occur near the northern limit of distribution for this species. A small stand occurring on fill material at Kanahooka is not considered to be naturally occurring (Mills & Jakeman 1993).

Populations in the Study Area: The largest populations of this species were recorded along the western and eastern edges of the shrubland on Belmont Ridge. Small populations or scattered individuals were also recorded within the shrubland, and along the closed forest edge to the south and downslope of the farm buildings on Belmont Ridge. Three large individuals were recorded on the northern edge of the "Cody gallery rainforest" (QEM 1994). Seedlings were recorded in the population occurring near a farm dam on the western edge of the shrubland stand. No seedlings were recorded within the shrubland stand. No seedlings were recorded within the shrubland stand. The larger populations contain from 30 to 200 individuals. The total number of individuals occurring in and along the shrubland stand would exceed 1000.

## Regionally Significant Plant Species

Nine plant species listed as regionally rare by Mills (1988) and Mills and Jakeman (1995) were recorded in the study area during this and previous studies; see Table 1. The status and location of the species of regional conservation significance are discussed below.

Three of these species have been classified "Category 1" by Mills (1988): Actephila lindleyi, Austromyrtus acmenoides and Deeringia amaranthoides. By the use of the term, "Category 1", Mills (1988) refers to species that are very rare in the Illawarra (<10 known occurrences) and in need of particular conservation and consideration in conservation planning and environmental impact assessment.

Actephila lindleyi is considered to be very rare in southern New South Wales, and usually occurs as a single specimen in subtropical rainforest (Mills 1988). This species was recorded by QEM (1994) in the "Cody gallery rainforest". It is not found in the area of the proposed quarry.

A small population of *Austromyrtus acmenoides* was recorded in the closed forest below the adjoining quarry, and an additional specimen was recorded near the northern extent of the "Cody gallery rainforest". This species occurs no further south than Jamberoo (Mills 1988, 1989) and is rare in the Illawarra. Harden (1991) describes the distribution of this species as ... common north of the Hunter Valley, and ... as far south as the Illawarra region". This species was not found in the area of the proposed quarry.

*Deeringia amaranthoides* occurs in subtropical rainforest and is listed as being conserved in Royal National Park, Morton National Park and Devils Glen Nature Reserve. Mills (1988) considers that this species is rare in the region "... and possibly also in the State". This species was recorded near the creekline in the closed forest following the major creekline below the adjoining quarry. This species was not found in the area of the proposed quarry.

Four species recorded during the survey have been classified as "Category 2" by Mills (1988). "Category 2" refers to species that are rare in the region but generally better conserved and/or abundant than Category 1 species.

Alchornea ilicifolia occurs on the margins of rainforest remnants, particularly on volcanic hills between Berkeley and Kiama. The only conservation area where this species is recorded is Killalea State Park (Mills 1988). Specimens of Alchornea ilicifolia occur along the edges of the shrubland on Belmont Ridge, as well as along the edges of sections of closed forest, including the vegetation immediately downslope of the adjoining quarry and remnant patches on Belmont Ridge and Kyawana Ridge. A few specimens of Alchornea ilicifolia occur within the proposed quarry area.

*Canthium coprosmoides* occurs throughout the Illawarra in subtropical rainforest but "... is nowhere a common tree ..." (Fuller & Mills 1985). Individuals of this species were recorded in the closed forest in the main creekline and in the gully at the south-eastern end of the study area. This species was not found in the area of the proposed quarry.

*Cinnamomum oliveri* occurs at its southern limit in the Jamberoo area (Fuller & Mills 1985) and prefers high rainfall areas, particularly on the escarpment. This species was recorded at several sites in the closed forest along the main creekline, as well as in the closed forest band on Belmont Ridge. This species was not found in the area of the proposed quarry.

*Geijera latifolia* is an occasional occurrence in several small remnant rainforest patches, as well as along rainforest stands occurring on south-facing hill-slopes. This species is conserved in Macquarie Pass National Park and Mount Brown
Reserve. Local occurrences are generally restricted to "... drier areas of rainforest, nearly always on volcanic soils" (Mills 1988). A few specimens of *Geijera latifolia* were found in the proposed quarry area.

*Dodonaea viscosa* subsp. *augustifolia* is a shrub species found in dry ridgetop communities, usually with *Melaleuca armillaris*, in the Dunmore-Jamberoo area, but is otherwise not found in the region. This species occurs in the eastern part of the property, on dry ridges. This species was not found in the area of the proposed quarry.

*Omalanthus stillingifolius* is a shrub species recorded by QEM (1994) on the margins of the Eastern Ridge (adjoining quarry). This species occurs on rocky sites mainly in coastal areas, but is uncommon in the Illawarra region. No individuals of this species were found in the quarry area.

# 3.3.2 Threatened Animals

The *Threatened Species Conservation Act 1995* conserves threatened species, populations and ecological communities of animals and plants in New South Wales. Threatened fauna are listed on the schedules attached to the Act and are classified either as "endangered" (Schedule 1 species), "vulnerable" (Schedule 2 species) or "presumed extinct" (Schedule 1, Part 4).

No threatened fauna species were recorded in the study area but several are known to occur in the locality. Threatened fauna species recorded within a five kilometre radius of the study area are listed in Table 2. The table and subsequent discussion do not include threatened fauna species for which there is no suitable habitat in or adjacent to the study area. The study area is within the general distributional range of many species of threatened fauna; the species discussed are the most likely species to be in the area.

Table 2						
Threatened Fauna in the Dunmore-Albion Park District						
Schedule 1 - Endangered Species						
Litoria aurea	Green and Golden Bell Frog					
Schedule 2 - Vulnerable Species						
Botaurus poiciloptilus	Australasian Bittern					
Ninox strenua	Powerful Owl					
Pteropus poliocephalus	Grey-headed Flying-fox					
Ptilinopus regina	Rose-crowned Fruit-Dove					
Dasyurus maculatus	Spotted-tailed Quoll					

# Green and Golden Bell Frog

The closest known occurrence of the Green and Golden Bell Frog is Killalea Lagoon, about five kilometres to the east. The only wetlands in and near the study area are farm dams, and most of them do not contain habitat suitable for this frog. The only dam in the study area with suitable habitat is Dam No. 8, because of the presence of Cumbungi *Typha orientalis*. All records of the Green and Golden Bell Frog in the Illawarra have been on the coastal lowlands, rather than hilly country, so it is unlikely that the Green and Golden Bell Frog would occur in the study area.

# Australasian Bittern

The Australasian Bittern has been recorded in the Minnamurra River system, at Dunmore and Jamberoo, at Killalea Lagoon and at Albion Park. There are large areas of suitable habitat at all of these locations, unlike the study area where there is only a small area of Cumbungi *Typha orientalis* on Dam No. 8. If the Australasian Bittern occurs in the study area, visits would be rare and fleeting because so little suitable habitat is present.

# Powerful Owl

The Powerful Owl was regularly recorded in rainforest at Bass Point, eight kilometres east of the study area, between 1984 and 1991. The owl has also been recorded at various locations along the Illawarra escarpment. The Powerful Owl may roost in the rainforest in the study area and may forage there if arboreal mammals are present. It is unlikely that the owl would use the small patches of regrowth in the paddocks.

# Rose-crowned Fruit-Dove

The Rose-crowned Fruit-Dove inhabits rainforest and was observed regularly at Bass Point between 1984 and 1989. Immatures seen in 1985 and 1989 may indicate local breeding. The species was last seen in the district in 1995 at Mount Keira. The Rose-crowned Fruit-Dove may occur in the rainforests in the study area.

# Spotted-tailed Quoll

There are many old records of the Spotted-tailed Quoll in the district (Robinson 1988), but few recent records from the Shellharbour area. Most recent records are from the forests along the escarpment south of Barren Grounds.

# Grey-headed Flying-fox

The Grey-headed Flying-fox has recently been added to the list of threatened species in New South Wales. This species is relatively common in the Illawarra region during summer, when it makes nightly visits to gardens, orchards and isolated fruit trees to feed on fruiting trees. There is a known daytime roosting camp site at Flying Fox Gully, north of Jamberoo, about four kilometres to the south of the present study area.

# Microchiropteran Bats

Several threatened bat species have been recorded in the district, including the Greater Broad-nosed Bat *Scoteanax rueppellii* (Tallawarra 1997), Large-footed Myotis *Myotis adversus* (Tallawarra 1997), Common Bentwing-Bat *Miniopterus schreibersii* (Kiama 1966) and Yellow-bellied Sheathtail Bat *Saccolaimus flaviventris*. Apparently no bat surveys have been undertaken in the vicinity of the study area. Bats would certainly occur in the general area, because of the presence of ample foraging habitat, large trees with hollows for roosting and other resources for bats; these are mainly in the valley to the south of the quarry site.

# 3.3.3 Endangered Ecological Communities

Three ecological communities in the area are listed as endangered under the *Threatened Species Conservation Act 1995*; these are discussed below. The proposed quarry will not affect the tall paperbark Shrubland; this community occurs on the far eastern par of the property, well away from the quarry extension area.

# Subtropical Rainforest

If the stands of rainforest are typical of the classifications described by Floyd (1990) and Mills and Jakeman (1995), their conservation status may be discussed in the national and regional context: Dry Rainforest Suballiance 23 is considered to be inadequately conserved in the national context and is "...not reserved in the south" (Floyd 1990). Mills and Jakeman (1995) observed that 55% of the land on which rainforest occurs in the Illawarra is privately owned, and that in the case of subtropical rainforest only 9.4% of the total remaining area occurs in a reserved area, i.e. Killalea State Recreation Area. "The greatest threat to the district's rainforest is the gradual loss and degradation, through a myriad of unsympathetic land uses associated with the rural and semi-urban environment in which the rainforest occurs" (Mills & Jakeman 1995).

# Illawarra Lowlands Grassy Woodland

This community has been listed as an endangered ecological community under the *Threatened Species Conservation Act 1995*; see Appendix 2. The stand of eucalypts in the study area was surveyed to determine its structural and floristic characteristics and to determine if it met the criteria of the Illawarra Lowlands Grassy Woodland community, as documented in the Final Determination.

This stand of eucalypts is dominated by Forest Red Gum *Eucalyptus tereticornis* and Coast White Box *Eucalyptus quadrangulata*. The understorey is a mixture of rainforest species, typical native grassland species and weeds. This type of forest was termed Moist Red Gum Forest by Kevin Mills & Associates (1997), and is at the

"moist end" of the complex of communities known as Illawarra Lowlands Grassy Woodland. The rainforest species present include Cockspur Thorn *Maclura cochinchinensis*, Native Olive Notelaea longifolia, Black Plum Diospyros australis, Whalebone Tree Streblus brunonianus, Guioa Guioa semiglauca, Native Quince and Alectryon subcinereus. The native grassland species present include Bergalia Tussock Carex longebrachiata, Kidney-weed Dichondra repens, Crane's-bill Geranium sp., Twining Glycine Glycine clandestina, Australian Basket-grass Oplismenus aemulus and Love-grass Eragrostis sp. The weed species are Kikuyu Grass Pennisetum clandestinum, Olive Olea europaea, Lantana Lantana camara, Spear Thistle Cirsium vulgare, Ribbed Plantain Plantago lanceolata, Fleabane Conyza sp. and Fireweed Senecio madagascariensis.

# Tall Paperbark Shrubland

The shrubland at the eastern end of the property but outside the area of the proposed quarry, may appear unattractive and apparently dominated by Black Wattle, but within the stands are remnant patches of *Melaleuca* shrubland, a characteristic vegetation type on exposed ridgetop sites where soils are thin and rock outcrops are common (Fuller & Mills 1985). This community is a significant visual feature of the Dunmore-Jamberoo area and provides habitat for several large populations of the nationally endangered plant species *Zieria granulata*.

# PART 4. MANAGEMENT

# 4 MANAGEMENT OBJECTIVES

The following key management objectives have been identified:

(i) Ensure that the development of the quarry, haul road and associated works do not impact upon the existing stands of native vegetation outside the quarry area.

(ii) Successfully rehabilitate and expand the existing areas of Illawarra Subtropical Rainforest and Illawarra Lowlands Grassy Woodland on the identified land adjoining the quarry.

(iii) Successfully control problem weeds in the area, particularly noxious weeds and weeds that are impacting significantly upon the native vegetation and rehabilitation efforts.

(iv) Implement other measures to ensure the success of the restoration and revegetation of the identified land.

# 5 MANAGEMENT ISSUES

### 5.1 Management Zones

Within the identified land two types of zones are recognised. These are restoration zones and a revegetation zones. The restoration zones cover stands of existing vegetation. The primary management task in this zone is the removal of weeds and the encouragement of native plant regeneration that is already occurring. The revegetation zone is currently cleared and grassed, mainly with exotic species, and contains little native regeneration. In this zone, the primary task is to replant appropriate local native species and control weed growth. The management zones can be summarised in the following way.

#### Restoration Zone - Rainforest

This zone includes the existing rainforest vegetation that with weeding and minor planting will regenerate naturally over time. The aim in this zone is to enhance the natural process of rainforest regeneration.

#### Restoration Zone - Woodland

This zone includes the existing woodland vegetation that with weeding and minor planting will regenerate naturally over time. The aim in this zone is to enhance the natural process of woodland regeneration.

# Revegetation Zone - Rainforest

This zone incorporates the cleared and treeless areas that originally would have supported rainforest and where there is almost no native vegetation or natural regeneration. The aim in this zone is to revegetate the area with native rainforest species.

#### Revegetation Zone - Woodland

This zone incorporates the cleared and treeless areas that originally would have supported woodland and where there is almost no native vegetation or natural regeneration. The aim in this zone is to revegetate the area with native woodland species.

#### Access Road Route

The report by Kevin Mills & Associates (2007) should be read in conjunction with this report in terms of the access road.

# 5.2 Protection of Existing Vegetation and Habitats

# Pre-Clearing Surveys

The vegetation to be cleared is described in detail in the Flora and Fauna Report and this is reproduced above. It is proposed to carry out pre-clearing vegetation surveys just prior to the clearing of any rainforest vegetation. The purpose of these additional surveys is to:

- identify any plant material (seeds, rootstock, cuttings) that would be useful to gather for use in propagating plants for the revegetation program elsewhere on the quarry site;
- identify any material on the site (logs, natural mulch, rocks, soil) that could be used for revegetating the buffer areas south of the quarry site;
- identify any important plants that may have colonised the site since the 2003 surveys (note that the final stage of the quarry is about 26 years in the future); and
- describe the fauna observed and any special habitat features, such as tree hollows.

Prior to the clearing of rainforest vegetation, an ecologist will inspect the vegetation and prepare a report dealing with, as a minimum, the above matters for inclusion in the annual EMR.

# <u>Fencing</u>

The primary measure to ensure that the existing vegetation is maintained is the erection of fencing along the designated boundary of the identified area. The fence will be constructed prior to any quarry development work being commenced in the vicinity of the boundary to be fenced.

# 5.3 Treatment of Restoration Areas

As noted above, the aim of management within this zone is to enhance the natural processes of rainforest regeneration. This will largely be achieved through weed removal. Natural regeneration is likely to be prolific in these areas with the removal of stock and the main weeds in the area. There may be some minor planting of native species as decided after weed removal has been undertaken.

# 5.4 Planting Revegetation Areas

# Collecting Propagation Material

The availability of plant propagation material will be identified during the preclearing surveys discussed above. Propagation material includes:

- seeds, these can be collected and stored for later use;
- cuttings, many species can be propagated this way;

- rootstock, some species can be readily transplanted by using their rootstock;
- whole plants, useful in some circumstances, such as seedlings of rare species and wetland plants.

The propagation material collected during the pre-clearing inspections will be provided to a specialist nursery for propagating the plants required for the planting programs. If constructed ponds require vegetating, appropriate wetland plants on existing dams will be identified by the ecologist for transplanting.

# Reuse of Cleared Material

Material removed from some areas, particularly from within the small rainforest patches, may be useful in the revegetation areas, to assist in revegetation or for creating habitat. This material will be identified during the pre-clearing surveys, and may include top soil, logs, surface rocks and mulch.

# Treatment of Topsoil

The "topsoil" is a valuable resource for revegetation and restoration of habitats. The soil below native vegetation often contains propagules (seeds, rootstock) useful for revegetation areas.

"Topsoil" stripped from each stage and identified for use in revegetation or on bund walls will be used as soon as possible. Preferably, it would be taken and spread immediately after stripping to the end use area, rather than being stored in a stockpile for a long period of time.

# Plant Selection

Plant species to be used in the revegetation areas must be locally occurring species and obtained from local stock. These species can be selected from the list of species that occur in the area, provided at Appendix 1.

A full range of species will be used, from trees to ground covers. Maximum use will be made of the existing plants growing in the revegetation area. When weeds are removed, for example, care will be taken to ensure that active species growing amongst the weeds will be kept. This strategy will greatly accelerate the regeneration of the forest in the area and reduce the need for planting in some areas.

# Planting Techniques

Tubestock is to be used for all plantings. Plantings of trees and shrubs will be at an average of two (2) metre centres. Plantings to be in a random pattern and planting in straight lines to be avoided. Once planted the plants should be watered. Plastic tree guards should be placed around all tubestock planting and supported by three hardwood stakes. Follow-up watering once a week may be required, depending upon

local weather conditions. A circle around each planting to be sprayed with an approved herbicide to suppress weeds.

# 5.5 Weed Control

The most important weeds on the quarry site are listed below, in Table 3. Note that there are many exotic (introduced) plants on the plant species list for the site, but most are not regarded as being significant weeds. The most important weeds are declared noxious within the City of Shellharbour under the *Noxious Weeds Act 1993*. Other weeds, termed environmental weeds, may also become important within the restoration and revegetation areas.

Table 3		
List of Important Weed Spe	cies in the Quarry	/ Area
Species	Habit	Status/Notes
<u>Noxious Weeds</u> African Box-thorn <i>Lycium ferocissimum</i>	Shrub	Noxious (W2). Rare on the site.
Blackberry <i>Rubus fruticosus</i>	Scrambling shrub	Noxious (W2). Scattered small patches.
Prickly Pear <i>Opuntia stricta</i>	Succulent herb	Noxious (W4). Rare on the site.
<u>Environmental Weeds</u> Castor Oil Plant <i>Ricinus communis</i>	Large herb	Mostly on disturbed ground; can form large colonies if not treated. Occasional on the site.
Crofton Weed <i>Ageratina adenophora</i>	Large herb	Significant weed of moist places.
Lantana <i>Lantana camara</i>	Scrambling shrub	Rampant invasive species, forms large thickets if left unchecked. Common on the site.
Large-leaved Privet <i>Ligustrum lucidum</i>	Small tree	Occasional in treed areas.
Madeira Vine Anredera cordifolia	Vine	Occasional to common amongst Lantana.
Mist Flower <i>Ageratina riparia</i>	Shrub	Common in moist areas.

Moth Vine <i>Araujia sericiflora</i>	Vine	Common amongst Lantana.
Noogoora Burr <i>Xanthium occidentale</i>	Large herb	Mainly on disturbed areas.
Small-leaved Privet <i>Ligustrum sinense</i>	Shrub, small tree	Occasional in treed areas.

The company will appoint a staff member to be responsible for monitoring the presence and abundance of weeds on the site. The responsible person will undertake an inspection of the subject land prior to clearing and develop a weed control strategy for implementation during the clearing operations. This will be aimed at destroying weeds and ensuring that they are not spread while transporting soil.

# 5.6 Maintenance

Maintenance of the restoration areas and planted vegetation will be guided by weekly site inspections undertaken by the responsible staff member. The proposed six-monthly monitoring inspections by the ecologist will also provide information for the successful maintenance of these areas.

Day to day maintenance will involve checking the following:

- condition of the plantings;
- condition of the planting bag and stakes;
- the need for weed control;
- the impact of feral animals;
- the need for follow up planting or watering;
- the condition of fences;
- general condition of the restoration and planting areas.

# 5.7 Pest Animal Species

Feral animals that may require control measures are Rabbits and Hares. These species are likely to be present and their impact on native plant regeneration will need to be monitored to determine if control measures are required.

# 5.8 Release of Water from the Dam

The release of water from the quarry dam should be variable; that is, rather than a continuous flow, water release should mirror the local rainfall events as far as possible.

# 6 **REFERENCES**

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# APPENDIX 1 LIST OF PLANT SPECIES FOR THE ALBION PARK QUARRY SITE

#### Key to Plant List

- 1. Recorded by QEM (1994). Additional species recorded by Kevin Mils & Associates.
- 2. closed forest
- 3. open forest
- 4. grassland
- 5. shrubland/regrowth
- 6. sedgeland/rushland (dams)
- \* Introduced plants.

- c common
- o occasional
- u uncommon
- # plant species of conservation importance.

FAMILY	GENUS SPECIES	*	1	2	3	4	5	6
FILICOPSIDA								
Adiantaceae	Adiantum aethiopicum		x	u				
	Adiantum formosum		x	u				
	Adiantum hispidulum		x	u	u			
	Cheilanthes distans		x					
	Cheilanthes sieberi		×		u	u	u	
Aspidiaceae	Asplenium australasicum		×	u				
	Asplenium flabellifolium		×	0	u			
	Lastreopsis acuminata		×	u				
	Lastreopsis microsora		x	u				
Azollaceae	Azolla filiculoides						ο	
Blechnaceae	Blechnum cartilagineum		x	u				
	Doodia aspera		x		u		u	
Davalliaceae	Arthropteris tenella		x	0				
Dennstaedtiaceae	Histiopteris incisa			0				
	Hypolepis muelleri			u				
	Hypolepis glandulifera			u				
	Pteridium esculentum			0				
Dicksoniaceae	Calochlaena dubia		x			u		
Polypodiaceae	Microsorium scandens		x		u			
	Platycerium bifurcatum		x	u	u			
	subsp. <i>bifurcatum</i>							
	Pyrrosia rupestris		x	0	u			
Sinopteridaceae	Pellaea falcata var. falcata		x	0	u		u	
CONIFEROPSIDA								
Podocarpaceae	Podocarpus elatus		x	u				
MAGNOLIOPSIDA -								
DICOTYLEDONS								
Acanthaceae	Brunoniella australis				0		u	
	Pseuderanthemum variabile		×	u	u			
Amaranthaceae	Alternanthera denticulata		x		u			u

	Amaranthus retroflexus	*	×			u		
	Deeringia amaranthoides	#	×	u				
	Nyssanthes erecta		x			u		
Amygdalaceae	Prunus persica	*					u	
Anacardiaceae	Euroschinus falcata		x	u				
Apiaceae	Centella asiatica				0		0	
	Hydrocotyle peduncularis		x					
	Hydrocotyle tripartita				u			
	Platysace ericoides		x					
Apocynaceae	Parsonsia straminea		x	с	0			
Araliaceae	Polyscias elegans		x	0				
Asclepiadaceae	Araujia sericiflora	*		0	0		0	
	Cynanchum elegans	#	×	u			u	
	Gomphocarpus fruticosus	*	×			u		
	Marsdenia flavescens		x	с				
	Marsdenia rostrata		x	0				
	Melodinus australis		x	u				
	Tylophora barbata		×		0		u	
Asteraceae	Ageratina adenophora	*	×	0				0
	Ageratina riparia	*	×	0	0			
	Bidens pilosa	*	x			0		
	Brachycome angustifolia var		x					
	angustifolia							
	Cassinia trinervia		×		u		u	
	Cirsium vulgare	*	×			0		
	Conyza albida	*	×		0	0	0	
	Conyza bonariensis	*	x				0	
	Delairea odorata	*	x	u			u	
	Euchiton sphaericum					u		
	Hypochaeris radicata	*	x			0		
	Ozothamnus diosmifolius		x		0		0	
	Senecio linearifolius			u	u			
	Senecio madagascariensis	*	×			с	0	
	Sonchus oleraceus	*	x			0		
	Tagetes minuta	*	x					0
	Xanthium occidentale	*	x			u		
Basellaceae	Anredera cordifolia	*	x	u			u	
Bignoniaceae	Pandorea pandorana		x	с	0		u	
	Tecomaria capensis	*						
Brassicaceae	Rorippa nasturtium-	*	x					u
	aqauticum							
Cactaceae	Opuntia stricta	*	×			0		
Campanulaceae	Wahlenbergia gracilis		×		0	0	u	
Caprifoliaceae	Lonicera japonica	*					u	

	Sambucus australasius		×	u			u	
Caryophyllaceae	Stellaria flaccida		x	0	u			
Celastraceae	Elaeodendron australe		х	с			u	
	Celastrus australis		x	u				
Chenopodiaceae	Einadia hastata		x			u		
·	Einadia nutans		x			u		
Clusiaceae	Hypericum gramineum					0		
Convolvulaceae	Convolvulus erubescens		x		u			
	Dichondra repens		x		u	0	u	
	Ipomoea indica	*					u	
Crassulaceae	Bryophyllum delagoense	*	x			0	0	
	Cotyledon orbiculata	*	x				u	
	Crassula sieberiana		x		0	u	0	
Cucurbitaceae	Sicyos australis		x	u				
Cunoniaceae	Aphanopetalum resinosum		x	u				
Dilleniaceae	Hibbertia dentata				u			
	Hibbertia scandens		x		u			
Ebenaceae	Diospyros australis		x	u				
	Diospyros pentamera		x	0				
Ehretiaceae	Ehretia acuminata		x	0			u	
Elaeocarpaceae	Elaeocarpus kirtonii		x	u				
	Sloanea australis		x	u				
Epacridaceae	Leucopogon juniperinus		x		u			
	Lissanthe strigosa						0	
Euphorbiaceae	Actephila lindleyi	#	x	u				
	Alchornea ilicifolia	#	x	0			0	
	Baloghia inophylla		x	0				
	Breynia oblongifolia		×	J	0		0	
	Claoxylon australe		×	J				
	Croton verreauxii		×	0			u	
	Glochidion ferdinandi		×	0				
	Omalanthus populifolius		×	U	0		u	
	Omalanthus stillingifolius	#	x					
	Phyllanthus gasstroemii		x		u			
	Ricinus communis	*	×			u		
Eupomatiaceae	Eupomatia laurina		x	u				
Fabaceae: Faboideae	Desmodium varians					u		
	Erythrina x sykesii	*				u		
	Glycine clandestina		x		0	0		
	Glycine tabacina					u		
	Hardenbergia violacea					u		
	Indigofera australis		x		u		u	
	Kennedia rubicunda		x			u	u	
	Trifolium repens	*				с		

	Trifolium subterranean	*	×			с		
Fabaceae: Mimosoideae	Acacia binervata				0		0	
	Acacia implexa		x		0		u	
	Acacia maidenii		x		u			
	Acacia mearnsii		×		0		с	
	Acacia melanoxylon				u			
	Pararchidendron pruinosum		x	J				
Flacourtiaceae	Scolopia braunii		x	u				
Gentianaceae	Centaurium erythraea	*	x			0		
Geraniaceae	Geranium homeanum		x					
	Geranium solanderi				u			
Goodeniaceae	Scaevola albida		x					
Icacinaceae	Citronella moorei		x	u				
	Pennantia cunninghamii		x	u				
Lamiaceae	Ajuga australis			u				
	Plectranthus graveolens(?)		x					
	Plectranthus parviflorus		x	0	0		0	
	Prostanthera linearis		x				u	
Lauraceae	Cinnamomum oliveri	#	x	u				
	Cryptocarya glaucescens		x	u				
	Cryptocarya microneura		×	C			0	
	Litsea reticulata		×	0				
Lobeliaceae	Pratia purpurascens				0			
Loranthaceae	Amyema congener		x	J			u	
Malaceae	Pyracantha fortuneana	*					u	
Malvaceae	Abutilon oxycarpum				u			
	Hibiscus heterophyllus		x	с	u		0	
	Modiola caroliniana	*	x			0		
	Sida rhombifolia	*	x			0		
Meliaceae	Melia azedarach		x	0			u	
	Synoum glandulosum		x	u				
	Toona ciliata		×	u			u	
Menispermaceae	Legnephora moorei		x	u			u	
	Sarcopetalum harveyanum		x	0			u	
	<i>Stephania japonica</i> var.		x	u			u	
	discolor							
Monimiaceae	<i>Daphnandra</i> sp. aff.	#	×	u				
	micrantha (species 'C')							
	Doryphora sassafras		×	u				
	Wilkiea huegeliana		x	u				
Moraceae	Ficus coronata		×	0			u	
	Ficus macrophylla		×	0		0		
	Ficus obliqua		×	u				
	Ficus rubignosa		x	u				

	Ficus superba var. henneana		×	u		0		
	Maclura cochinchinensis		×	с			0	
	Malaisia scandens		x	0			u	
	Strebulus brunonianus		x	с	0		0	
Myrsinaceae	Rapanea howittiana		×	u				
	Rapanea variabilis		×	u				
Myrtaceae	Acmena smithii		x	с			u	
	Angophora floribunda		x		u			
	Austromyrtus acmenoides	#	×	u				
	Eucalyptus amplifolia		×					
	Eucalyptus bosistoana		×		0			
	Eucalyptus quadrangulata		×		0			
	Eucalyptus tereticornis		×		с			
	Melaleuca armillaris		×		u		с	
	Melaleuca styphelioides		×		u			
	Syzygium australe		x	0				
Oleaceae	Ligustrum lucidum	*					u	
	Ligustrum sinense	*	x			u	u	
	Notolaea longifolia		x		u			
	Notolaea venosa		x	0			u	
	<i>Olea europaea</i> subsp.	*	x			u	u	
	africana							
Onagraceae	Ludwigia peploides subsp.	*	×					u
	montevidensis							
Passifloraceae	Passiflora herbertiana		×	u	u		u	
Phytolaccaceae	Phytolacca octandra	*	×			u		
Piperaceae	Piper novae-hollandiae		x	u				
Pittosporaceae	Billardiera scandens				u			
	Bursaria spinosa		×				0	
	Citriobatus pauciflorus		×	с			0	
	Pittosporum revolutum		×	0			u	
	Pittosporum undulatum		×	0	0		0	
Plantaginaceae	Plantago lanceolata	*	×			0		
	Plantago major	*	x					0
Polygonaceae	Acetosella vulgaris	*	×				u	
	Muehlenbergia gracillima		x	u				
	Persicaria decipens		×					u
	Persicaria hydropiper		x					u
	Rumex crispus	*	×					u
Portulacaceae	Portulaca octandra	*				0		
Proteaceae	Stenocarpus salignus		×	u	u			
Ranunculaceae	Clematis aristata				u			
	Clematis glycinoides		×	u			u	
Rhamnaceae	Alphitonia excelsa		×	с	0		0	

	Emmenosperma alphitonoides		×	u				
	Pomaderris aspera		×				u	
Rosaceae	<i>Rubus fruticosus</i> sp.	*	×			0	u	
	aggregate							
	Rubus hillii		x		u			
	Rubus parviflorus		x		0			
	Rubus rosifolius			J				
Rubiaceae	Canthium coprosmoides		x	J				
	Coprosma quadrifida (?)		x					
	Morinda jasminoides		x	u				
	Psychotria loniceroides		×	J				
Rutaceae	Acronychia oblongifolia		x	f				
	Citrus limonia	*	x			u		
	Geijera latifolia		x	0			u	
	Melicope micrococca		x	0			u	
	Sarcomelicope simplicifolia		×	u				
	Zieria granulata	#	x				0	
Santalaceae	Exocarpos cupressiformis		×		u		u	
Sapindaceae	Alectryon subcinerus		x	0			u	
	Cardiospermum grandiflorum	*	×	0	0		0	
	Diploglottis australis		×	0				
	Dodonaea viscosa subsp.	#	×				0	
	angustifolia							
	Guioa semiglauca		x	0			u	
Sapotaceae	Pouteria australe		×	0			u	
Scrophulariaceae	Verbascum thapsus	*	×			0		
	Veronica plebeia				u			
Solanaceae	Duboisia myoporoides			u				
	Lycium ferocissimum	*					0	
	Solanum aviculare				u			
	Solanum brownii(?)		x					
	Solanum mauritianum	*	x		u		u	
	Solanum nigrum	*	x			u		
	Solanum pseudocapsicum	*	x			u		
	Solanum stelligerum		x			u		
Sterculiaceae	Brachychiton acerifolius		x		u		u	
	Commersonia fraseri		x	0			0	
Ulmaceae	Trema tomentosa var. viridis		×	0			0	
Urticaceae	Dendrocnide excelsa		×	0				
	Urtica incisa		×	u			u	
Verbenaceae	Clerodendrum tomentosum		x	0	u		u	
	Lantana camara	*	×	с	с		с	
	Verbena bonariensis	*	x			0		

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CyperaceaeBolboschoenus caldwellixCarex appressax	u u		u
Carex appressa x	u		
	u		
<i>Carex longebrachiata</i> x u		u	
Cyperus eragrostis *			u
Cyperus imbecillis u			
Cyperus polystachyos x	1		u
Eleocharis sphacelata x			u
Isolepis prolifera *		с	
Iridaceae Romulea longifolia * x	0		
Juncaceae Juncus usitatus x			0
Lemnaceae Spirodela oligorrhiza x			0
PhilesiaceaeEustrephus latifoliusxoo			
<i>Geitonoplesium cymosum</i> x o o			
Poaceae Andropogon virginicus * x	0		
Aristida ramosa x o	0		
Aristida vagans o	1		
Axonopus affinis * x	0		
Bothriochloa macra x u	1		
Chloris gayana * x	0		
Chloris truncata x u	1		
Cynodon dactylon x o	u	u	
Danthonia tenuior o	1		
<i>Echinopogon caespitosus</i> x o	0		
Microlaena stipoides x u			
<i>Oplismenus aemulus</i> c c			
<i>Oplismenus imbecillis</i> x c c	1	u	
Paspalum dilatatum * x	с	u	
Paspalum distichum x			u
Pennisetum clandestinum * × o	с		0
Poa labillardieri x o	0		
Sporobolus indicus var. * x capensis	u		

	Stenotraphrum secundatum	*	x			u		
	Stipa ramosissima		×		0		u	
	Themeda australis		×		0		0	
Orchidaceae	Dendrobium speciosum		x					
	Pterostylis hildae(?)		x					
Potamogetonaceae	Potamogeton crispus		x					u
Smilacaceae	Smilax australis		x	с			u	
Typhaceae	Typha domingensis		x					
	Typha orientalis		x					u

### APPENDIX 2 LIST OF ANIMAL SPECIES FOR THE ALBION PARK QUARRY SITE

#### Mammals

Swamp Wallaby Fox\* Rabbit\* Domestic Cattle\*

#### Birds

Australian Magpie Australian Raven Australian Wood Duck Bar-shouldered Dove Black-shouldered Kite Brown Gerygone **Brown Thornbill** Chestnut Teal **Clamorous Reed-Warbler** Common Mynah\* Common Starling\* Crimson Rosella Eastern Rosella Eastern Spinebill Eastern Whipbird European Goldfinch\* Fan-tailed Cuckoo Green Catbird Grey Butcherbird **Grey Fantail** Grey Shrike-thrush House Sparrow\* Latham's Snipe Laughing Kookaburra Lewin's Honeyeater Little Eagle Magpie-lark Masked Lapwing Mistletoebird Nankeen Kestrel Noisy Friarbird Pacific Black Duck Pied Currawong Purple Swamphen **Red-browed Finch** Red-whiskered Bulbul\*

Wallabia bicolor Vulpes vulpes Oryctolagus cuniculus Bos taurus

Gymnorhina tibicen Corvus coronoides Chenonetta jubata Geopelia humeralis Elanus axillaris Gerygone mouki Acanthiza pusilla Anas castanea Acrocephalus stentoreus Acridotheres tristis Sturnus vulgaris Platycercus elegans Platycercus eximius Acanthorhynchus tenuirostris Psophodes olivaceus Carduelis carduelis Cacomantis flabelliformis Ailuroedus crassirostris Cracticus torquatus Rhipidura fuliginosa Collurincincla harmonica Passer domesticus Gallinago hardwickii Dacelo novaequineae Meliphaga lewinii Hieraaetus morphnoides Grallina cyanoleuca Vanellus miles Dicaeum hirundinaceum Falco cenchroides Philemon corniculatus Anas superciliosa Strepera graculina Porphyrio porphyrio Neochmia temporalis Pycnonotus jocosus

Kevin Mills & Associates

Richard's Pipit Satin Bowerbird Silvereye Spotted Turtle-Dove\* Superb Fairy-wren Topknot Pigeon Tree Martin Welcome Swallow White-browed Scrubwren White-faced Heron Willie Wagtail Yellow Thornbill Yellow-rumped Thornbill Anthus novaeseelandiae Ptilonorhynchus violaceus Zosterops lateralis Streptopelia chinensis Malurus cyaneus Lopholaimus antarcticus Hirundo nigricans Hirundo neoxena Sericornis frontalis Egretta novaehollandiae Rhipidura leucophrys Acanthiza nana Acanthiza chrysorrhoa

#### Frogs

Brown-striped Frog Common Eastern Froglet Limnodynastes peronii Crinia signifera

#### Reptiles

Grass Skink Long-necked Tortoise Red-bellied Black Snake \* - Introduced species. Lampropholis guichenoti Chelodina longicollis Pseudechis porphyriacus Appendix F

# REHABILITATION MANAGEMENT PLAN – ACCESS ROAD

#### REHABILITATION MANAGEMENT PLAN HARD ROCK QUARRY ACCESS ROAD Lots 1 & 2 DP 858245, Lot 23 DP 1039967 CLEARY BROS (BOMBO) PTY LTD

#### 1. Purpose

On 10 May 2007 Shellharbour City Council issued development consent to Cleary Bros (Bombo) Pty Ltd to construct a quarry access and haul road (DA 814/2006).

This report is prepared pursuant to condition 34 of the consent that reads as follows:

- 16. Within six months of the date of this consent, the applicant must prepare, and subsequently implement a Rehabilitation Management Plan for the site in consultation with Shellharbour City Council. This plan must:
  - *a) identify the disturbed area at the site*
  - b) describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site (including the decommissioning of the haul road the return to the natural ground levels at the expiration of the quarrying process)
  - *c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site, and*
  - *d) describe how the performance of these measures would be monitored over time.*

"The site" referred to in the condition is that part of Lot 1 DP 858245, owned by Bridon Pty Ltd (a Cleary Bros company), Lot 2 DP 858245, owned by Rinker Australia Pty Ltd and Lot 23 DP 1039967, owned by Cleary Bros (Bombo) Pty Ltd that is affected by the access road.

#### 2. Identification of Disturbed Area

The access road corridor and footprint are shown on the survey plan (Drawing 106208/90750) attached to this report.

During road construction, all earth works will be confined to within the land designated "extent of batter", shown with a dashed line on the plan. The access road involves cut and fill components. Any surplus excavated material will be used to construct the noise/sight bund at the north eastern corner of the quarry. At the completion of earthworks, the batters will be hydromulched and screen planting will be undertaken at locations shown on the landscape plan for the site.

Repairs will be made to any areas of grassland outside the immediate footprint of the haul road that may have become damaged during construction. This work forms part of access road construction and maintenance and is not the subject of this rehabilitation plan.

#### **3.** General measures to rehabilitate the site

The access road will be rehabilitated when it is no longer required to service the quarry project, scheduled to occur some 30 years after commencement. After the road is decommissioned its surface will be ripped and the excavation backfilled to original contours.

A surface layer of suitable topsoil will be placed and grassland re-established over the disturbed area similar to grassland in adjoining paddocks. Erosion and sediment controls will be installed during in this work and will remain in place at least until the surface has fully stabilised.

Haul road rehabilitation will be undertaken at a single point in time and hence is not subject to short, medium or long term measures, other than monitoring and maintenance as referred to below.

#### 4. Detailed rehabilitation measures over the next five years

It is not anticipated that rehabilitation of the haul road will be required during the next five years, as the quarry is a 30-year project.

#### 5. Monitoring performance of rehabilitation measures

When rehabilitation of the haul road is undertaken, Cleary Bros will monitor surface stability, subsidence, re-establishment of weed-free grassland and performance of erosion and sediment controls. Monitoring will occur every three months until a stable, grassed surface has been achieved. Should monitoring indicate that corrective action is required, Cleary Bros will promptly undertake the necessary works.

Monitoring results and corrective action will be reported to the Community Consultative Committee.

Prepared by Perram & Partners 27 September 2007



Appendix G

# WATER BALANCE

# QUARRY WATER BALANCE

### 1. Introduction and Summary

Prior to the extension onto Lot 1 DP 858245 Cleary Bros Albion Park quarry has been self-sufficient for water. Water harvested in the existing quarry and the surrounding catchment and stored in the existing storage has proven more than sufficient for the processing plant, haul road and quarry operations.

The quarry extension onto Lot 1 DP 858245 will progressively increase the water catchment and water availability for the consolidated site accompanied by an increase in water demand associated with the new access road. In the early years the quarry extension will utilise water from the existing storage supplemented with water harvested on the new site. As the quarry extension expands, the quantity of water harvested in the excavation will increase, largely eliminating the need for water to be taken from the existing storage.

# 2. Water Demand

#### 2.1 EIS Prediction

The water demand of the quarry extension was outlined on page 3.14 of the EIS (Perram & Partners 2003), being approximately 20 megalitres per annum, increasing to about 22 megalitres during particular years where there is a significant revegetation component. Those figures are no longer valid because the new route of the access road is significantly shorter, the road is now only half the width (7 metres) of the road described in the EIS and the dust management plan requires a greater rate of application of dust suppression water than used for EIS calculations.

The EIS proposed that all vehicles would access the quarry extension by passing along the access road to the existing quarry and then via a new 14 metre wide road, 400 metres in length, to the quarry extension. According to the access configuration described in the EIS, additional dust suppression water was required for the 400 metre section of new road along the ridge and a similar length of road within the quarry extension leading to the workface.

For the purpose of calculating additional demand, it was assumed in the EIS that dust suppression on the existing haul road from the processing plant to the now exhausted quarry would continue to be provided from the existing sources as there would be no change to the use of this road. However with the relocation of quarry access, the road to the existing quarry will fall into disuse with little or no demand for dust suppression water. Instead existing sources will service dust suppression on the relocated haul road leading over the ridge

nil

to the boundary of the quarry extension. This road is slightly shorter and narrower though more exposed than the route to the old quarry. For this reason it is assumed the demand for dust suppression water from the existing storage will be largely unchanged. The quarry extension will require additional dust suppression water only for the section of haul road within the extension area.

### 2.2 Recalculated Water Demand

Water demand for potable use, irrigation and fire fighting will not change from predictions contained in the EIS. Dust suppression water has been revised because of the changed road area and rate of application. Revised water demand is summarised in *Table 1* below:

Use	Source	Annual Requirement (megalitres)
Potable (in the quarry)	Delivery to small on-site tank	negligible
Dust Suppression	Collected rainfall runoff	15
Irrigation	Collected rainfall runoff	1.2

Collected rainfall runoff

#### Table 1QUARRY EXTENSION WATER DEMAND

The dust suppression water quantity is based on a daily application of two litres per square metre per hour (see section 5.8) over a haul road of about 500 metres in length (3,500 square metres) for nine hours per day on 238 non-rain days per year.

The water demand in the quarry extension will be approximately 15 megalitres per year increasing to about 16.2 megalitres during particular years where there is a significant revegetation component. This will occur in the first year while the bunds and external revegetation areas are being established and then after Year 15 when overburden placement areas reach final profile.

# 2.3 Water for Existing Uses

Fire fighting

There is an existing water demand for the processing plant and haul road between it and the quarry boundary, which is serviced from existing storage on the northern side of the Wentworth Hills. The existing supply and demand is discussed in section 4 below.

# 3. Quarry Extension Water Supply

Page 3.14 of the EIS states that water will be obtained from existing storages associated with the existing quarry and processing plant as well as water captured by the quarry extension.

*Table* 2 below summarises the average water availability from the quarry extension as the land is progressively disturbed for quarrying. The following assumptions are implicit in the table:

- the additional catchment for each stage will become available early in the stage when a collection storage is formed at the low side, as soon as the surface has been stripped of topsoil and overburden;
- volumetric figures are based on the long term average annual rainfall of 1.261 metres;
- the coefficient of runoff is 0.3. This may underestimate the quantity of runoff when overburden is stripped exposing underlying rock;
- groundwater inflow to the workings has been ignored as a water source. If such inflow is significant, it will be balanced by re-injection of water via the infiltration trench on the southern side of the site;
- the quarry storage will have approximate surface dimensions 20 by 60 metres during stages 1 to 3 and will have twice that area for the remaining three stages when the water catchment significantly increases; and
- the average annual evaporation rate of 1.78 m per year (4.9 mm/day) will occur each year;

*Table 2* indicates that in years with average rainfall, the quarry extension will be self-sufficient for water after Stage 2 (year 11 onwards). Should a year with higher than average rainfall occur during Stages 1 and 2, the quarry may approach or achieve self sufficiency for that year. Should a dry year occur during Stages 1 or 2, the draw of water from the existing main storage will be greater. The decile 1 annual rainfall (10 per cent driest) recorded at Kiama is 825 millimetres. Should a decile 1 rainfall year occur during Stage 1, the draw from the main storage would be 12.2 megalitres and 8.4 megalitres if the decile 1 year occurred during Stage 2.

In addition to the runoff quantities included in *Table 2*, groundwater would continue to seep through the bedrock and enter the surface drainage system, particularly where quarry extraction cuts off subsurface flow paths. However, this is expected to be balanced by groundwater injection to the infiltration trench for ecological purposes.

Stage	Additional Catchment (hectares)	<b>Cumulative</b> <b>Catchment</b> (hectares)	<b>Average</b> <b>Annual</b> <b>Runoff</b> (megalitres)	Average Annual Pond Evaporation (megalitres)	Average Annual Water Availability (megalitres)	Average Supplement from Storage Dam (megalitres)
1	2	2	7.5	2.1	5.4	9.6
2	2	4	15.1	2.1	13	3.2
3	3	7	26.5	2.1	24.4	Not required
4	5.3 internal 2.7 external	15	56.7	4.3	52.4	Not required
5	3	18	68.1	4.3	63.8	Not required
6	3.5	21.5	81.3	4.3	77.0	Not required

#### Table 2QUARRY EXTENSION WATER SUPPLY

#### 4. Existing Storage and Water Use

Cleary Bros has advised that the main storage dam supplying water for the processing plant has a capacity of 24 megalitres to the current level of the pipe overflow. The company advised the storage has further capacity of 21 megalitres above the pipe overflow to the level of the existing spillway. The company can adjust the pipe invert level to store additional water in the higher parts of the reservoir, but this has not been needed to date.

The main storage receives rainfall runoff from the steep slopes in its catchment together with any groundwater that may surface in the catchment area. There are other storages associated with the existing quarry and processing plant, which can contribute further water for operational use.

The processing plant consumes water for spraying on conveyors, stockpiles and the manoeuvring area around the stockpiles at the rate of 45 kilolitres per day or about 11 megalitres per year. Dust suppression on the existing section of haul road would use up to 10 megalitres per year. Hence the main storage holds more than the annual water requirement for the existing quarry and processing plant and can be reconfigured to hold twice this quantity.

The existing main storage, supplemented by water caught in the existing quarry has more than adequate capacity to make up the shortfall required by the quarry extension during the first two stages (10 years) and to act as a buffer smoothing out variations between wet and dry years.

#### 5. Environmental Release

The creek draining the quarry extension site will not be cut until Stage 4 (Years 16 to 20). Significant water release from the quarry will not be required until that stage is reached. At that time there will be surplus water within the quarry storage for environmental release.

Ecological advice contained in the EIS is that environmental release should mirror the natural behaviour of the creek as far as practicable. For this reason the majority of releases will be during or immediately following wet periods.

# Appendix H

# EMERGENCY PROCEDURES WORK INSTRUCTION

A.C.N. 000 157 808

CLEARY BROS (BOMBO) PTY LTD

**QUARRY DIVISION** 

# **ALBION PARK QUARRY**

# **WORK INSTRUCTIONS**

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**REVISION: 1** 

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Issue: 2	CLEARY BROS (BOMBO) PTY LTD - QUARRY DIVISION	No: WLAPQ10	
Rev: 2	Albion Park Quarry Work Instruction	Rage: 1	
Date: 24/10/06	Emergency Procedures	Appr Brayon	

#### 1.0 PURPOSE/SCOPE

The purpose of this work instruction, is to specify the steps to be taken when faced with emergencies such as fires, fuel explosions, vehicle accidents or emergency evacuations.

#### 2.0 **REFERENCES/DEFINITIONS**

Incident: - An unplanned event which causes or has the potential to cause injury, damage or environmental failure.

#### 3.0 DETAILS

#### 3.1 GENERAL

3.1.1 Albion Park Quarry has on its site, operations which are controlled by three different divisions of the company - Quarry Division, Concrete Division and Transport Division. Because of this, the day to day reporting structure for emergency procedures will differ from the reporting structure for normal operational activities to enable an integrated effective approach. Figure 1 shows the organisational chart and the associated responsibilities for emergency procedures.

#### Figure 1 - Site Organisation Chart for Emergencies



#### 3.2 EMERGENCY CONTROLLER

- 3.2.1 During operating hours and after hours, the site person in charge of each area will become the Emergency Controller as follows:
  - Quarry Quarry Manager or Quarry Foreman
  - Concrete Plant Batcher
  - Workshops Maintenance Manager or Workshop Foreman.

#### Note: The Quarry Manager, having overall responsibility for the site, may also assume the roll of an Emergency Controller for any situation on the quarry site.

- 3.2.2 The roll of the Emergency Controller is to assume control of the situation until such time as a more senior supervisor, manager or emergency services officer assumes that roll. The Emergency Controller should
  - assess the extent of the emergency
  - raise the evacuation alarm if required
  - The company radio or CB radio channel 26 may be used to contact the Weighbridge who will assist in contacting the Emergency services required.
  - A telephone may also be used, dial 000, stay calm and in a clear and precise manner ask the person you are talking to, to connect you to the Fire Brigade, Police or Ambulance which ever service or services are required. Stay on the telephone and follow all voice instructions.
  - notify appropriate persons and organisations within and outside the company
  - call on the first aid officer to assess casualties and provide or arrange for treatment as required
  - identify further hazards and take measures to minimise their potential danger
  - as much as possible preserve evidence which will have a bearing on any subsequent investigation.

#### 3.3 SPILL OF HAZARDOUS MATERIAL

- 3.3.1 The person identifying the spill shall immediately notify the appropriate Emergency Controller who shall ensure that the following steps are taken.
  - 1. In a safe manner, isolate the source of the spill.
  - 2. Contain the spill from spreading or reaching drainage systems.

3. Identify the spilled material and determine the appropriate means of disposal.

#### 3.4 FIRES AND EXPLOSION OF LIQUID FUEL

- 3.4.1 The person identifying the fire should, if feasible and safe, attempt to extinguish it immediately. If it is not feasible or not successful, the appropriate Emergency Controller must immediately be notified.
- 3.4.2 The Emergency Controller:
  - notifies the Shellharbour/Kiama Bush Fire Services
  - · evacuates the immediate area if deemed necessary and
  - organises first aid, medical treatment or ambulance as required and ensures all persons can be accounted for.
  - takes control of the firefighting effort until the Fire Brigade arrives.

Measures taken may include using portable fire extinguishers, engaging the use of the water truck and shutting off power supply to affected areas.

- 3.4.3 When the Fire Brigade arrives, the Emergency Controller hands control over to the officer in charge and briefs him as to the following:
  - injured or trapped persons needing their help
  - · highly flammable materials in close proximity to the fire
  - isolations and or draining of fuels carried out.
- 3.4.4 If the bushfire is approaching the explosives magazine, the site must be evacuated and sealed off for a one kilometre radius around the magazine. The Emergency Controller must recognise that a firefighter's first instinct is to fight the fire and should not leave it up to the fire fighters to decide when to pull out.
- 3.4.5 If a vehicle catches fire it should not be left in from the vicinity of the magazine.

#### 3.5 EXPLOSION OF EXPLOSIVES MAGAZINE

- 3.5.1 In the event of explosion of the explosives magazine the Quarry Manager will call an emergency evacuation to the meeting place at the weighbridge. An attempt will be made to account for all persons who were on site.
- 3.5.2 The Quarry Manager will:
  - seal off the area within a one kilometre radius for one hour after the last blast.

 send in recognised experts to look for unexploded explosives which may have been scattered.

(for further advice relating to an incident, contact Orica Australia 24 hour emergency response service 1800033111).

- 3.5.3 Where there are injured persons, they will be dealt with in accordance with clause 3.8.
- 3.5.4 Ensure that measures are taken to keep all but essential personnel out until such time as the area can be declared safe.

#### 3.6 GAS BOTTLE LEAK

- 3.6.1 Should a gas bottle be found damaged and leaking, the following steps should be taken:
  - (i) ensure there are no ignition sources in the area
  - (ii) clear the area of personnel and visitors
  - (iii) if possible and safe to do so, isolate the leaking bottle from other gas bottles or explosive materials and place it in a well ventilated area.

Danger: Evaporating liquid may cause cold burns. Wear safety glasses and leather gloves while handling a leaking bottle. acetylene could cause oxygen depletion in a confined space.

- (iv) Contact the Site Manager or other Emergency Controller.
- (v) The Emergency controller should ring BOC Gases emergency number 1800 044 149 for further advice on dealing with the situation.
- 3.6.2 If an acetylene bottle has caught fire close to the valve, turn it off and feel the bottle to make sure it is not getting hot. If it is getting hot it could mean that it is burning inside the bottle. In this event, keep the bottle cool, by continuous hosing from a protected location and have someone call the fire brigade.
- 3.6.3 If the fire is from a cylinder is impinging on flammable materials or other cylinders, then:
  - (i) Evacuate uninvolved personnel and call the fire brigade.
  - (ii) Do not attempt to approach or remove cylinders.
  - (iii) From a protected location, drench the entire surface of all cylinders with water until the fire brigade arrives and then hand control over to them. Appendix 4.2 shows the procedure that they should follow.
| Issue: 2<br>Rev: 3 | CLEARY BROS (BOMBO) PTY LTD - QUARRY DIVISION<br>Albion Park Quarry Work Instruction | No: WIAPQ10 |
|--------------------|--|-------------|
| Date: 17/12/03     | Emergency Procedures   | Appr: blog  |

- 3.6.4 If the cylinder is standing alone and the fire is not impinging on the flammable materials:
  - (i) evacuate uninvolved personnel
  - (ii) from a protected location, spray water on the cylinder to keep it cool; eliminate all sources of ignition.
  - (iii) Extinguish the flame with dry powder extinguisher and shut the cylinder valve if this will stop the leak.
  - (iv) recommence and continue water spray until the fire brigade arrives.
  - (v) Ensure the working area is well ventilated before use.

### 3.7 VEHICULAR ACCIDENTS

- 3.7.1 Staff witnessing a motor vehicle accident should notify the appropriate emergency controller who will:
  - see if anyone is injured and arrange for first aid assistance or ambulance as appropriate
  - contact the police if deemed appropriate
  - make written records of witness's statements and complete an Incident Report. Also an Accident Investigation Report is to be completed if required.

### 3.8 PERSONAL INJURY

- 3.8.1 The injured person or witness should contact the appropriate emergency controller who will organise first aid or an ambulance as appropriate.
- 3.8.2 Do not attempt to move injured persons who may have a sustained a spinal injury.
- 3.8.3 Take steps to eliminate further immediate danger.
- 3.8.4 Do not disturb evidence where possible.
- 3.8.5 Be prepared to brief the emergency controller or emergency services when they arrive.

### 3.9 EVACUATION PROCEDURES

- 3.9.1 When evacuation is required, the appropriate Emergency Controller will
  - give the order to evacuate
  - notify the Quarry Manager of the emergency circumstances.

3.9.2 On being notified of the evacuation, all personnel shall proceed to the weighbridge area where a roll call will be carried out by the supervisors and further instructions will be given.

### 3.10 TERMINATION OF EMERGENCY

- 3.10.1 In an emergency involving external emergency services, when the role of the emergency services is complete, control is handed back to the Emergency Controller who will assess the situation and decide on any additional actions before declaring termination of the emergency.
- 3.10.2 On declaring termination of the emergency, the Emergency Controller advises Operators of the termination of emergency.
- 3.10.3 The Emergency Controller will arrange for clean-up of any spill and safe disposal of any contaminated material as a result of the emergency.
- 3.10.4 The Manager for each affected area should:
  - inform those affected what has happened and what they should do now
  - identify witnesses to help with further investigations
  - identify those who may need trauma counselling and refer them to the Rehabilitation Coordinator.

### 3.11 EVALUATION OF RESPONSE

- 3.11.1 A review shall be conducted after all serious incidents by the Divisional Manager and those nominated to be called on as Emergency Controllers. A report based on the review will include the following:
  - brief summary
  - conclusions
  - recommendations
  - method of investigation
  - findings of the investigation
  - discussion of the findings
  - ways of avoiding recurrence of similar incidents
  - review of the emergency plan in relation to the incident.

This report will be forwarded to the Technical Manager and CEO within 7 days of the incident.

### 4.0 APPENDICES

4.1 Outside Services - Emergency Phone Numbers

4.2 Procedure for dealing with fire impinging on flammable materials or other cylinders.

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# **Cleary Bros Albion Park Quarry**

### **EMERGENCY PHONE NUMBERS**

Emergency Number 000 connects to the *Telstra* Switchboard. The person dialling must ask to be connected to the emergency service required

POLICE		
Emergency		000 "Police"
Warilla		42952699
Albion Park		42561044
FIRE BRIGADE		
Emergency		000
Shellhabour-Kiama Bush Fi	re Services	42562500
AMBULANCE		
Emergency		000
All Areas		131233
HOSPITALS		
Shellharbour Hospital		42952500
STATE EMERGENCY SERVICES	\$	
Shellharbour Municipality		4257 1010
ENVIRONMENT PROTECTION	AUTHORITY	
Wollongong		42244100
NATURAL GAS COMPANY		131909
BOC GAS		1800044149
POISONS INFORMATION		131126
MAXAM		1800 833 111
ELECTRICITY		131003
SYDNEY WATER		
<b>Emergency Inquiries</b>		132090
EMERGENCY CONTROLLERS		
<b>Operations Manager</b>	0408322213	42961837
Quarry Manager	0418603398	42564241
Quarry Foreman	0413239064	

### PROCEDURE FOR DEALING WITH FIRE FROM A CYLINDER IMPINGING ON FLAMMABLE MATERIALS OR OTHER CYLINDERS

- (i) Do not attempt to approach or remove cylinders.
- (ii) From a protected location, drench the entire surface of all cylinders with water for at least one hour after the fire has been extinguished;
- (iii) From a safe position, check every 30 minutes to see if steam is coming from the surface of the cylinder when hosing is interrupted. Once steam has stopped, from a safe position, check that the surface remains wet. If patches of the bottle dry quickly when hosing is stopped, continue to hose with water as before. Once all of the cylinder surface remains wet, check with bare hand that cylinder remains cool for 30 minutes. Wait a further 30 minutes and recheck as the surface temperature. if any part feels warm, then reapply the water and check as before.
- (iv) When the surface of the cylinder remains cool for one hour, submerge the cylinder in water, carefully avoiding shocks and bumps. The cylinder may normally be recovered after 12 hours immersion.

# Appendix I

# CUSTOMER FEEDBACK FORM



# **CUSTOMER FEEDBACK FORM**

Please complete this form	and return it to:	Internal Quality Auditor Cleary Bros (Bombo) Pty Ltd PO Box 210 Port Kembla 2505					
NAME:		DATE:	TIME:				
ADDRESS – No & Stree Suburb: Postcode:	t:	PHONE –	Home: Work:				
FEEBDBACK: To do with charges To do with service Other	Where did the ir Details:	ncident occur?					
YOUR SUGGESTION IS How do you suggest that who are in a similar posit	S IMPORTANT T we resolve the iss ion are not confro	O US ue to your satisfaction and/or ented with this issue again:	ensure that you and other customers				
Thank you for taking the have been a significant he the highest standard.	time to help us im elp in increasing tl	nprove our service to you, our c he effectiveness of our policy o	customer. People such as yourself of maintaining customer service to				
SIGNATURES							

Customer: \_\_\_\_\_ Cleary Bros Representative: \_\_\_\_\_

### **OFFICE USE**

(	Customer Feedback Registration Number: NCR/CAR Number:
	Response to customer feedback:
	Perceived Effectiveness of Response:

# Cleary Bros Concrete & Quarrying Customer Complaint & Feedback Register

Plant/Quarry: \_\_

osed No Customer Out Feedback Forms Since Last Man Review													
0 C													
Handled by													
Brief Description of Complaint or Feedback													
Name of Person													
Date Complaint or Feedback Made													
NCR/CAR No.													
Complaint or Feedback Number													



# **APPENDIX 4:**

"Approved Extraction Site Plan (6 June 2016)"



 5			6	
	RevNo	Revi	sion note	

Itemref Quantity	Title/Name, des	signation, ma	aterial, dimens	sion etc	Article No./Refere	nce
Designed by AW	Checked by AW	Approved 23/3/16	by – date	File name APQ	Date 6/6/16	Scale NTS
39 FIVE PORT F	E ISLANDS ROAD KEMBLA		Арр	roved E	xtraction S	ite
CLEARY BROS NSW 24 PH. (02 FAX. (0	505 2) 427 51 000 2) 427 41 125			FIGURE-4.5	Edition 2	Sheet 1
	6		r	7	8	



# **APPENDIX 5:**

"Community Consultation Documentation (Notices & Meetings – June 2015 through July 2016)"

APD, CCC



Our Ref: HN:TH:GEN1506-05

PO Box 210 PORT KEMBLA New South Wales 2505 Australia

Telephone (02) 4275 1000 Facsimile (02) 4276 1168

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29 June 2015

Dear Sir / Madam

### Albion Park Extension - Stage 5 & 6 Consultation

Cleary Bros are commencing the consultation process required for the preparation of a report to the Minister for Planning and Environment for his consideration regarding hard rock extraction in the areas identified as Stage 5 & 6 in the current development consent. The condition relating to the future consent for mining in Stage 5 & 6 (Schedule 3, Staged Development 6) is attached.

Initial discussions will be held with the APQ Community Consultative Committee meeting which will be held on 8 July 2015. While consultation will be ongoing as the report is being developed, it would be appreciated if people involved in the consultation could advise us, in writing, of any issues they may have involving the proposed quarrying in Stages 5 & 6. All correspondence received will be documented for inclusion in the final report to the Minister.

Please forward your comments to Helen Nicolaidis at Cleary Bros. All correspondence will be acknowledged. Cleary Bros representatives will be available to meet and discuss this development proposal however it would be appreciated if appointments are made by contacting Teresa Hallam on phone 4275 1000.

Thank you for your assistance in this matter.

Yours faithfully Cleary Bros (Bombo) Pty Ltd

Helen Nicolaidis Senior Environmental Officer

Copy to: CCC Members

Brian Weir - CCC Chairman Susan Dunster (Fig Tree Land Owner) Craig Nolan - Shellharbour City Council John Murray Steve Crandell Arthur Webster Kane Winwood Matt Fuller

DoPE EPA Shellharbour City Council Grant Meredith - Manager Development & Planning

### Appeal No 10839 of 2005

### SCHEDULE 3 ADMINISTRATIVE CONDITIONS

### Obligation to Minimise Harm to the Environment

 The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

### Scope of Development

- 2. The Applicant shall carry out the development in accordance with:
  - a) DA No. 466–11-2003;
  - b) The EIS titled Proposed Quarry Extension Albion Park, dated October 2003, and prepared by Perram & Partners; and
  - c) Conditions of this consent.
- 3. If there is any inconsistency between the above, the conditions of this consent shall prevail to the extent of the inconsistency.
- 4. The Applicant shall compty with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
  - a) Any reports, plans or correspondence that are submitted in accordance with this consent; and
  - b) The implementation of any actions or measures contained in these reports, plans or correspondence.

Note: Amendment of any environmental management plan, strategy or monitoring program required under this consent shall be prepared and approved in accordance with the consultation and approval requirements of the original environmental management plan, strategy or monitoring program, unless otherwise authorised by the Director-General.

### Staged Development

- 5. Under section 80(4) of the Act, this consent Is issued for Stages 1 to 4 of the development only.
- Under section 80(5) of the Act, Stages 5 and 6 must be the subject of another development consent.

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of 'The Fig Tree Hill Land', and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to In subclause (b) above;
- assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public and notify the objectors to the original proposal by letter;
- seek independent expert advice on the report il deemed to be warranted;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public.

### Period of Approval

7. This consent lapses 30 years after the date it commences.

Note: Conditions of this consent may require activities to be carried out by the Applicant beyond the period of approval for hard rock extraction, processing, and rehabilitation on the project site.

### Limits on Production

- 8. The production of quarry products from the quarry shall not exceed 400,000 tonnes per annum.
- 9. The Applicant shall:
  - a) Provide annual production data to the DPI using the standard form for that purpose; and
  - b) Include a copy of this data in the AEMR.



# **Meeting Minutes**

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APQ-CCC-11

Purpose of Meeting: Albion Park Quarry CCC Meeting Minutes								
Sit	e / Location:	Albion Park						
Ve	nue:	Albion Park RSL	Date of Meeting: 8 July 2	2015				
Me	eeting conducted by:	Brian Weir						
At	tendees Name		Apologies	1				
Bri	an Weir (Chairperson) (BW	')	John Murray					
Su	san Dunster (SD)							
Cr	aig Nolan (CN)							
Ste	eve Crandell (SC)		×					
Art	thur Webster (AW)							
1.20				Action				
Iss	sues addressed:							
Meeting opened at 12.40pm.       (BW) welcomed all members and acknowledged the traditional owners of the land and paid his respects to Elders past and present.         Minutes of the previous meeting on 25 November 2014.         The Minutes were accepted as accurate.         There were no matters arising.								
2	<ul> <li>2 (SC) advised that:</li> <li>During the period 1 July 2014 to 30 June 2015 a total of 534,700 tonnes of material was extracted.</li> <li>From 1 January 2015 until 30 June 2015, 309,000 tonnes was extracted.</li> <li>The Quarry is currently operating a day shift and a small afternoon shift.</li> <li>The EPA and the Mines Dept have recently inspected Quarry operations. There were no issues raised by either regulator.</li> <li>Kevin Mills recently inspected the revegetation areas.</li> <li>Quarry production is averaging 60% external sales and 40% internal sales.</li> </ul>							
3	Environmental Monitorin	ng:						
	<ul> <li>(AW) tabled an environmental summary report. In summary the dust, borehole and blasting results for the period since the previous CCC meeting, are all within the objective limits (report attached). The revegetating planting in zones 1 &amp; 2 is complete.</li> <li>(AW) advised that the application to modify the consent to increase the annual production and transportation of rock to 900,000 has been approved by DoPE. Several conditions were included which require Best Practice Management plans to be prepared for dust &amp; noise control and blast management.</li> <li>(AW) advised that CB are commencing the process required for DoPE consent to extract rock in areas 5 &amp; 6. Letters had been sent to all relevant people and authorities notifying them of the process and requesting comment.</li> </ul>							
	proposal and requesting c	omment.						



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	Other Business:	
4	<ul> <li>(SD) noted that on Page 13 of the Environmental Audit Report on CB's compliance with the consent, it was recommended that the noise monitor, which was to be located adjacent to a proposed rural dwelling within the Dunster property, be removed. (SD) asked on what basis was this recommendation made. (AW) requested that he take this question on notice. He stated that he would investigate and contact (SD) with a response. Further he would provide a response in the minutes. (Response attached)</li> <li>(SD) advised that a blast which occurred on 30 June 2015 at about 12 noon was noisy. (SC) advised that he would check the blast monitoring results.</li> </ul>	
	Post Meeting: The blast record is as follows: The blast occurred at 12.33pm on 30 June 2015 Peak velocity – 2.61mm/s (5mm/s allowable) Peak overpressure – 102.0dBL (115dBL allowable)	
	<ul> <li>(SD) advised that prior to a quarry blast recently she was requested to move 400 metres away from her property boundary.</li> <li>(SD) stated that this set back request impacts on the management of her farm land for cattle grazing.</li> <li>(SC) advised that only a few blasts would be carried out along the extraction area located near the 50 metre setback from the adjoining boundary. He advised that CB subcontract the blasting. The request for (SD) to move away from the boundary was made by the contractor to minimise any risk of fly rock injurying a person standing near the blast site. (SC) stated that he would review the Appeal Judgment where the issue of fly rock impact was raised.</li> </ul>	
	<b>Post Meeting:</b> (The Judgement dated 13 January 2006 raises the issue of flyrock in items 47 to 52. The Commissioners accepted that based on the expert evidence provided any potential risk of flyrock impact within the Dunster property is minimal and at an acceptable level.)	
	Meeting closed 1.15pm	



### APQ Sand Mine Summary of Environmental Results – July 2015

Duot				
DATE	1	2	3	4
Dec-14	2.4	6.6	1.6	3.2
Jan-15	1.7	2.3	2.2	2.4
Feb-15	1.8	1.5	0.3	1
Mar-15	1.2	1.5	2.2	1.2
Apr-15	2.9	2.3	1.3	1.4
May-15	2	1.4	1.8	2.4
Jun-15	2.5	1.2	0.5	1.6
Average	2.5	2.0	1.2	1.5

Dust results are steady and at low levels

### **Boreholes**

Dust

Borehole results are steady and consistent with historical results.

### Blasting

All blast results have complied with EPA and DoPE objective limits (summarised below)

Blast Number	Date	Sound Pressure Level (dB Linear)	Ground Vibration (mm/sec)
1/15	19/1/15	104.9	1.25
2/15	12/3/15	107.3	2.61
3/15	18/3/15	100.3	3.43
4/15	10/4/15	108.6	1.78
5/15	7/5/15	113.4	0.96
6/15	25/5/15	105.9	2.35
7/15	17/6/15	108.9	1.11
8/15	30/6/15	102.0	2.61

### Rehabilitation and Revegetation

Planting in Zone 1 and 2 are complete and are subject to maintenance due to grazing by swamp wallabies.

### Annual Report

Currently being prepared and will be sent to all CCC members in early September.

### Response regarding Noise Monitor Recommendation – Post Meeting

An independent environmental audit report on compliance with the development consent conditions was recently completed. One of the consent conditions requires the placement of a noise monitor adjacent to a proposed rural dwelling to be located in the Dunster property following the construction of the dwelling. The auditor requested information on progress with the placement of the monitor.

Cleary Bros requested Shellharbour Council to advise if the consent to build the proposed rural dwelling in Dunster's property is current. The response was as follows:

- DA108/1992 approved in part the construction of a dwelling.
- DA841/2004 approved the consolidation and redefinition of lot boundaries.
- Substantial physical work was carried out before 30 March 2011 to ensure that the consent remains current.

Prior to the issue of a subdivision certificate for the above the consent for the rural dwelling must be surrendered or deleted from the original consent via a Section 96 Modification.

In view of the above facts it was considered that the construction of the proposed rural dwelling is highly unlikely and that the additional noise monitor unwarranted.

Purp	oose of Meeting:	Albion Park Quarry CCC	C Meeting Minutes	
Site	/ Location:	Albion Park		
Venu	ue:	Albion Park RSL	Date of Meeting: 9 Dec 2015	
Mee	ting conducted by:	Brian Weir		
Atte	ndees Name		Apologies	
Briar	n Weir (Chairperson) (E	3W)	Craig Nolan	
Susa	an Dunster (SD)			
John	Murray (JM)			
Stev	e Crandell (SC)			
Hele	n Nicolaidis (HN)			
				Action
lssu	es addressed:			
Meet (BW) Elde	ting opened at 1.06pm ) welcomed all members past and present. Minutes of the previous SD queried the post of dwelling. HN advised <i>Post meeting</i> <i>and confirm a</i> <i>Dunster prop</i> SD referred to the lass "that it was unfair for when a blast is about HN replied that this wo necessary as a safet HN asked if SD had to last CCC. SD replied	rs and acknowledged the us meeting on 8 July 201 meeting advice in the min that she would review an <i>g clarification: Cleary Bros</i> <i>that there are 2 DA's curre</i> <i>berty</i> st item re "fly rock" and sa us to have to move away t to occur". vas a decision of the blast y precaution for residents been asked to relocate on not in this period.	traditional owners of the land and paid his 5. utes relating to the proposed rural id advise post meeting. wishes to correct the previous minutes ently approved and activated at the id she again wished to make the point from the blast area within our property ing contractor when he considered it and stock. her property during a blast since the	respects to



### **Current Works:** 2 (SC) advised that: During the period from 1 July 2015 to 30 Nov 2015, 225,000 ton of basalt product • had been extracted. In the calendar year, from 1 Jan 2015 to current month, 534,000 ton had been extracted. Sales are expected to continue at this current rate. From 1 July, 5 blasts had been carried out and 14 blasts since 1 Jan 2015 Since the last meeting, Cleary Bros had bought some large machines: 120 ton excavator to replace 2 loaders and a 100 ton dump truck to replace 2 x 50 ton dump trucks which reduce truck movements and results in less machines on site. CB have also replaced a 988 loader with a newer model. The guarry currently operates 3 x 8 hr shifts in the sales and processing area. . The transport division currently operates long day shifts for 5.5 days The workshop operates 1 x afternoon shift, Concrete operates 6 days. The quarry sales are currently made up of 40% external clients and 60% internal clients (ie concrete and construction) The quarry will shut down from 23<sup>rd</sup> Dec to 4<sup>th</sup> Jan. There will be maintenance work during this period in the production and sales area. **Environmental Monitoring:** 3 Planning Approval to increase production from 600,000 ton to 900,000 ton received on 25 June 2015. As part of this approval CB was required to submit a Blast, Air, Noise and Traffic Management Plan which have been approved this month by DoPE and uploaded to CB webpage. **Annual Report** Annual Report has been completed, sent to all members in mid September and uploaded to the webpage. A summary of the results follows. Dust DATE 1 2 3 4 Jul-15 3.6 0.9 0.3 0.8 Aug-15 2.9 1.2 0.5 1.1 Sep-15 5.3 6.6 0.7 9.1 2.7 Oct-15 1.5 0.7 1.9 4 1.5 Nov-15 2.2 1.5 2.4 2.3 12 month Average 2.8 1.1 Dust results are steady and at low levels **Boreholes** Borehole results are steady and consistent with historical results. Blasting All blast results have complied with EPA and DoPE objective limits **Rehabilitation and Revegetation** Planting in Zone 1 and 2 are complete, some plants have been subject to grazing by wallabies and now goats. CB propose to install a selection of more mature plants to trial for success against the wallabies and goats in early 2016 **EPA Inspections** HN advised that there had been an unscheduled inspection by EPA in October 2015. no areas of concern were raised.



	Other Business:					
4	SD asked about the PM10 dust monitor. HN confirmed the monitor is operational and located adjacent Belmont.					
	HN asked if the location of the dust monitors had been corrected in the EPA licence description. HN confirmed that the licence had been varied and the description corrected and was included in the 2014/3015 Annual Review.					
	CB have commenced consultation works for Stages 5 and 6 and propose to make a submission as required by the consent to DoPE in early 2016.					
	Meeting closed 1.55pm					





Page 1 of 2

REF: N:/tp/luk/ltr/crrspdce.to.CCC-clry.brs.AP.grry.ste(stgs5&6).doc



Re: Cleary Bros (Bombo) Pty Ltd Modification of Development Consent 10639 of 2005 (LEC) Activation of Stages 5 & 6 Albion Park Quarry

Martin Morris & Jones Pty Limited (MMJ Wollongong) has been engaged by Cleary Bros (Bombo) Pty Ltd ("Cleary Bros") to prepare an Environmental Assessment ("EA") for the modification of a development consent application ("the Application") for its Albion Park quarry. The Application seeks to undertake rock extraction from Stages 5 and 6 within the Albion Park quarry. The approx. location of this area is shown within the attached plan.

The quarry works relative to the development consent have now been operational for the past 7 years. The quarry has operated consistent with the development consent and in accordance with the adopted Albion Park Quarry Environmental Management Plan (QEMP). The proposal described in the EA regarding Stages 5 and 6 is a continuation of existing quarry operations already reflected in the development consent and seeks, in effect, to activate *Condition 6* by way of modification to this development consent.

In greater detail, the EA provides a description of the subject site, an identification of the modification sought by this application, and an assessment/management of the



Page 2 of 2

perceived impacts of this modification for relevant matters. The Application is intended to be submitted to the NSW Department of Planning and Environment (the Department) for review and assessment on Wednesday 17<sup>th</sup> August 2016.

In the meantime, should you require a copy of the EA for perusal, please contact my office on (02) 4229 5555. Additionally, if required, a representative of Cleary Bros can be made available to explain the proposal in more detail upon request through our office.

Yours faithfully, MARTIN MORRIS & JONES PTY LTD

LUKE ROLLINSON BUrbRegPlan DipArchTech MPIA DIRECTOR - TOWN PLANNER





 title :
 LOCATION PLAN

 property :
 Cleary Bros Albion Park Quarry

 date :
 June 2016
 scale ; reduced



# **Meeting Minutes**

APQ-CCC-12

Purpose of Meeting: Alk		Albion Park Quarry CCC Meeting Minutes			
Site / Location:		Albion Park			
Venue:		Albion Park RSL	Date of Meeting: 21 July 2016		
Meeting conducted by:		Brian Weir			
Atter	ndees Name		Apologies		
Briar	weir (Chairperson) (E	3W)			
Susa	n Dunster (SD)				
John	Murray (JM)				
Darre	en Moon (SCC) (DM)				
Phil I	Dennis (PD)				
Mark	Hammond (MH)				
Hele	n Nicolaidis (HN)				
				Action	
Meet (BW) Elder	Meeting opened at 10:42am.         (BW) welcomed all members and acknowledged the traditional owners of the land and paid his respects to Elders past and present.         1       Minutes of the previous meeting on 9 December 2015.         1       No comments. All accepted as accurate record of meeting.         2       Matters Arising: Stage 5/6 Modification <ul> <li>HN advised that emails/mail had been sent to all CCC members from MMJ that Cleary Bros are about to submit modification to support Stage 5 &amp; 6 of the Albion Park Quarry. Modification including management plans will be submitted to the Department of Planning and Environment, which will then be publically displayed for comment.         • HN confirmed query from SD, that MMJ can be contacted for copies of the management plans associated with the modification.         • PD stated timeline for entry into Stage 5 &amp; 6 will not be for a couple of years, with current infrastructure arrangements preventing entry to these areas.         • PD confirmed that current access arrangements to paddock between Holcim and Cleary Bros would be unchanged with this modification.         Mark Hammond is replacing Helen Nicolaidis as Environmental Officer for the Albion Park Quarry.         BW expressed his thanks on behalf of the Albion Park Quarry CCC for Helen's past contribution to the CCC.</li></ul>				
3	<ul> <li>Current Works:</li> <li>PD advised that:</li> <li>During the 2015-2016 financial year, approximately 550,000 tonne of blue basalt and 66,000 tonne of overburden was extracted.</li> <li>Extraction volumes may be increased in coming years due to major construction projects commencing in the Sydney region.</li> </ul>				



	Environmental Monitoring:			
4	<b>Planning</b> CB propose to submit the Modification next month to activate Stages 5 and 6. MMJ have sent a letter to all CCC members advising the above and that they may be contact for a copy of the draft Environmental Assessment.			
	Annual Review 2015-2016 Annual Review is currently being developed. Will be sent to CCC members and uploaded to website in August once finalised.			
	<b>Dust</b> Dust results are steady at all gauges. Higher dust levels in December/January in dust gauge 1 may be related to traffic on the East-West link road. The three dust gauges near the current quarry pit are averaging between 1.8 and 2.8 g/m <sup>2</sup> /month. High Volume Sampler all results under the limit of 50 μg/m <sup>3</sup>			
	Boreholes Borehole results are steady and consistent with historical results.			
	<b>Blasting</b> All blast results have complied with EPA and DP&E limits. SD noted that blasts are noticeable at the residence, even though they are below the limits. SD identified the blasts on 1/6/16, 20/5/16, 6/5/16 and 13/4/16 were particularly noticeable. SD noted that they are starting to hear Boral, and of course Holcim. SD is receiving proper notification for blasts. HN outlined the rules and procedures related to notifying SD during Geoff Robinson's absence on annual leave. PD stated that blasting occurrences will drop off now for the rest of the year. MH to follow up and investigate if there was any reason why the identified blasts were more of a problem.			
	Rehabilitation and Revegetation Annual independent inspection of Vegetation Management carried out in June 2016 by Kevin Mills. Report concluded that recent fencing and planting works in Zones 2 and 3 should overcome previous browsing problem by wallabies and feral goats. Feral goats are continuing to be an issue with the replanting and controlled removal of the goats is proposed in the coming months.			
5	Other Business:			
2	NII.			
Meeting closed 11:07am				





# **APPENDIX 6:**

"Air Quality Impact Assessment – prepared by SLR Consulting (8 April 2016)"



global environmental solutions

Albion Park Quarry Activation of Stages 5 & 6 Air Quality Impact Assessment

Report Number 610.04156

8 April 2016

Cleary Bros (Bombo) Pty Ltd 39 Five Islands Road Port Kembla NSW 2505

Version: Revision 0

# Albion Park Quarry

# Activation of Stages 5 & 6

## Air Quality Impact Assessment

PREPARED BY:

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> This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Cleary Bros (Bombo) Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

### DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.04156	Revision 0	8 April 2016	A Radford	K Lawrence	K Lawrence

# Executive Summary

SLR Consulting Pty Ltd has been commissioned by Cleary Bros (Bombo) Pty Ltd to conduct an Air Quality Impact Assessment in relation to the activation of Stages 5 and 6 of the Albion Park Quarry. The Quarry is currently extracting 900,000 tonnes per annum of hard rock from Stage 2 and 4 of the operations. This assessment addresses the potential impacts to air quality from extracting 900,000 tpa of hard rock from Stage 5 and 6 of the operations. SLR has historically conducted air quality impact assessments for this quarry.

Atmospheric dispersion modelling was carried out to determine the potential impacts to air quality of extractive activities for the Albion Park Quarry. The potential emission-generating activities for both the stages of operation have been identified and potential emissions from these activities were estimated based on available information and emission factors from the literature.

The existing air quality environment was quantified through a combination of monitoring data from both the Albion Park Quarry and a regional station maintained by the NSW Office of Environment and Heritage. Data from the on-site meteorological station were used to represent the local atmospheric dispersion conditions.

Dispersion modelling of the emissions to predict maximum off-site pollutant concentrations indicates that the proposed operational activities would comply with all relevant ambient air quality criteria at all representative surrounding sensitive receptors, even when existing background pollutant levels are considered.

Based on the modelling approach, it is concluded that dust and particulate matter impacts during the annual extraction of 900,000 tpa of hard rock during Stage 5 and 6 at the Albion Park Quarry would not cause exceedances of the relevant air quality criteria.

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### **APPENDICES**

- Analysis pf  $\ensuremath{\text{PM}_{10}}$  and TSP data Meteorological Data Appendix A
- Appendix B
- Appendix C **Emission Inventory**

### **1** INTRODUCTION

Cleary Bros (Bombo) Pty Ltd (Bombo) are seeking approval to extend their quarry operations to include additional reserves to the Albion Park Quarry's east (the Project site). Operations in the current stages 1, 2, 3 and 4 of the quarry's operations will continue to operate as necessary to commence benching into the additional reserves of Stage 5 & 6. There will be no increase in the annual extraction rate of 900,000 tonnes per annum (tpa).

SLR Consulting Pty Ltd (SLR Consulting) has had a long history performing air quality impact assessments for the operations at Albion Park Quarry.

In 2002, SLR Consulting (formerly Heggies Pty Ltd) was commissioned to prepare an air quality impact assessment for a previous increase in extraction rate at the site (Report 10-1676-R1, dated 23 October 2002) as part of the Environmental Impact Assessment. As part of that assessment, atmospheric dispersion modelling was performed based on an extraction rate of 400,000 tpa. The results of the dispersion modelling indicated that all relevant air quality assessment goals would be complied with for the life of the operation. Approval for the increase in the extraction rate at the Project site, with a maximum annual extraction limit of 400,000 tpa, was granted in February 2006.

In 2004, SLR Consulting was commissioned to conduct an additional dispersion modelling investigation (Report 10-1676-R2, dated 31 May 2004) to determine the air quality impact of increasing the extraction rate of the quarry operation to 500,000 tpa. The results of the dispersion modelling indicated that, while maximum off-site incremental concentrations were predicted to increase, all relevant air quality assessment goals would be complied with if the annual extraction increased to 500,000 tpa.

In 2008, SLR Consulting was again commissioned to conduct additional atmospheric dispersion modelling (Report 10-7319-R1, dated 29 October 2008) for another increase in the extraction rate at the Albion Park hard rock quarry, to determine the level of air quality impact associated with increasing the extraction rate to 800,000 tpa. Using resources not available at the time of the previous two assessments, including site-specific meteorological and air quality monitoring data, the results of the dispersion modelling study indicated that all relevant air quality assessment goals would be complied with for the life of the operation.

SLR Consulting was commissioned in 2012 to conduct additional atmospheric dispersion modelling (Report 610.14029-R1, dated 20 November 2012) for another increase in the annual extraction rate to 900,000 tpa at the Albion Park hard rock quarry. The predicted incremental and cumulative impact at the surrounding sensitive receptors complied with the relevant guidelines.

Figure 1 illustrates the proposed layout of the six-stage 30-year operation of the Albion Park Quarry.



### Figure 1 Layout of Albion Park Quarry Proposed Expansion

### 2 PROJECT SETTING

The Albion Park Quarry (the Project Site) is situated approximately 20 km south-southwest of the central business district of Wollongong on the New South Wales south coast. **Figure 2** illustrates the regional setting of the Project Site.





### 2.1 Sensitive Receptors

A number of non-project related residential dwellings are situated in the area surrounding the Project Site. The nearest dwellings were identified as sensitive receptor locations to be taken into account during the assessment of potential air quality impacts due to the expanded operations.

A list of existing sensitive receptor points (R1 to R6) identified in the immediate vicinity of the Project Site is provided in **Table 1**, along with the respective distances of each of these receptor points to the site boundary. **Figure 3** illustrates the location of the surrounding receptors in relation to the Project Site. Belmont is a former farm dwelling located adjacent to the eastern boundary of the extraction site. This property is owned by Cleary Bros. and has not been included as a sensitive receptor location.

Receptor	Receptor Name	Location (	m, UTM)	Distance (m) / Direction	Elevation
ID		Easting	Northing	from Site Boundary	(m, AHD)
R1	The Cottage	300,669	6,171,018	330 / NE	140
R2	The Hill	300,794	6,171,040	440 / NE	140
R3	Approved Property	301,005	6,170,825	520 / ENE	110
R4	St Ives Farm	301,560	6,170,804	1020 / E	60
R5	Deer Farm	301,616	6,170,465	970 / E	70
R6	Kurrawong	301,659	6,169,740	1180 / SE	50

### Table 1 Surrounding Sensitive Receptor Locations

### Figure 3 Sensitive Receptor Locations


### 2.2 Surrounding Topography

A three dimensional representation of the topographical features in the region surrounding the Project Site is presented in **Figure 4**.





# 3 AIR QUALITY CRITERIA

#### 3.1 Pollutants of Interest

As previously stated, SLR Consulting have been commissioned to conduct a number of air quality impact assessments for the Project Site for lower annual extraction rates; specifically 400,000 tpa, 500,000 tpa, 800,000 tpa, and 900,000 tpa.

The results of these assessments indicated that the key pollutants for determining compliance with relevant air quality criteria were suspended particulate matter and fugitive dust deposition. While emissions of pollutants associated with the combustion of diesel fuel, including nitrogen dioxide, sulphur dioxide, carbon monoxide, and air toxics, will be generated by the current and proposed operations at the Project Site, these emissions are unlikely to compromise air quality goals at the closest receptors, given the nature and scale of the operation.

#### 3.2 Particulate Matter (as TSP, PM<sub>10</sub> and PM<sub>2.5</sub>)

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms "dust" and "particulates" are often used interchangeably. The term "particulate matter" refers to a category of airborne particles, typically less than 50 microns ( $\mu$ m) in diameter and ranging down to 0.1  $\mu$ m and is termed Total Suspended Particulate (TSP). The annual goal for TSP recommended by the NSW Environment Protection Authority (EPA) is 90 micrograms per cubic metre of air ( $\mu$ g/m<sup>3</sup>) (NHMRC, 1996).

The TSP goal was developed before the more recent results of epidemiological studies which suggested a relationship between health impacts and exposure to concentrations of finer particulate matter.

Emissions of particulate matter less than 10  $\mu$ m and 2.5  $\mu$ m in diameter (referred to as PM<sub>10</sub> and PM<sub>2.5</sub> respectively) are considered important pollutants due to their ability to penetrate into the respiratory system. In the case of the PM<sub>2.5</sub> category, recent health research has shown that this penetration can occur deep into the lungs. Potential adverse health impacts associated with exposure to PM<sub>10</sub> and PM<sub>2.5</sub> include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

The NSW EPA PM<sub>10</sub> assessment goals set out in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW OEH, 2005) are as follows:

- a 24-hour maximum of 50  $\mu$ g/m<sup>3</sup>; and
- an annual average of 30 μg/m<sup>3</sup>.

The Approved Methods do not set any assessment goals for  $PM_{2.5}$ . In December 2000, the National Environment Protection Council (NEPC) initiated a review to determine whether a national ambient air quality criterion for  $PM_{2.5}$  was required in Australia, and the feasibility of developing such a criterion. The review found that:

- there are health effects associated with these fine particles;
- the health effects observed overseas are supported by Australian studies; and
- fine particle standards have been set in Canada and the USA, and an interim criterion is proposed for New Zealand.

The review concluded that there was sufficient community concern regarding  $PM_{2.5}$  to consider it an entity separate from  $PM_{10}$ .

As such, in July 2003, a variation to the Ambient Air Quality NEPM was made to extend its coverage to  $PM_{2.5}$ , setting the following Interim Advisory Reporting Standards for  $PM_{2.5}$  (NEPC, 2003):

- a 24-hour average concentration of 25  $\mu$ g/m<sup>3</sup>; and
- an annual average concentration of 8 µg/m<sup>3</sup>.

It is noted that the NEPM Advisory Reporting Standards relating to PM<sub>2.5</sub> particles are reporting guidelines only at the present time and not intended to represent air quality criteria.

The National Clean Air Agreement (NCAA) was endorsed by Commonwealth, state and territory Environment Ministers on 15 December 2015. Ministers agreed to strengthen national ambient air quality reporting standards for airborne fine particles as follows:

For PM<sub>10</sub>:

- a 24-hour average concentration of 50 µg/m<sup>3</sup> (unchanged from the Approved Methods); and
- an annual average of 25  $\mu$ g/m<sup>3</sup> (compared to a value of 30  $\mu$ g/m<sup>3</sup> in the Approved Methods).

For PM<sub>2.5</sub>:

- a 24-hour average concentration of 25 μg/m<sup>3</sup>; and
- an annual average concentration of 8 µg/m<sup>3</sup>.

All jurisdictions have agreed to implement strengthened standards for particles, as well as move to even tighter standards for annual average and 24-hour  $PM_{2.5}$  in 2025. As these standards have not yet been adopted by NSW EPA, this assessment is based on the current assessment goals set out in the Approved Methods and the NEPM.

A summary of the particulate guidelines is shown in **Table 2**.

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( )

 Table 2
 EPA Criteria for Particulates

Source: (NSW OEH, 2005), (NEPC, 2003)

#### 3.3 Nuisance Impacts of Fugitive Emissions

The criteria for  $PM_{10}$  and  $PM_{2.5}$  are primarily concerned with the health impacts of exposure to suspended particulate matter. Nuisance impacts need also to be considered, mainly in relation to the larger size fractions of dust. In NSW, accepted practice regarding the nuisance impact of dust is that dust-related nuisance can be expected to impact on residential areas when annual average dust deposition levels exceed 4 g/m<sup>2</sup>/month.

**Table 3** presents the impact assessment goals for dust deposition, showing the maximum increase in dust deposition levels over the ambient (background) level which would be acceptable to avoid dust nuisance.

\_\_\_\_

#### Table 3 Goals for Allowable Dust Deposition

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

Source: (NSW OEH, 2005).

#### 3.4 Project Air Quality Goals

In view of the foregoing, the air quality goals adopted for this assessment, which conform to current air quality criteria, are summarised in **Table 4**.

Pollutant	Averaging Period	Concentration
TSP	Annual	90 μg/m <sup>3</sup>
PM <sub>10</sub>	24 Hours Annual	50 µg/m <sup>3</sup> 30 µg/m <sup>3</sup>
PM <sub>2.5</sub>	24 Hours Annual	25 μg/m <sup>3</sup> (interim <u>advisory</u> reporting standard only) 8 μg/m <sup>3</sup> (interim <u>advisory</u> reporting standard only)
Dust Deposition (Project only)	Annual	2 g/m <sup>2</sup> /month
Dust Deposition (Cumulative)	Annual	4 g/m <sup>2</sup> /month

#### Table 4 Adopted Project Air Quality Goals

# 4 EXISTING AIR QUALITY

### 4.1 Air Quality Monitoring Locations

Recent air quality monitoring data for  $PM_{10}$  and dust deposition from the Project site, or in close proximity to the Project site, provide an indication of the existing air quality environment. The locations of the monitoring sites from which data was sourced for use in this report, are presented in **Figure 5**. It is noted that this monitoring data would include a contribution from the operations at the Project site, and when combined with the incremental modelling for the Project site, is effectively double counting emissions from the Project site. Appropriate background concentrations have been selected with this in mind.

#### 4.2 Background Dust Deposition

Dust deposition monitoring has been conducted at four locations in the area surrounding the Project Site for a number of years. Annual average dust deposition data for the period between January 2010 and December 2015 are presented in **Table 5**. The locations of the dust monitors are illustrated in **Figure 5**.

ID		Average 1	otal Insoluble S	olids (g/m²/mo	nth)	
	2010	2011	2012	2013	2014	2015
Dust Monitor 1	2.8	2.7	4.4	4.5	3.1	3.0
Dust Monitor 2	2.7	2.5	1.6	2.7	2.6	2.1
Dust Monitor 3	2.0	1.6	1.6	0.7	0.9	1.1
Dust Monitor 4	1.8	1.7	2.2	1.5	1.6	2.2
Average	2.3	2.1	2.4	2.4	2.1	2.1
Maximum	2.8	2.7	4.4	4.5	3.1	3.0

Table 5 Annual Average Dust Deposition Monitoring Data – 2010 to 20	Table 5	0ata – 2010 to 201	Annual Average Dust Deposition Monitoring
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Based on the data presented in **Table 5**, a conservatively high background dust deposition rate at the Project Site of  $2.4 \text{ g/m}^2$ /month (expressed as an annual average) has been assumed for assessment purposes. This value corresponds to the worst case annual average deposition rate recorded across all four monitoring sites (ie 2012 and 2013) over the period reviewed.



#### Figure 5 Air Quality Monitoring Locations – Albion Park Quarry

#### 4.3 Suspended Particulate Matter (PM<sub>10</sub>)

 $PM_{10}$  monitoring is conducted immediately east of the Project Site at the *Belmont* property, indicated on **Figure 5** using a High Volume Air Sampler (HVAS) fitted with a size-selective sampling head. The HVAS is used to collect 24-hour average  $PM_{10}$  samples in accordance with the standard one-in-six day sampling routine. A summary of the 24-hour  $PM_{10}$  concentrations recorded at the Project Site in 2010 to 2015 are presented in **Table 6** and **Figure 6**.

	24-hour Average PM <sub>10</sub> (μg/m <sup>3</sup> )			Sampling	Number of	Monitoring	
	Average	Minimum	Maximum	Method	um Method Samples	Samples	Location
2010	9.9	2.3	32.2	HVAS	61	Project site	
2011*	10.6	0.6	43.0	HVAS	60	Project site	
2012	9.3	0.7	32.8	HVAS	61	Project site	
2013	10.0	0	44.2	HVAS	58	Project site	
2014	12.2	0.3	38.3	HVAS	61	Project site	
2015	11.9	0.7	64.2	HVAS	59	Project site	

#### Table 6 24-Hour Average PM<sub>10</sub> Concentrations – January 2010 to December 2015

Note An extremely high 24-hour average PM<sub>10</sub> concentration of 207 µg/m<sup>3</sup> was recorded on 28<sup>th</sup> November 2011. The occurrence of such high concentrations is very uncharacteristic of this area and therefore this record was considered as contaminated and has not been considered in the cumulative impact assessment presented in this report.



Figure 6 24-Hour Average PM<sub>10</sub> Concentrations Recorded at the Project Site

It is noted that continuous  $PM_{10}$  monitoring data from the Albion Park South monitoring station (located approximately 3 km west of the Project Site), is available to use as daily varying background data. A brief summary of this background dataset, which was based on 24-hour average concentrations recorded during the 2015 calendar year (i.e. concurrent with the meteorological dataset used), are presented in **Table 7**.

It can be observed from **Table 6** and **Table 7** that average  $PM_{10}$  concentrations recorded at the project site in recent years are lower than the concentrations measured in 2015 by the air quality monitoring station (AQMS) located at Albion Park South. Therefore use of this 2015 monitoring data as background data would be expected to provide a conservative estimate of current ambient background PM<sub>10</sub> levels in the Project area. This means that the impacts predicted in this study for the proposed operations should provide a conservative worst-case estimate of the actual cumulative concentrations that would be expected to occur.

Table 7	24-Hour Average PM <sub>10</sub> Concentrations (2015) – Albion Park South
---------	--

Year	24-hour Average PM <sub>10</sub> (μg/m <sup>3</sup> )			Sampling	Number of	Monitoring
	Average	Minimum	Maximum	Method	Samples	Location
2015	14.0	2.8	41.2	TEOM	347	Albion Park

#### 4.4 Suspended Particulate Matter (PM<sub>2.5</sub>)

Continuous  $PM_{2.5}$  monitoring data is also available to use as daily varying background data from the Albion Park South monitoring station. A brief summary of this background dataset, which was based on 24-hour average concentrations recorded during the 2015 calendar year (i.e. concurrent with the meteorological dataset used), are presented in **Table 8**.

Table 8	24-Hour Average PM <sub>2.5</sub> Concentrations (2015) – Albion Park South
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Year	24-hour Average PM <sub>2.5</sub> (μg/m <sup>3</sup> )			Sampling	Number of	Monitoring
	Average	Minimum	Maximum	Method	Samples	Location
2015	6.4	0.6	21.1	TEOM	286	Albion Park

#### 4.5 Total Suspended Particulate Matter

Concentrations of TSP are not measured at Albion Park South. As  $PM_{10}$  represents a fraction of the broader particulate concentration, relationships between TSP and  $PM_{10}$  as measured at four sites in the Newcastle area between 2000 and 2011 (NSW OEH, 2012) and in the Illawarra region between 1996 and 2004 have been examined and are presented in **Appendix A**. This analysis indicates that the annual average TSP concentration is approximately 2.4 times the annual average  $PM_{10}$  concentration measured at Albion Park South in 2015 to estimate the annual average TSP concentration measured at Albion Park South in 2015 to estimate the annual average TSP concentration.

Although many of the TSP/PM<sub>10</sub> data have been measured in areas in which the sources of particulate matter may not be identical to those surrounding the Development site, the broad relationship is considered to be appropriate for use within this assessment. It is noted that the conclusions of this assessment as they relate to the annual average TSP concentration are not dependent on highly accurate calculation of the existing background TSP concentration experienced in the area.

### 4.6 Background Air Quality Levels Assumed for Assessment Purposes

For the purposes of assessing the potential cumulative air quality impacts from the Project, an estimation of background air quality levels is required. The site-specific background air quality levels adopted for this assessment are summarised in **Table 9**.

Air Quality Parameter	Averaging Period	Assumed Background Ambient Level	Data Source
TSP	Annual	34.2 μg/m <sup>3</sup>	Estimated based on a PM <sub>10</sub> :TSP ratio of 0.41:1
PM <sub>10</sub>	24-Hour	41.2 µg/m <sup>3</sup>	Albion Park South – highest measured concentration
	Annual	14.0 μg/m <sup>3</sup>	Albion Park South
PM <sub>2.5</sub>	24-Hour	21.1 µg/m <sup>3</sup>	Albion Park South – highest measured concentration
	Annual	6.4 μg/m <sup>3</sup>	Albion Park South
Dust Deposition	Annual	2.4 g/m <sup>2</sup> /month	Bombo

 Table 9
 Ambient Air Quality Environment for Assessment Purposes

## 5 ASSESSMENT OF POTENTIAL IMPACTS

Emissions from proposed quarrying operations associated with Stage 5 & 6 at the Project site identified as having the potential to impact upon the nearby residences have been modelled using the US EPA's CALPUFF (Version 6.267) modelling system as described below.

#### 5.1 Dispersion Modelling Methodology

For this assessment, dispersion modelling was conducted using the US EPA's CALPUFF (Scire, Strimaitis, & Yamartino, 2000) modelling system.

CALPUFF is a transport and dispersion model that ejects "puffs" of material emitted from modelled sources, simulating dispersion and transformation processes along the way. In doing so it typically uses the fields generated by a meteorological pre-processor CALMET, discussed further in **Section 5.1.1.2**. Temporal and spatial variations in the meteorological fields selected are explicitly incorporated in the resulting distribution of puffs throughout a simulation period.

The primary output files from CALPUFF contain hourly concentrations or deposition values evaluated at selected receptor locations. The CALPOST post-processor is then used to process these files, producing tabulations that summarise results of the simulation for user-selected averaging periods.

#### 5.1.1 Meteorological Modelling

Meteorological mechanisms govern the dispersion, transformation and eventual removal of pollutants from the atmosphere. The extent to which pollution will accumulate or disperse in the atmosphere is dependent on the degree of thermal and mechanical turbulence within the earth's boundary layer. Dispersion comprises vertical and horizontal components of motion. The stability of the atmosphere and the depth of the surface-mixing layer define the vertical component. The horizontal dispersion of pollution in the boundary layer is primarily a function of the wind field. The wind speed determines both the distance of downwind transport and the rate of dilution as a result of plume 'stretching'. The generation of mechanical turbulence is similarly a function of the wind speed, in combination with the surface roughness. The wind direction, and the variability in wind direction, determines the general path pollutants will follow, and the extent of crosswind spreading.

Pollution concentration levels therefore fluctuate in response to changes in atmospheric stability, to concurrent variations in the mixing depth, and to shifts in the wind field (Oke 1998).

To adequately characterise the dispersion meteorology of the study site, information is needed on the prevailing wind regime, mixing height and atmospheric stability and other parameters such as ambient temperature, rainfall and relative humidity.

Meteorological data collected over the period 2010-2015 at the nearest BOM station (Albion Park [station number 068241]) were analysed to select a representative year for dispersion modelling. The analysis showed that data collected during the 2015 calendar year are in reasonably good agreement with long term averages compared to other years and was therefore selected for use in this assessment.

#### 5.1.1.1 TAPM

In order to calculate all required meteorological parameters required by the dispersion modelling process, meteorological modelling using The Air Pollution Model (TAPM, v 4.0.4) has been performed. TAPM, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) is a prognostic model which may be used to predict three-dimensional meteorological data and air pollution concentrations.

The TAPM model predicts wind speed and direction, temperature, pressure, water vapour, cloud, rain water and turbulence. The program allows the user to generate synthetic observations by referencing databases (covering terrain, vegetation and soil type, sea surface temperature and synoptic scale meteorological analyses) which are subsequently used in the model input to generate site-specific hourly meteorological observations at user-defined levels within the atmosphere.

TAPM may also assimilate actual local wind observations so that they can optionally be included in a model solution. However, given that TAPM is known to under-predict calm wind conditions, the wind speed and direction observations obtained from the nearest BoM stations have also been used in the subsequent CALMET component of the modelling as described in **Section 5.1.1.2** below.

Modelling Period	1 January 2015 to 31 December 2015
Centre of analysis	300,251 mE 6,170,554 mN (UTM Coordinates)
Number of grid points	30 × 30 × 25
Number of grids (spacing)	3 (30 km, 10 km, 6 km)
Data assimilation	Onsite meteorological data Albion Park AWS (Station # 68241)
Terrain	AUSLIG 9 second DEM

Table 10	Meteorological Parameters used for this Study	v (	(TAPM v 4.0.4)	)
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The three dimensional upper air data from TAPM output was used as input for the diagnostic meteorological model (CALMET).

#### 5.1.1.2 CALMET

In the simplest terms, CALMET is a meteorological model that develops wind and temperature fields on a three-dimensional gridded modelling domain. Associated two-dimensional fields such as mixing height, surface characteristics, and dispersion properties are also included in the file produced by CALMET. The interpolated wind field is then modified within the model to account for the influences of topography, as well as differential heating and surface roughness associated with different land uses across the modelling domain. These modifications are applied to the winds at each grid point to develop a final wind field. The final wind field thus reflects the influences of local topography and current land uses.

CALMET modelling was conducted using the 'with Obs' CALMET approach. TAPM-generated upper air data and available surface weather observations in the area were used to refine the wind field predetermined by TAPM data. Hourly surface meteorological data from the nearest BoM stations were incorporated in the CALMET modelling. A horizontal grid spacing of 100 m was used to adequately represent the important local terrain features and land use. **Table 11** details the parameters used in the meteorological modelling.

Table 11	CALMET	Configuration	Used t	for this	Study
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Modelling Period	1 January 2015 to 31 December 2015
Centre of analysis	300,251 mE 6,170,554 mN (UTM Coordinates)
Meteorological grid domain (Meteorological grid resolution)	170 km x 170 km (3.4 km) 50 km x 50 km (1 km) 15 km x 15 km (0.3 km) 6 km x 6 km (0.1 km)
Vertical Resolution (Cell Heights)	10 (0 m, 20 m, 40 m, 80 m, 160 m, 320 m, 640 m, 1200 m, 2000 m, 3000 m, 4000 m)
Data Assimilation	Onsite meteorological data Albion Park AWS (Station # 68241) Sydney Airport AWS (Station # 66037)

A summary of the key features of the site-representative meteorological file derived for use in the modelling study using the above methodology is provided in **Appendix B**.

#### 5.2 Emission Estimation Methodology

Two emission inventories have been compiled for this assessment:

- Stage 5 operations 900,000 tpa; and
- Stage 6 operations 900,000 tpa.

The emission inventories take into consideration the movement of mobile plant and equipment during operation at the current extraction rates and incorporate the following activities:

- Extraction operations, including drilling and blasting, bulldozer and excavator;
- Overburden removal, including use of scraper and excavator;
- Stockpiling of overburden material, including wind-generated erosion;
- Stockpile management;
- Grader operation;
- Movement of haul trucks about the Project Site; and
- Unloading of extracted materials at the existing operations to the north.

Potential particulate emissions from the operations have been estimated based on the emission factors presented in the *Emission Estimation Technique Manual for Mining* (hereafter, "EETMM"), *Version 3.1* (DSEWPC, 2012). In some instances, the moisture content of materials at the Project Site is not adequately reflected within the default emission factors contained in the EETMM or the equations given in Table 1 of the EETMM document. USEPA AP-42 documentation was therefore used to derive representative emission factors in these instances (USEPA, 1998).

Potential particulate emissions from both the Stage 5 & 6 operations were estimated based on the latest EETMM and AP42 documents in order to provide comparable emission inventories for the two scenarios. Details of the emission factor/equations used in estimating the potential emissions are provided below.

#### 5.2.1 Bulldozer

$$EF = k \times \frac{s^a}{M^b}$$
 kg/h

where k=2.6, a=1.2, b=1.3 for TSP and k=0.34, a=1.5, b=1.4 for  $PM_{10}$ ,  $PM_{2.5} = EF_{TSP} \times 0.105$ ; s = silt content and M = moisture content. Source: EETMM and AP42

# 5.2.2 Miscellaneous Handling (Excavators, loading/unloading of material)

$$EF = k \times 0.0016 \times \left(\frac{U}{2.2}\right)^{1.3} \left(\frac{M}{2}\right)^{-1.4} \text{kg/t}$$

where k=0.74 for TSP and 0.35 for  $PM_{10}$ , 0.053 for  $PM_{2.5}$ , U = mean wind speed and M = moisture content.

Source: EETMM and AP42

#### 5.2.3 Scraper Operation

 $EF = k \times 10^{-6} \times s^{1.3} W^{2.4} \text{ kg/VKT}$ 

where k=9.6 for TSP and 1.32 for  $PM_{10}$ ,  $PM_{2.5} = EF_{TSP} \times 0.0468$ , s = silt content and W = vehicle gross mass Note: VKT = Vehicle Kilometres Travelled.

Source: EETMM

#### 5.2.4 Grader Operation

 $EF_{TSP} = 0.0034 \times S^{2.5} \text{ kg/VKT}$ 

 $EF_{PM10} = 0.00336 \times S^{2.0} \text{ kg/VKT}$ 

where S = average vehicle speed,  $PM_{2.5} = EF_{TSP} \times 0.031$ Note: VKT = Vehicle Kilometres Travelled Source: AP42

#### 5.2.5 Blasting

 $EF = 0.00022 \times A^{1.5}$  kg/blast

where A = Blast area (m<sup>2</sup>),PM<sub>10</sub> is 52% of TSP. Source: EETMM

#### 5.2.6 Stockpile Wind Erosion

EF = 0.4 kg/ha/hr for TSP

EF = 0.2 kg/ha/hr for  $PM_{10}$  and  $PM_{2.5}$ Source: EETMM

#### 5.2.7 Haul Truck Wheel Dust

$$EF = k \times \left(\frac{s}{12}\right)^{0.7} \times \left(\frac{W}{3}\right)^{0.45} \times \left(\frac{0.4536}{1.6093}\right) \text{kg/VKT}$$

where k=4.9 for TSP, 1.5 for  $PM_{10}$ , 0.15 for  $PM_{2.5}$ , s = silt content and W = vehicle gross mass Note: VKT = Vehicle Kilometres Travelled. Source: USEPA AP-42

#### 5.3 Estimated Emissions

**Table 12** presents a comparison of the assumed operating parameters and total estimated potential TSP and  $PM_{10}$  emission rates for the Stage 5 & 6 operating scenarios. Detailed calculations for estimating the emissions are presented in **Appendix C**.

SLR has been advised that currently the scraper operates approximately once a week. Information provided for current operations indicates that the haul roads are usually graded once a week.

Activity	Unit	Stage 5	Stage 6
Extraction rate	tpa	900,000	900,000
Hours of operation	per annum	2,888	2,888
Disturbed area	ha	2.6	2.9
Number of blasts <sup>1</sup>	per annum	26	26
Number of Drill holes	per annum	1,766	1,766
Hauling	VKT/hr	12.0	11.0
Grading	km/week	3.9	3.6
Scraper	VKT/annum	573	573
PM <sub>2.5</sub> emission rate	kg/annum	4,292	4,189
PM <sub>10</sub> emission rate	kg/annum	28,970	27,983
TSP emission rate	kg/annum	55,060	52,546

Table 12	Operating Parameters and Estimated Emission Rate
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Notes:

1. There will be approximately 26 blasts per annum however, the emissions from one blast per day has been modelled to capture the worst 24-hour average (ie the maximum ground level concentration).

#### 5.4 **Predicted Impacts**

#### 5.4.1 Total Suspended Particulate Matter (TSP)

Potential TSP emissions from Stages 5 & 6 of the quarry operations have been estimated based on the current NPI and AP42 documents. Annual average incremental and cumulative TSP concentrations predicted at the nearest sensitive receptors for Stage 5 & 6 operations are presented in **Table 13**, with contour plots of the incremental impacts presented in **Figure 7** and **Figure 8** respectively.

The modelling results indicate that the extraction of hard rock from Stages 5 & 6 is unlikely to result in exceedances of the criterion for annual average TSP concentrations at any of the surrounding sensitive residences.

Percenter	Paakaround	Incremental Impact (µg/m <sup>3</sup> )		Cumulative I	mpact (µg/m³)
Receptor	Background	Stage 5	Stage 6	Stage 5	Stage 6
R1	34.2	1.7	1.7	35.9	35.9
R2	34.2	1.2	1.2	35.4	35.4
R3	34.2	1.0	1.0	35.2	35.2
R4	34.2	0.3	0.3	34.5	34.5
R5	34.2	0.3	0.3	34.5	34.5
R6	34.2	0.1	0.1	34.3	34.3
Criterion				90	90

Table 13	Incremental and Cumulative Annual Average PM <sub>10</sub> Concentrations at Surrounding Re	eceptors
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#### Figure 7 Stage 5 Predicted Annual Average Incremental TSP Concentrations



#### Figure 8 Stage 6 Predicted Annual Average Incremental TSP Concentrations

#### 5.4.2 Suspended Particulate Matter (PM<sub>10</sub>)

**Table 14** presents incremental and cumulative annual average  $PM_{10}$  concentrations predicted at each receptor listed in **Section 2.1**. The incremental and cumulative annual average  $PM_{10}$  concentrations predicted at each sensitive receptor are well below the relevant guideline, indicating that the proposed operations are unlikely to cause any exceedances of the guideline at these locations.

It can also be observed that the predicted incremental annual average  $PM_{10}$  concentrations at all receptors are minor (<5%) compared to the relevant ambient air quality guideline. The proposed operational activities are unlikely to cause any additional exceedances above background air quality concentrations of the  $PM_{10}$  criterion at the sensitive receptor locations.

Contour plots of the predicted annual average incremental  $PM_{10}$  concentrations are presented in **Figure 9** and **Figure 10** for Stage 5 & 6 operations.

Decenter	Peekareund	Incremental I	mpact (µg/m³)	Cumulative I	mpact (µg/m³)
Receptor	Background -	Stage 5	Stage 6	Stage 5	Stage 6
R1	14.0	1.0	0.8	15.0	14.8
R2	14.0	0.7	0.6	14.7	14.6
R3	14.0	0.6	0.5	14.6	14.5
R4	14.0	0.2	0.2	14.2	14.2
R5	14.0	0.2	0.2	14.2	14.2
R6	14.0	0.1	0.1	14.1	14.1
Criterion				30	30

#### Table 14 Incremental and Cumulative Annual Average PM<sub>10</sub> Concentrations at Surrounding Receptors

The maximum 24-hour average incremental  $PM_{10}$  concentrations predicted at sensitive receptors for Stage 5 & 6 operations are presented in **Table 15**, with contour plots of the incremental impacts presented in **Figure 11** and **Figure 12** respectively.

Decenter	Incremental I	mpact (µg/m³)
Receptor	Stage 5	Stage 6
R1	7.1	7.1
R2	4.8	4.8
R3	5.4	5.4
R4	1.6	1.6
R5	1.3	1.3
R6	1.0	1.0

Table 15	Incremental Maximum 24-Hour Average PM <sub>10</sub> Concentrations at Surroun	ding Receptors
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Based on the results presented in **Table 15**, Residence R1 was identified as being the potentially worst impacted sensitive receptor. To analyse the cumulative 24-hour average  $PM_{10}$  impacts predicted by the modelling in more detail, a contemporaneous analysis was conducted as required by the Approved Methods for this receptor (R1) and is presented in **Table 16** for Stage 5 and **Table 17** for Stage 6.

The data presented in **Table 16** shows that, during Stage 5, the days predicting the highest impacts occur when the contribution from background air quality sources is high. The modelling results show that the cumulative 24-hour average  $PM_{10}$  concentrations for Stage 5 are predicted to be below the relevant criterion.

	Maximum Predicted 24-Hour Average PM <sub>10</sub> Concentrations (µg/m³)							
	High Backgro	ound Days			High Increment Days			
Date	Background	Increment	Total	Date	Background	Increment	Total	
26/11/2015	41.2	0.7	41.9	30/06/2015	10.0	7.1	17.1	
05/05/2015	38.6	0.0	38.6	20/06/2015	8.7	6.0	14.7	
20/12/2015	38.6	0.0	38.6	18/06/2015	5.0	5.8	10.8	
16/10/2015	38.0	0.0	38.0	10/08/2015	13.4	5.5	18.9	
06/05/2015	37.8	1.0	38.8	01/07/2015	8.6	5.1	13.7	
22/08/2015	33.9	0.0	33.9	18/07/2015	7.8	5.1	12.9	
19/11/2015	33.6	0.1	33.7	24/09/2015	8.4	4.9	13.3	
19/12/2015	33.0	0.0	33.0	19/06/2015	4.2	4.9	9.1	
21/08/2015	32.5	0.3	32.8	19/07/2015	6.7	4.8	11.5	
07/10/2015	31.1	0.2	31.3	16/07/2015	4.6	4.7	9.3	
Criterion			50				50	

Table 16	Stage 5 - Summary of	Contemporaneous Imp	act and Background at Receptor R1
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The data presented in **Table 16** shows that, during Stage 6, the days predicting the highest impacts occur when the contribution from background air quality sources is high. The modelling results show that the cumulative 24-hour average  $PM_{10}$  concentrations for Stage 6 are predicted to be below the relevant criterion.

	Maximum Predicted 24-Hour Average PM <sub>10</sub> Concentrations (µg/m³)								
	High Backgro	ound Days		High Increment Days					
Date	Background	Increment	Total	Date	Background	Increment	Total		
26/11/2015	41.2	0.6	41.8	01/07/2015	8.6	4.4	13.0		
05/05/2015	38.6	<0.1	<38.7	19/07/2015	6.7	4.1	10.8		
20/12/2015	38.6	<0.1	<38.7	24/03/2015	9.2	4.0	13.2		
16/10/2015	38.0	<0.1	38.1	30/06/2015	10.0	4.0	14.0		
06/05/2015	37.8	0.7	38.5	18/06/2015	5.0	3.9	8.9		
22/08/2015	33.9	<0.1	<34.0	24/09/2015	8.4	3.8	12.2		
19/11/2015	33.6	0.1	33.7	02/05/2015	9.6	3.8	13.4		
19/12/2015	33.0	<0.1	<33.1	20/06/2015	8.7	3.7	12.4		
21/08/2015	32.5	0.3	32.8	10/08/2015	13.4	3.5	16.9		
07/10/2015	31.1	0.2	31.3	03/07/2015	10.0	3.3	13.3		
Criterion			50				50		

 Table 17
 Stage 6 – Summary of Contemporaneous Impact and Background at Receptor R1

It is therefore concluded that extraction of hard rock during Stages 5 & 6 is unlikely to cause any additional exceedances of the 24-hour average  $PM_{10}$  guideline at the surrounding sensitive receptors.



#### Figure 9 Stage 5 Predicted Annual Average Incremental PM<sub>10</sub> Concentration

	1	GDA 1994 MGA Zone 56	tion:
Pollutant		24/03/2016	
-			



#### Figure 10 Stage 6 Predicted Annual Average Incremental PM<sub>10</sub> Concentrations



#### Figure 11 Stage 5 Predicted Maximum 24-Hour Average Incremental PM<sub>10</sub> Concentrations



#### Figure 12 Stage 6 Predicted Maximum 24-Hour Average Incremental PM<sub>10</sub> Concentrations

#### 5.4.3 Suspended Particulate Matter (PM<sub>2.5</sub>)

**Table 18** and **Table 19** show the predicted incremental and cumulative impacts for annual and the predicted incremental 24-hour average  $PM_{2.5}$  concentrations at each receptor, respectively. The maximum 24-hour and annual average incremental  $PM_{2.5}$  concentration contour plots for both Stage 5 and 6 are presented in **Figure 13** to **Figure 16**.

The predicted incremental 24-hour and annual average  $PM_{2.5}$  concentrations at all receptors are minor (<10% and <5% respectively) compared to the relevant ambient air quality guideline. Considering the relatively small predicted incremental contribution, it can be concluded that the proposed operational activities are unlikely to cause any additional exceedances above background air quality concentrations of the 24-hour or annual average  $PM_{2.5}$  criteria at sensitive receptor locations.

Decenter	Deelemeund	Incremental I	mpact (µg/m³)	Cumulative Impact (µg/m <sup>3</sup> )		
Receptor	Background -	Stage 5	Stage 6	Stage 5	Stage 6	
R1	6.4	0.2	0.2	6.6	6.6	
R2	6.4	0.1	0.1	6.5	6.5	
R3	6.4	0.1	0.1	6.5	6.5	
R4	6.4	<0.1	<0.1	<6.5	<6.5	
R5	6.4	<0.1	<0.1	<6.5	<6.5	
R6	6.4	<0.1	<0.1	<6.5	<6.5	
Criterion				8	8	

 Table 18
 Incremental and Cumulative Annual Average PM<sub>2.5</sub> Concentrations at Surrounding Receptors

Table 19	Incremental Maximum 24-Hour average PM <sub>2.5</sub> Concentrations at Surrounding Reco	eptors
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Decenter	Incremental I	mpact (µg/m³)
Receptor	Stage 5	Stage 6
R1	1.6	1.6
R2	1.1	1.1
R3	1.1	1.1
R4	0.3	0.3
R5	0.2	0.2
R6	0.2	0.2

Based on the results presented in **Table 19**, Residence R1 was identified as being the potentially worst impacted sensitive receptor. To analyse the cumulative 24-hour average  $PM_{2.5}$  impacts predicted by the modelling in more detail, a contemporaneous analysis was conducted as required by the Approved Methods for this receptor (R1) and is presented in **Table 20** for Stage 5 and **Table 21** for Stage 6.

The data presented in **Table 20** shows that, during Stage 5, the days predicting the highest impacts occur when the contribution from background air quality sources is high. The modelling results show that the cumulative 24-hour average  $PM_{2.5}$  concentrations for Stage 5 are predicted to be below the relevant criterion.

	Maximum Predicted 24-Hour Average PM <sub>2.5</sub> Concentrations (µg/m³)								
	High Backgro	ound Days			High Increment Days				
Date	Background	Increment	Total	Date	Background	Increment	Total		
21/08/2015	21.1	<0.1	<21.2	30/06/2015	6.0	1.6	7.6		
22/08/2015	18.5	<0.1	<18.6	10/08/2015	6.5	1.2	7.7		
19/12/2015	16.9	<0.1	<17.0	20/06/2015	-	1.1	1.1		
20/12/2015	16.9	<0.1	<17.0	18/06/2015	2.1	1.1	3.2		
16/10/2015	16.2	<0.1	<16.3	01/07/2015	5.2	1.0	6.2		
25/11/2015	15.3	<0.1	<15.4	19/07/2015	3.1	0.9	4.0		
20/11/2015	15.1	0.1	15.2	18/07/2015	3.5	0.9	4.4		
11/12/2015	15.1	0.1	15.2	02/06/2015	4.5	0.9	5.4		
29/11/2015	14.7	<0.1	<14.8	16/07/2015	3.7	0.9	4.6		
11/10/2015	14.4	<0.1	<14.5	19/06/2015	-	0.9	0.9		
Criterion			25				25		

#### Table 20 Stage 5 - Summary of Contemporaneous Impact and Background at Receptor R1

The data presented in **Table 21** shows that, during Stage 6, the days predicting the highest impacts occur when the contribution from background air quality sources is high. The modelling results show that the cumulative 24-hour average  $PM_{2.5}$  concentrations for Stage 6 are predicted to be below the relevant criterion.

	Maximum Predicted 24-Hour Average PM <sub>2.5</sub> Concentrations (µg/m <sup>3</sup> )								
	High Backgro	und Days		High Increment Days					
Date	Background	Increment	Total	Date	Background	Increment	Total		
21/08/2015	21.1	<0.1	<21.2	01/07/2015	5.2	0.9	6.1		
22/08/2015	18.5	<0.1	<18.6	24/03/2015	3.5	0.9	4.4		
19/12/2015	16.9	<0.1	<17.0	30/06/2015	6.0	0.8	6.8		
20/12/2015	16.9	<0.1	<17.0	19/07/2015	3.1	0.8	3.9		
16/10/2015	16.2	<0.1	<16.3	02/05/2015	4.1	0.8	4.9		
25/11/2015	15.3	<0.1	<15.4	18/06/2015	2.1	0.8	2.9		
20/11/2015	15.1	0.1	15.2	10/08/2015	6.5	0.7	7.2		
11/12/2015	15.1	0.1	15.2	03/07/2015	5.9	0.7	6.6		
29/11/2015	14.7	<0.1	<14.8	20/06/2015	-	0.7	0.7		
11/10/2015	14.4	<0.1	<14.5	24/09/2015	4.1	0.7	4.8		
Criterion			25				25		

Table 21 Stage 6 - Summary of Contemporaneous Impact and Background at Receptor R1

It is therefore concluded that extraction of hard rock during Stages 5 & 6 is unlikely to cause any additional exceedances of the 24-hour average  $PM_{2.5}$  guideline at the surrounding sensitive receptors.



#### Figure 13 Stage 5 Predicted Annual Average Incremental PM<sub>2.5</sub> Concentrations



#### Figure 14 Stage 6 Predicted Annual Average Incremental PM<sub>2.5</sub> Concentrations



#### Figure 15 Stage 5 Predicted Maximum 24-Hour Average Incremental PM<sub>2.5</sub> Concentrations





#### 5.4.4 Dust Deposition

Annual average dust deposition rates (in g/m<sup>2</sup>/month) at the surrounding sensitive receptors due to the proposed quarry operations during Stage 5 & 6 have been predicted based on the TSP emission rates presented in **Table 12**.

Estimated annual average incremental and cumulative dust deposition levels at each receptor for the proposed operation are summarised in **Table 22** and the incremental impacts are presented as contour plots in **Figure 17** and **Figure 18**. It can be observed that the proposed operation is unlikely to exceed the nuisance criteria for incremental or cumulative dust deposition levels at any of the identified surrounding sensitive receptor locations.

Receptor	Background* (g/m²/month)	Incremen (g/m²/	tal Impact month)	Cumulative (g/m²/month)	
	-	Stage 5	Stage 6	Stage 5	Stage 6
R1	2.4	<0.1	<0.1	<2.5	<2.5
R2	2.4	<0.1	<0.1	<2.5	<2.5
R3	2.4	<0.1	<0.1	<2.5	<2.5
R4	2.4	<0.1	<0.1	<2.5	<2.5
R5	2.4	<0.1	<0.1	<2.5	<2.5
R6	2.4	<0.1	<0.1	<2.5	<2.5
Criterion		2.0	2.0	4.0	4.0

#### Table 22 Incremental and Cumulative Annual Average Dust Deposition at Nearest Receptors

Note: \*The background value is based on data from the site monitoring program and therefore includes the impact from current operations.



#### Figure 17 Stage 5 Predicted Annual Average Incremental (Project only) Dust Deposition



#### Figure 18 Stage 6 Predicted Annual Average Incremental (Project only) Dust Deposition

## 6 CONCLUSION

The Albion Park Quarry is currently extracting 900,000 tpa of hard rock from Stage 4 of the operations. This assessment addresses the potential impacts to air quality from extracting 900,000 tpa of hard rock from Stage 5 and 6 of the operations. SLR has historically conducted air quality impact assessments for this quarry.

Atmospheric dispersion modelling was carried out to determine the potential impacts to air quality of extractive activities for the Project. The potential emission-generating activities for the both stages of operation have been identified and potential emissions from these activities were estimated based on available information and emission factors from the literature.

The existing air quality environment was quantified through a combination of monitoring data from both the Project Site and a regional station maintained by the NSW Office of Environment and Heritage. Data from the on-site meteorological station were used to represent the local atmospheric dispersion conditions.

Dispersion modelling of the emissions to predict maximum off-site pollutant concentrations indicates that the proposed operational activities would comply with all relevant ambient air quality criteria at all representative surrounding sensitive receptors, even when existing background pollutant levels are considered.

Based on the modelling approach, it is concluded that dust and particulate matter impacts during the annual extraction of 900,000 tpa of hard rock during Stage 5 and 6 at the Albion Park Quarry would not cause exceedances of the relevant air quality criteria.

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ANALYSIS OF PM<sub>10</sub> AND TSP DATA



Figure A-1 Analysis of PM<sub>10</sub> and TSP HVAS Data, Newcastle Region (2000 to 2011) and Illawarra Region (1996 to 2004)

Newcastle: Mayfield, Steel River Estate, Stockton, Fern Bay and Fullerton Road, Stockton. Illawarra: Albion Park, Kembla Grange, Warrawong, Wollongong, Port Kembla.

# METEOROLOGICAL DATA USED IN MODELLING

#### Wind Speed and Direction

A summary of the annual wind behaviour predicted by CALMET at the Development site is presented as wind roses in **Figure B-1**. **Figure** indicates that winds experienced at the site are predominantly moderate (between 1.5 m/s and 5.5 m/s) with a large percentage of the strong winds (>10.5 m/s) originating from the west. Calm wind conditions (wind speed less than 0.5 m/s) were predicted to occur approximately 3.1% of the time throughout the modelling period.

The seasonal wind roses indicate that typically:

- In summer, winds are moderate to strong predominantly from the northeast.
- In autumn, winds are moderate to strong predominantly from the western quadrant with also a significant contribution of moderate to strong winds from the southwest quadrant.
- In winter, predominant wind directions are from the west and wind speeds are considered to be moderate to strong.
- In spring, moderate winds occur from the northeasterly quadrant with winds from the southwest also dominant.

METEOROLOGICAL DATA



#### Figure B-1 Predicted Seasonal Wind Roses for the Project Site (CALMET predictions, 2015)
#### Atmospheric Stability

Atmospheric stability refers to the tendency of the atmosphere to resist or enhance vertical motion. The Pasquill-Turner assignment scheme identifies six Stability Classes, A to F, to categorize the degree of atmospheric stability as follows:

- A = Extremely unstable conditions
- B = Moderately unstable conditions
- C = Slightly unstable conditions
- D = Neutral conditions
- E = Slightly stable conditions
- F = Moderately stable conditions

The meteorological conditions defining each Pasquill stability class are shown in Table B-1.

Surface wind	D	aytime insolatio	on	Night-time conditions		
speed (m/s)	Strong	Moderate	Slight	Thin overcast or > 4/8 low cloud	<= 4/8 cloudiness	
< 2	А	A - B	В	E	F	
2 - 3	A - B	В	С	E	F	
3 - 5	В	B - C	С	D	E	
5 - 6	С	C - D	D	D	D	
> 6	С	D	D	D	D	

Table B-1	Meteorological Conditions	<b>Defining Pasquill Stability</b>	y Classes (Source: Pasquill, 1961	)
-----------	---------------------------	------------------------------------	-----------------------------------	---

Notes:

1. Strong insolation corresponds to sunny midday in midsummer in England; slight insolation to similar conditions in midwinter.

2. Night refers to the period from 1 hour before sunset to 1 hour after sunrise.

3. The neutral category D should also be used, regardless of wind speed, for overcast conditions during day or night and for any sky conditions during the hour preceding or following night as defined above.

The frequency of each stability class predicted by CALMET during the modelling period, extracted at the centre of the Project Site, is presented in **Figure B-2**. The results indicate a high frequency of conditions typical to Stability Class F. Stability Class F is indicative of stable night time conditions, which will inhibit pollutant dispersion resulting in higher pollutant concentrations.

#### METEOROLOGICAL DATA



Figure B-2 Predicted Stability Class Frequencies at the Development Site (CALMET predictions, 2015)

#### **Mixing Heights**

Diurnal variations in maximum and average mixing heights predicted by CALMET at the Development site during the 2015 modelling period are illustrated in **Figure B-3**.

As would be expected, an increase in mixing height during the morning is apparent, arising due to the onset of vertical mixing following sunrise. Maximum mixing heights occur in the mid to late afternoon, due to the dissipation of ground based temperature inversions and growth of the convective mixing layer.



Figure B-3 Predicted Mixing Heights at the Project Site (CALMET predictions, 2015)

#### Temperature

The modelled temperature variations as predicted at the Development site during 2015 are illustrated in **Figure B-4**. The maximum temperature (31.6°C) was predicted on 20 November and the minimum temperature (5.1°C) was predicted on 4 August.





#### Plot of Hourly Temperature Records

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#### EMISSION INVENTORY

Activity	Control Factors	TSP emission (kg/y)	PM <sub>10</sub> emission (kg/y)	PM <sub>2.5</sub> emission (kg/y)	Intensity	Units	TSP emission factor	PM <sub>10</sub> emission factor	PM <sub>2.5</sub> emission factor	Units
Bulldozer	2	8,150	3,593	1,626	1,650	hours/year	9.9	2.3	1.0	kg/h
Excavator - Rock	2	502	451	68	900,000	tonnes/year	0.0011	0.0005	0.00008	kg/t
Excavator - OB	2	13	12	2	49,196	tonnes/year	0.0005	0.0003	0.00004	kg/t
Air - Track Drill	2	521	515	46	1,766	holes/year	0.59	0.3068	0.0276	kg/hole
Scrapers	2	3,441	473	161	573	VKT	6.008	0.8261	0.2812	kg/VKT
Grader	1,2	26	16	2	195	Km	1.08	0.34	0.03	kg/VKT
Blasting	2	13	13	1	26	blasts/year	1.0	0.5	0.03	kg/blast
Wheel Dust (Empty)	1,2	15,123	7,757	776	34,768	VKT	3.480	0.939	0.094	kg/VKT
Wheel Dust (Full)	1,2	22,285	11,431	1,143	34,768	VKT	5.128	1.384	0.138	kg/VKT
Trucks dumping Rock	2	502	451	68	900,000	tonnes/year	0.0011	0.0005	0.00008	kg/t
Dumping overburden	2	13	12	2	49,196	tonnes/year	0.0005	0.0003	0.00004	kg/t
Wind Erosion	2	4,471	4,248	398	2.6	ha	0.40	0.20	0.02	kg/ha/hour
Total		55,060	28,970	4,292						

#### Table C-1 Stage 5 Emission Inventory

Notes:

-

1. Control factors:

1. Haul road water spraying = 75% reduction

2. Pit Retention: TSP = 50% reduction;  $PM_{10} = 5\%$  reduction

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#### EMISSION INVENTORY

Activity	Control Factors	TSP emission (kg/y)	PM <sub>10</sub> emission (kg/y)	PM <sub>2.5</sub> emission (kg/y)	Intensity	Units	TSP emission factor	PM <sub>10</sub> emission factor	PM <sub>2.5</sub> emission factor	Units
Bulldozer	2	8,150	3,593	1,626	1,650	hours/year	9.9	2.3	1.0	kg/h
Excavator - Rock	2	502	451	68	900,000	tonnes/year	0.0011	0.0005	0.00008	kg/t
Excavator - OB	2	13	12	2	49,196	tonnes/year	0.0005	0.0003	0.00004	kg/t
Air - Track Drill	2	521	515	46	1,766	holes/year	0.59	0.3068	0.0276	kg/hole
Scrapers	2	3,441	473	161	573	VKT	6.008	0.8261	0.2812	kg/VKT
Grader	1,2	24	14	1	180	km	1.08	0.34	0.03	kg/VKT
Blasting	2	13	13	1	26	blasts/year	1.0	0.5	0.03	kg/blast
Wheel Dust (Empty)	1,2	13,826	7,092	709	31,788	VKT	3.480	0.939	0.094	kg/VKT
Wheel Dust (Full)	1,2	20,375	10,451	1,045	31,788	VKT	5.128	1.384	0.138	kg/VKT
Trucks dumping Rock	2	502	451	68	900,000	tonnes/year	0.0011	0.0005	0.00008	kg/t
Dumping overburden	2	13	12	2	49,196	tonnes/year	0.0005	0.0003	0.00004	kg/t
Wind Erosion	2	5,165	4,907	459	2.9	ha	0.40	0.20	0.02	kg/ha/hour
Total		52,546	27,983	4,189						

#### Table C-2 Stage 6 Emission Inventory

Notes:

2. Control factors:

1. Haul road water spraying = 75% reduction

2. Pit Retention: TSP = 50% reduction;  $PM_{10} = 5\%$  reduction



# **APPENDIX 7:**

"Noise and Blasting Assessment/Management Plans – prepared by SLR Consulting (4 April 2016)"



global environmental solutions

## Albion Park Quarry Extension - Stages 5 and 6 Noise and Blasting Assessment/Management Plans

Report Number 610.04156-R5

4 April 2016

Cleary Bros (Bombo) Pty Ltd 39 Five Island Road PORT KEMBLA NSW 2505

Version: Revision 0

## Albion Park Quarry Extension - Stages 5 and 6 Noise and Blasting Assessment/Management Plans

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> This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Cleary Bros (Bombo) Pty Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

#### DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.04156-R5	Revision 0	4 April 2016	Dick Godson	Mark Blake	Dick Godson

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- Appendix B EPA Response to a Review of the Noise and Blast Management Plans
- Appendix C Stage 5 and 6 Noise Level Contours
- Appendix D Site Law Graphs
- Appendix E Visual NOx Fume Rating Scale and Field Colour Chart

#### 1 INTRODUCTION

The Minister for Infrastructure and Planning has conditionally approved the extension of the Cleary Bros (Bombo) Pty Ltd (Cleary Bros) Albion Park Quarry extension and the development of the quarry haul road in 2004.

Further to this approval being issued, a third party appeal was lodged by Figtree Hill Pty Limited against Cleary Bros (Bombo) Pty Limited and the Minister for Planning. Following the Land and Environment Court Proceedings No. 10639 of 2005, amended Consent Conditions (Consent) were issued.

The Consent Conditions for the hard rock quarry haul road on Lot 2 DP858245, Dunsters Lane, Croome relate to Development Application No. 467-11-2003 (Haul Road DA). The Consent Conditions for the extension of the hard rock quarry on Lot 1 DP858245 and Lot 23 DP1939967, Dunsters Lane, Croome relate to DA 466-11-2003 (Quarry Extension DA).

Initially, SLR Consulting Australia Pty Ltd (SLR - then Heggies Australia Pty Ltd) was requested to provide a Blast Management Plan (BMP) and Noise Monitoring Programme (NMP) relating to the assessment and monitoring requirements in order to ensure environmental compliance in regard to the blasting and noise aspects of the operations.

The SLR report dated 10 February 2006 contained the NMP for the Albion Park Quarry extension and detailed monitoring locations and intervals, methods of monitoring noise emissions and associated weather as well as the correct compliance checking procedures/corrective action and subsequent reporting in accordance with the (then) Department of Infrastructure, Planning and Natural Resources (DIPNR) and the Department of Environment and Conservation (DEC) requirements.

The original Noise Monitoring Programme was prepared in accordance with Conditions 7, Schedule 4 of the 2006 Consent Conditions for the quarry extension.

In 2015 a Modified Development Consent was issued for the extension to the hard rock quarry and is attached as **Appendix A**.

Subsequently, a Noise Management Plan (NMP) was prepared in accordance with Condition 14, Schedule 4 of the 2015 Quarry Extension DA Consent which states that:

"Noise Management Plan

- 8. The Applicant shall prepare and implement a Noise 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevance noise criteria and operating conditions in this consent;
  - c) describe the proposed noise management system on site; and
  - d) include a monitoring program that:
    - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
    - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents."

Similarly, a Revised Blast Management Plan (RBMP) was prepared in accordance with Condition 14 of the 2015 Quarry Extension DA Consent which states that:

"Blast Management Plan

- 14. Prior to the commencement of operations in each stage of the development after Stage 1, the Applicant shall prepare, and subsequently implement, a Blast Management Plan for the development in consultation with the landowner(s) of The Fig Tree Hill Land, the EPA and to the satisfaction of the Secretary. This plan must:
  - a) include a summary of monitoring results for the previous quarry stage;
  - b) describe the objectives for noise and blasting for that stage;
  - c) describe the proposed blasting design for that stage, and demonstrate that the design will meet the blast criteria listed in Tables 3 and 4;
  - d) include a monitoring program for evaluating and reporting on the performance of the development, including:
    - compliance with the blasting criteria in this consent; and
    - minimising the fume emissions from the site;
  - e) describe the measures that would be implemented to:
    - ensure compliance with the blasting criteria and operating conditions of this consent; and
    - mitigate, remediate or compensate for any blasting impacts of the development on The Fig Tree Hill Land or the use of that land.

Note: The plan shall be generally in accordance with the draft Blast Management Plan titled 'Albion Park Quarry Extension, Noise Monitoring Program/Blast Management Plan' dated 10 February 2006 and prepared by Heggies Australia Pty Ltd."

The EPA's response to a review of the NMP (dated 30 October 2015) and the BMP (dated 18 November 2015) is attached as **Appendix B**.

As Stage 2 and Stage 4 of the subject quarry extension are being excavated concurrently, the next stage of excavation is Stage 5 concurrently with Stage 6.

In relation to Stages 5 and 6 of the subject Quarry Extension, Condition 6, Schedule 3 of the 2015 Quarry Extension DA states that:

"Staged Development"

. . . . . . .

*"6. Under section 80(5) of the Act, Stages 5 and 6 must been the subject of another development consent.* 

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of The Fig Tree Hill Land, and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to in subclause (b) above;
- d) assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public;
- seek independent expert advice on the report if deemed to be warranted;

- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public."

Following a meeting between the Proponent and DoPE representatives, the Proponent was advised, in relation to the assessment for Stages 5 and 6 of the Quarry Extension called up in Condition 6 above, that:

"This assessment should focus on changed impacts associated with Stages 5 & 6 and does not need to address already approved operations. The Environmental Assessment must provide an assessment of the environmental performance of the quarry to date and, where possible, use this information to calibrate the prediction of impacts for Stages 5 & 6."

This assessment has consequently been prepared on that basis.

#### 2 PROJECT NOISE EMISSION LIMITS

#### 2.1 Noise

Condition 4, Schedule 4 of the 2015 Quarry Extension DA Consent states that:

"The Applicant shall ensure that noise generated by the development does not exceed the criteria specified in Table 1.

Receiver Locations	Noise Limits dB(A) LAeq(15minute)				
	Stages 1-2	Stages 3-4	Stages 5-6		
'The Hill' residence (Dunster premises)	35	38	35		
'The Cottage' residence (Dunster premises)	35	38	35		
Approved rural workers dwelling (Dunster premises)	35	38	35		
Greenmeadows Residential Estate	41	41	41		

Table 1: Noise Criteria for the Development

Notes:

- 1. Staging as depicted in Figure 3.5 of the EIS prepared by Perram and Partners, dated October 2003.
- Receiver locations nominated in Table 5.12 of the report prepared by Richard Heggie and Associates Report No. 30-1079R1 titled 'Noise and Blasting Impact Assessment - Cleary Bros Albion Park Quarry' (13 December 2002). At the time of the DA the above were the nearest affected residences.
- 3. The receiver locations and noise limits in the above table may be varied in the instance that negotiated agreements are entered into by the licensee and affected residents/occupiers or if existing agreements become void, or the nearest receiver location changes due to urban encroachment. These limits may be subject to change with an EPL variation.
- 4. Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Table 1. Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- 5. The noise emission limits in Table 1 apply under meteorological conditions of:
  - Wind speeds up to 0.5m/s in any direction at 10 metres above ground level; or
  - Temperature gradient (environmental lapse rate) conditions of less than or equal to 0°C/100m (lapse)."

#### 2.2 Operating Hours

Conditions 5 and 6, Schedule 4 of the 2015 Quarry Extension DA Consent state that:

"5. The Applicant shall comply with the operating hours in Table 2.

Activity	Days of the Week	Time
Drilling, rock breaking, loading and haulage of materials from quarry to processing plant,	Monday - Friday	7.00 am - 5.30 pm
processing and stockpiling, overburden stripping and other stage preparatory works, all site construction activities, rehabilitation works, general plant and maintenance. Processing, crushing and screening and product transfer to stockpiles	Saturday	7.00 am - 1.00 pm

 Table 2:
 Operating Hours for the Development

- 6. The following activities may be carried out at the premises outside the hours specified in Table 2:
  - a) the delivery of materials as requested by Police or other authorities for safety reasons;
  - b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm;
  - c) workshop activities and other maintenance work inaudible at the nearest affected receiver."

#### 3 QUARRY ENVIRONMENTAL MANAGEMENT PLAN

The criteria and procedures in the current Quarry Environmental Management Plan (QEMP) for Albion Park Quarry which relate to noise are as follows. However, the QEMP will be revised and updated in accordance with this Noise Management Plan.

#### **"5.5 NOISE LIMITS**

#### 5.5.1 Performance Objective

- Source Quarry development consent: schedule 4, conditions 4, 8 and 9; Access road consent: conditions 16, 17 and 18. (identical)
- Requirement Operational noise generated by the development must not exceed criteria specified in Table 5.1 under conditions of wind speeds (10 metres above ground) of up to 0.5 metres per second and under temperature gradients of to 0° C per 100 metres (Condition 4).
- Verification Noise measurement to be undertaken at the most affected point on the receptor boundary or within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary. Measurements to be undertaken by a qualified person within eight weeks of commencing extraction and annually thereafter. Results to be submitted to DECC and the Director-General within three months (Condition 8). Noise monitoring procedures are included in the noise monitoring plan and summarised in section 7 of this QEMP.
- Notification Within seven days of detecting an exceedance of a noise limit in Table 5.1, the exceedance is to be reported to DECC, the Director-General and the owner of the property. (refer to Condition 9 for details).

#### Table 5.1 NOISE LIMITS

Receiver Locations	Noise Limits LAeq(15minute)				
	Stages 1-2	Stages 3-4	Stages 5-6		
"The Hill" residence (Dunster premises)	35	38	35		
"The Cottage" residence (Dunster premises)	35	38	35		
Approved rural worker's dwelling (Dunster premises)	35	38	35		
Greenmeadows residential estate	41	41	41		

#### 7.3 NOISE MONITORING

#### 7.3.1 Source

Noise monitoring requirements are detailed in the Noise Monitoring Programme/Blast Management Plan (Heggies Australia 2006) and summarised below.

#### 7.3.2 Location

Noise monitoring locations are as follows:

Location Type	Monitoring
Reference location	"Belmont" (Cody Residence)
Residential Assessment Location	"The Cottage" (Dunster Residence)
Residential Assessment Location	Greenmeadows Residential Estate

Operator attended monitoring and unattended noise logging shall be carried at all of the above locations, except as detailed in 7.3.3 below.

#### 7.3.3 Frequency

Operator attended monitoring is to be undertaken on one day per calendar quarter for the first 12 months after commencement of works and then at yearly intervals and at the commencement of any significant operational event.

Unattended noise logging is to be carried out for a minimum period of seven days on a quarterly basis for the first 12 months after commencement of works and then at yearly intervals.

The Greenmeadows estate is affected by noise from the processing plant which is unlikely to change unless the plant is altered. Once compliance has been established, further quarterly noise monitoring at this location is not required, although annual monitoring will continue.

#### 7.3.4 Method

Operator attended monitoring shall quantify and characterise the maximum (LAmax) and the average (LAeq(15minute)) intrusive noise from quarrying over a 15 minute measuring period.

Unattended continuous noise logging shall be conducted to quantify overall ambient noise amenity levels resulting from quarrying and processing emissions and other environmental noise sources.

Measurements will be taken with acoustic instrumentation carrying current NATA or manufacturer calibration certificates. Instrument calibration will be checked before and after each measurement survey.

All noise measurements will be accompanied by qualitative and quantitative measurements of prevailing local weather conditions. The operator shall record any significant quarry generated noise sources and obtain the operating logs for quarry plant and equipment during the measurement period.

#### 7.3.5 Performance Targets

Performance targets are summarised in section 5.5 of this QEMP.

#### 7.3.6 Assessment

Operator attended residential measurements are designed to confirm that noise generated by the development does not exceed the noise limits specified in the development consent (see section 5.5 of this QEMP).

Unattended noise logger data shall be correlated with weather data and quarry operating conditions, with data from periods of unstable weather deleted. The results shall be presented graphically.

#### 7.3.7 Reporting and Review

The results of noise monitoring are to be included in the Annual Environmental Management Report.

In the event of any exceedance of relevant criteria, the matter will immediately be brought to the attention of the Quarry Production Manager, who will report the exceedance as required in section 7.7 of this QEMP."

#### 4 NOISE MONITORING PROGRAM STAGES 5 AND 6

#### 4.1 Historic Noise Compliance Monitoring

Subsequent to the submission of the January 2009 to March 2009 noise compliance report to the Department of Planning and Infrastructure (DoPI, now DoPE), concerns were expressed by the DoPE in relation to the lack of supporting evidence to justify the reported findings of compliance with the noise limits for the Albion Park Quarry.

Accordingly, SLR prepared a noise monitoring methodology in order to accommodate the requirements of the DoPE. This methodology differs from the Noise Monitoring Programme developed in 2006 for the Albion Park Quarry. The subsequent reporting procedures were considered sufficient to meet the requirements of the 2015 Quarry Extension DA Consent ("2015 Consent") in relation to Stages 5 and 6 and are presented in **Section 4.2**.

#### 4.2 General Requirements

The noise measurement procedures employed throughout the monitoring programme will be in accordance with the requirements of AS 1055 1997 "*Acoustics - Description and Measurement of Environmental Noise*" and the NSW EPA's Industrial Noise Policy (INP).

In response to the DoPE's request for supporting evidence to justify compliance with the noise limits for the Albion Park Quarry, two unattended continuous noise loggers will be installed at strategic positions within the quarry in order to capture the contributions from the Albion Park Quarry. One logger will be installed in the Processing Plant Area near the crusher and the other logger will be installed in the Quarry Extension Area for a minimum period of 7 days, depending upon the weather conditions.

However, the weather conditions would have a minimal effect on the measured noise level at the two unattended monitoring locations (Processing Plant and Quarry Extension Areas) because of the close proximity of the noise loggers to the Albion Park Quarry operations.

The median value of the LA1 and LA10 quarry operations noise levels will be used to quantify the "maximum" and "average maximum" noise levels respectively at the nominated assessment locations. The LAeq is the equivalent continuous noise level which is equal in energy to the fluctuating level over the 15 minute interval.

In order to derive the statistical noise levels, the data will be processed for the 0700 hours to 1800 hours daytime period. The calculated statistical ambient noise levels at each monitoring location will subsequently be determined.

#### 4.2.1 Noise Impact Assessment Procedures

The two unattended monitoring locations have been incorporated into the existing quarry noise model, which was developed in 2002 and used to prepare the Noise and Blasting Impact Assessment for the quarry. These two locations are used as reference points enabling a comparison to be made between the predicted noise levels at the two reference locations and the noise levels modelled at the residences under varying weather conditions. This "relationship" will subsequently be used to calculate the daily fluctuating quarry noise contributions at the respective residences.

The 2015 Consent noise limits apply under calm conditions only (ie wind speeds up to 0.5 m/s at 10 m height). Accordingly, the analysis of the noise logger results together with the modelling results during Stages 5 and 6 will enable the contribution of the Albion Park Quarry to be calculated for calm (ie no wind) conditions to check compliance with the Consent noise limits.

#### 4.3 Operator Attended Noise Surveys

Operator attended noise measurements and recordings will also be conducted, where prevailing weather conditions are favourable, in order to quantify the intrusive noise emissions from the quarrying, processing and transportation operations as well as the overall level of ambient noise in order to complement the unattended noise survey analysis.

The operator will quantify and characterise the maximum (LAmax) and the average (LAeq(15minute)) intrusive noise level from quarrying and processing operations over a 15 minute measurement period. In addition, the operator will quantify and characterise the overall levels of ambient noise (ie LAmax, LA1, LA10, LA50, LA90, LA99, LAmin) over the 15 minute measurement interval.

#### 4.4 Monitoring Locations and Intervals

Operator-attended noise measurements during Stages 5 and 6 will be carried out at the three (3) key monitoring locations identified in Table 1 of the 2015 Consent at yearly intervals as well as at the commencement of any significant operational event. Operator-attended noise measurements will be carried out during the operating hours presented in Table 2 of the 2015 Consent.

It should be noted that Greenmeadows Residential Estate is only affected by noise emissions from the quarry processing plant. The noise levels are unlikely to change at this location over time unless alterations are made to the processing plant. As compliance at this location has previously been established, monitoring will no longer be conducted at the Estate.

#### 5 INSTRUMENTATION AND MEASUREMENT PARAMETERS

#### 5.1 Operator-Attended Surveys and Unattended Logging

All acoustic instrumentation employed throughout the Stages 5 and 6 monitoring programme will be designed to comply with the requirements of AS 1259.2-1990, "*Sound Level Meters*" and will carry current NATA or manufacturer calibration certificates.

All instrumentation will be programmed to record continuously statistical noise level indices in 15 minute intervals which may include the LAmax, LA1, LA5, LA10, LA50, LA90, LA99, LAmin and the LAeq.

Instrument calibration will be checked before and after each measurement survey, with the variation in calibrated levels not to exceed  $\pm 0.5$  dBA.

#### 5.2 Weather Monitoring Instrumentation

All noise measurements will be accompanied by both qualitative description (including cloud cover) and quantitative measurements of prevailing local weather conditions throughout the survey period.

Meteorological measurements will be guided by the requirements of AS 2923-1987 "Ambient Air-Guide for Measurements of Horizontal Wind for Air Quality Applications". An automatic weather station on the quarry site has been programmed to continuously record the meteorological parameters as shown in **Table 1**.

Measured Parameter	Unit	Sample Interval	
Mean wind speed	km/hr (or m/s)	15 minute	
Mean wind direction	Degrees	15 minute	
Sigma-theta	-	15 minute	
Aggregate rainfall	mm	15 minute	
Mean air temperature	°C	15 minute	
Mean relative humidity	%RH	15 minute	

 Table 1
 Meteorological Measurement Parameters

#### 5.3 Plant and Equipment Observations and Log

During the Stages 5 and 6 attended noise measurements, the operator will record any significant quarry generated noise sources (ie haul trucks, dozer, etc). In addition, the operator will obtain copies of the relevant fixed plant and mobile quarrying equipment operating shift logs during the period of the unattended noise logger surveys.

#### 6 DOCUMENTING, REPORTING AND CORRECTIVE ACTION

#### 6.1 Operator Attended Noise Surveys

The measured LAeq(15minute) noise level contributions from Stages 5 and 6 quarrying, processing and transporting operations as well as the overall ambient noise levels together with the weather and quarrying operating conditions will be documented on an annual basis.

The measured contributed noise emissions from quarrying, processing and transporting operations will be evaluated and assessed with the noise emission criteria presented in Table 1 of the 2015 Consent.

#### 6.2 Unattended Continuous Noise Logging

The unattended ambient noise logger data from each key monitoring location, together with the weather and quarrying operating conditions, will be presented graphically on a daily basis together with the corresponding noise levels modelled at the residences.

Prior to further analysis and where appropriate, the ambient noise level data from each monitoring location which correlate with periods of unstable weather (ie rainfall greater than 0.5 mm or wind speed greater than 18 km/h) will be discarded.

#### 6.3 Reporting

All Stages 5 and 6 quarry operational noise monitoring results will be documented and reported on an annual basis in accordance with the 2015 Consent requirements, as is currently the case.

#### 6.4 Excessive Noise Emissions and Corrective Action

In addition to the routine requirements of the noise monitoring programme, should the occupant of any dwelling raise concerns over the levels of noise associated with normal quarry operations, then the emission level and its source will be promptly investigated.

In the event of an exceedance of the relevant criteria (a "noise incident"), the Albion Park Quarry Environmental Engineer will be promptly informed of the location and the margin of exceedance. The noise, weather and plant operating results will be documented and forwarded to the Environmental Engineer.

Further, in the event that a noise incident is identified, the relevant Government Department and affected stakeholders will be notified immediately.

The following corrective action will be implemented in order to restore compliance with the appropriate criteria.

Potential noise mitigation measures include the use of Best Achievable Technology together with Best Environmental Management Practices.

In general terms, Best Achievable Technology will include the following engineering based treatments:

- **Source Mitigation**, including variation to the operating method or design and the modification or replacement of plant and equipment.
- **Propagation Path Mitigation**, including the use of barriers (or isolation) in close proximity to the source of emission or at the receiver.
- **Receiver Mitigation**, including permanent treatment of a dwelling to the satisfaction of the occupant.

Best Environmental Management Practices will include the following procedures:

- Siting high noise generating plant and equipment at remote locations.
- Scheduling high noise generating operations to occur during late morning and afternoon only.
- Monitoring, reporting and community liaison programmes.

#### 6.5 Historic Noise Compliance Survey Results

Based on the procedures and requirements of the Noise Compliance Surveys outlined in **Sections 4.1** to **4.4**, presented below in **Table 2** are the survey results and noise limits for the years 2010 to 2015.

Monitoring Stage 1			Stage 3	Stage 3			Noise Lin	Noise Limits	
Location	2010	2011	2012	2013	2014	2015	Stage 1	Stage 3	
The Hill	34	34	35	35	37	31	35	38	
The Cottage	34	34	37	36	38	32	35	38	
GR Estate	37	36	36	36	36	36	41	41	

Table 2 Calculated Noise Contribution of the Albion Park Quarry for No Wind (Calm) LAeq (dBA)

The historic noise survey results presented in **Table 2** indicate that the calculated Albion Park Quarry noise levels complied with the Consent Conditions under the nominated meteorological conditions.

#### 7 STAGES 5 AND 6 NOISE ASSESSMENT

In order to predict the Stages 5 and 6 quarry operational noise levels, the approach developed for the annual noise compliance measurements was adopted, as outlined in **Sections 4.2**, **4.3** and **4.4**, and compared to the noise predictions presented in the original EIS.

The mobile equipment modelled in the EIS for Stages 5 and 6 as well as the mobile equipment proposed to be used during the Stages 5 and 6 operations are presented in **Table 3**.

Table 3         Quarry Extension Area (Stages 5 and 6 Extraction)	Areas Operations) Equipment Fleet
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Equipment Type	EIS Fleet	Currently Proposed Fleet
Excavator + hammer CAT 330L	1	1
Excavator Hitachi 1200	1	1
Excavator CAT 345	1	1
Dump trucks (50t) – CAT 773B, CAT 777 and CAT 773E	5	6
Scrapers CAT 637	1	2
Water truck	1	1
Dozer CAT D8	1	1
FEL CAT 992C	1	1
Pump	-	1
Drill	1	1

Comparison of the 2010 to 2015 compliance noise levels presented in **Table 2** with the noise level predictions presented in Table 7.1.1 of the original Noise and Blasting Impact Assessmet for the quarry extension EIS indicates that the quarry operational noise levels range from 0 dBA to 1 dBA lower than the predicted levels.

Given the similarity of the equipment fleets used for the EIS assessment and proposed for the Stages 5 and 6 operations (refer to **Table 3**), it is anticipated that the Stages 5 and 6 operational noise level at "The Hill" residence would be within  $\pm 1$  dBA of that predicted.

The predicted Stages 5 and 6 operational noise level at The Hill residence in the EIS is 34 dBA LAeq(15minute). It is therefore anticipated that the actual noise level will be between 33 dBA LAeq(15minute) and 35 dBA LAeq(15minute), thereby complying with the 2015 Consent Stages 5 and 6 noise criterion at The Hill of 35 dBA LAeq(15minute).

The operational noise level contours for Stages 5 and 6 of the quarry extension are presented in **Appendix C**.

#### 8 PROJECT BLAST EMISSION LIMITS

#### 8.1 Blasting

Condition 10 and 11, Schedule 4 of the 2015 Quarry Extension DA Consent state that:

#### "Airblast Overpressure Criteria

10. The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 3 at any point that is located at least 3.5 m from any residence or other sensitive receiver on privately owned land.

Airblast overpressure Level [dB(Lin Peak)]	Allowable Exceedance
115	5% of the total number of blasts over any 12 month reporting period
120	0%

Table 3: Airblast Overpressure Limits

#### Ground Vibration Criteria

11. The Applicant shall ensure that the peak particle velocity from blasting at the development does not exceed the criteria in Table 4 at any point that is located at least 3.5 m from any residence or other sensitive receiver on privately owned land.

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over any 12 month reporting period
10	0%

Table 4: Ground Vibration Limit

#### 8.2 Operating Hours

Condition 5, Schedule 4 of the 2015 Quarry Extension DA Consent state that:

"The Applicant shall comply with the operating hours in Table 2.

Activity	Days of the Week	Time
Drilling, rock breaking, loading and haulage of materials from quarry to processing plant, processing and stockpiling, overburden stripping and other stage preparatory works, all site construction activities, rehabilitation works, general plant and maintenance. Processing, crushing and screening and product transfer to stockpiles	Monday - Friday Saturday	7.00 am - 5.30 pm 7.00 am - 1.00 pm

Table 2: Operating Hours of the Development

Condition 12, Schedule 4 of the 2015 Quarry Extension DA Consent goes on to state:

#### "Blasting Restrictions

- 12. Blasting operations on the premises may only take place:
  - a. between 9.00am and 5.00pm Monday to Friday inclusive:
  - b. are limited to 1 blast each day; and
  - c. at such other times as may be approved by the EPA."

#### 9 BLAST HISTORY/MANAGEMENT PLAN

#### 9.1 Overview

A detailed review of the historic blast designs and corresponding blast emissions (ground vibration and airblast) monitoring data, as presented in **Table 4**, was conducted by SLR for blasting in Stages 1 to 4 of the quarry extension in order to complement the findings presented in SLR Report 610.04156-R3 Revision 4 *"Albion Park Quarry Extension Revised Blast Management Plan"* (RBMP). The findings of the updated review form the basis of this assessment.

Date	Blast ID Number	Ground Vibration PPV (mm/s)	Airblast (dB Linear Peak)
11-Mar-16	06/16	0.59	109.9
08-Mar-16	05/16	1.39	104.2
01-Mar-16	04/16	1.24	101.9
12-Feb-16	03/16	1.20	101.9
05-Feb-16	02/16	1.49	107.5
12-Jan-16	01/16	1.92	105.8
09-Dec-15	14/15	2.07	103.4
02-Nov-15	13/15	2.61	104.6
12-Oct-15	12/15	1.24	107.0
06-Aug-15	11/15	1.45	102.7
30-Jul-15	09/15	1.30	108.8
30-Jun-15	08/15	2.61	102.0
17-Jun-15	07/15	1.11	108.9
25-May-15	06/16	2.35	105.9
07-May-15	05/15	0.96	113.4
10-Apr-15	04/15	1.78	108.6
18-Mar-15	03/15	3.43	100.3
12-Mar-15	02/15	2.61	107.3
19-Jan-15	01/15	2.12	106.9
08-Dec-14	16/14	1.51	101.9
04-Nov-14	15/14	1.08	104.2
23-Sep-14	14/14	0.79	101.0
09-Sep-14	13/14	0.85	101.0
05-Aug-14	12/14	1.17	105.5
16-Jul-14	11/14	1.23	108.1
23-Jul-14	10/14	2.84	104.2
04-Jun-14	09/14	0.72	101.0
06-May-14	08/14	1.30	104.9
15-Apr-14	07/14	0.81	105.1
08-Apr-14	06/14	1.91	99.6
04-Apr-14	05/14	0.62	107.0
12-Mar-14	04/14	1.46	112.2
05-Mar-14	03/14	1.83	98.8
12-Feb-14	02/14	1.09	102.8
30-Jan-14	01/14	0.79	97.5
19-Dec-13	26/13	1.15	92.6
09-Dec-13	25/13	0.35	100.0
19-Nov-13	24/13	2.67	107.0
01-Nov-13	22/13	1.29	108.0
11-Oct-13	23/13	1.18	100.7
04-Sep-13	21/13	2.17	101.8

#### Table 4 Historic Blast Emissions Levels

Date	Blast ID Number	Ground Vibration PPV (mm/s)	Airblast (dB Linear Peak)
20-Aug-13	20/13	1.61	101.8
16-Aug-13	19/13	1.08	100.7
05-Aug-13	18/13	1.16	106.8
15-Jul-13	17/13	1.21	103.5
25-Jun-13	16/13	1.46	109.1
05-Jun-13	15/13	1.18	105.6
27-May-13	14/13	0.91	101.8
16-May-13	13/13	0.88	-
29-Apr-13	12/13	1.29	100.3
18-Apr-13	11/13	1.21	101.9
11-Apr-13	10/13	1.21	103.3
04-Apr-13	09/13	2.13	105.0
25-Mar-13	08/13	1.92	99.4
06-Mar-13	06/13	1.76	99.9
27-Feb-13	05/13	0.94	100.5
20-Feb-13	04/13	1.48	100
19-Dec-12	24/12	1.11	95.9
05-Dec-12	23/12	1.95	114.0
27-Nov-12	21/12	1.35	101.0
16-Oct-12	16/12	2.17	97.5
13-Sep-12	14/12	2.48	105.5
09-Aug-12	11/12 & 12/12	0.84	108.0
02-Jul-12	10/12	0.69	107.0
01-May-12	8/12	0.71	101.0
03-Apr-12	6 & 7/12	0.99	100.0
29-Feb-12	4/12	0.58	95.9
23-Feb-12	3/12	0.86	94.0
02-Feb-12	2/12	1.58	110.0
19-Jan-12	1/12	1.59	101.0
15-Dec-11	18 & 19/11	1.24	107.0
14-Nov-11	15/11	0.82	94.0
28-Oct-11	14/11	0.61	102.8
10-Oct-11	13/11	1.24	101.9
21-Sep-11	12/11	0.84	108.0
06-Sep-11	11/11	0.74	104.2
22-Aug-11	10/11	0.51	106.0
25-Jul-11	9/11	0.87	102.8
24-Aug-11	8/11	0.74	109.0
16-Jun-11	7/11	0.73	106.0
30-May-11	6/11	0.58	103.5
08-Apr-11	5/11	1.04	104.9
08-Mar-11	3 & 4/11	0.67	106.0

Date	Blast ID Number	Ground Vibration PPV (mm/s)	Airblast (dB Linear Peak)
22-Feb-11	2/11	0.80	108.8
03-Feb-11	1/11	0.78	103.5
20-Dec-10	31/10	0.74	112.3
03-Dec-10	30/10	1.10	101.0
26-Nov-10	29/10	0.45	104.9
08-Nov-10	28/10	0.78	97.5
29-Oct-10	26/10 & 27/10	0.88	104.2
15-Oct-10	25/10	Below threshold level	Below threshold level
27-Sep-10	24/10	0.48	98.8
17-Sep-10	22/10 & 23/10	0.52	110.6
11-Aug-10	21/10	0.29	104.9
27-Jul-10	20/10	0.77	104.9
19-Jul-10	19/10	1.62	109.2
09-Jul-10	18/10	0.86	103.5
28-Jun-10	17/10	1.16	98.8
17-Jun-10	15/10 & 16/10	0.67	102.8
08-Jun-10	14/10	0.75	104.2
31-May-10	13/10	0.60	88.0
24-May-10	11/10 & 12/10	0.79	101.0
18-May-10	10/10	0.69	106.0
10-May-10	09/10	Below threshold level	Below threshold level
03-May-10	08/10	0.32	95.7
23-Apr-10	07/10	Below threshold level	Below threshold level
13-Apr-10	06/10	1.07	97.5
22-Mar-10	04/10 & 05/10	1.06	109.5
15-Mar-10	03/10	1.32	104.2
19-Feb-10	02/10	2.65	101.9
21-Jan-10	01/10	Below threshold level	Below threshold level
22-Dec-09	48/09	0.94	95.9
08-Dec-09	47/09	2.05	80.7
26-Nov-09	45/09	Below threshold level	Below threshold level
26-Nov-09	46/09	Below threshold level	Below threshold level
16-Nov-09	44/09	0.91	111.8
27-Oct-09	43/09	1.39	105.5
16-Oct-09	42/09	0.93	107.5
02-Oct-09	41/09	2.72	80.7
25-Sep-09	40/09	1.87	80.7
17-Sep-09	39/09	1.46	99.9
07-Sep-09	38/09	1.18	102.0
21-Aug-09	37/09	0.75	108.8
07-Aug-09	36/09	0.38	100.0

Date	Blast ID Number	Ground Vibration PPV (mm/s)	Airblast (dB Linear Peak)
03-Aug-09	35/09	0.64	100.0
22-Jul-09	34/09	0.58	94.0
17-Jul-09	33/09	0.32	108.4
03-Jul-09	32/09	0.65	109.5

Note: Additional blast emissions monitoring results to those presented in **Table 4** have been recorded in order to increase the accuracy of the prediction site laws. The additional data collected to prepare the site laws does not contain any exceedances of the 2015 Consent blast emissions criteria at the closest residence.

#### 9.2 Supplementary Considerations for Vibration and Airblast Criteria

In order to address Condition 14 d) of the 2015 Consent, the vibration and airblast site laws take account of the likely impact at the adjacent Fig Tree Hill Land southern boundary, in order to protect the health of people and/or cattle.

#### 9.3 Vibration

The ground vibration site law has been developed to assist in designing the blasts so that the peak particle component velocity levels for blasting at the development do not exceed 200 mm/s at any point on the southern boundary of the Fig Tree Hill Land.

#### 9.3.1 Airblast

The airblast site law has been developed to assist in designing the blasts so that the airblast levels for blasting at the development do not exceed 135 dB Linear at any point on the southern boundary of the Fig Tree Hill Land.

#### 9.4 General Blast Management

The following blast design parameters will be implemented for all blasts:

- Direction of detonator initiation is away from the closest residence, where possible.
- All blast faces to face generally away from the closest residence where possible.
- Use of solid decking in the blastholes, where required (solid decking is an inert material used in deck charging, usually stemming material).
- Two (or more) columns of explosives of approximately equal length per blasthole, where decked holes are required.
- Two (or more) detonators per blasthole, where decked blastholes are required.
- Use of 89 mm diameter blastholes, unless otherwise authorised.
- Stemming depth 3.0 m (nominal).
- Subdrill of 1.0 m (nominal) for both production and overburden blasts.
- Bench height up to 14 m, unless blastholes are decked.
- Front row burden 4.0 m (nominal).
- Subsequent burden 2.5 m (nominal)
- Spacing 3.5 m (nominal).

#### 9.5 Predicted Blast Emission Levels

Blast emission data from every blast will be used (via the blast emissions site laws developed from the results of the quarry extension blast monitoring to date) to refine subsequent blast designs in order to control blast emission (ground vibration and airblast) levels, particularly for later blasting when operating closer to residences.

The ground vibration and airblast criteria nominated in the 2015 Consent cater for the inherent variation in emission levels from a given blast design by allowing a five percent exceedance of a general criterion up to a (never to be exceeded) maximum. Correspondingly, the "5% exceedance" prediction formulae were generated in the blast emissions site laws. All subsequent blast emissions will be predicted using the continually refined site laws.

#### 9.6 Managing Airblast

The Maximum Instantaneous Charge (MIC-kg) of blasts in Stages 5 and 6 will not exceed the mass of explosives given by the following formula (based on the current 5% exceedance airblast site law):

MIC (kg) =  $[(Distance to nearest Receiver (m)) / 125.0]^3$ 

#### 9.6.1 Mitigation of Airblast

Blast design procedures will be implemented with the primary objective of maintaining the levels of airblast at the closest residences below 115 dB Linear, in accordance with the consent conditions for the development. The consent conditions also state that the blast emissions criteria may be exceeded for up to 5% of the total number of blasts over a period of 12 months but there can be no exceedances of 120 dBLinear.

By incorporating deck charging (a method of loading blastholes in which the explosive charges in the same blasthole are separated by an inert material) of (at least) the front row of blastholes in each blast (for benches greater than 14 m high) and initiating the blast in the direction away from the closest receiver location, emissions from blasting in the proposed extension, using an MIC in accordance with the airblast site law established for the quarry, will result in compliance with the general consent condition of 115 dB Linear airblast.

For an MIC of 50 kg, the current 5% exceedance site law predicts that a level 135 dB Linear will occur at a distance of approximately 88 m from the blast. As a precaution, when blasting within 88 m of the property boundary, the MIC from each blast may need to be restricted to below 50 kg with reference to the blasting site law for the quarry extension.

During Stages 5 and 6 of the quarry operation, blasting at the closest point will occur 30 m from the Fig Tree Hill Land southern boundary. Here, a restricted MIC below 15 kg may be required for only one (1) blast on the upper bench at the northern end of the quarry to meet the requirements of the site law. This blast will have an estimated duration of approximately 4 seconds.

In summary, in order to meet the requirements of the current airblast site law, it is currently predicted that the MIC for quarry blasting may need to be restricted to below 15 kg for a total of approximately 8 blasts over the life of the quarry. These blasts will have an estimated combined duration of approximately 32 seconds.

This means that blasting with a restricted MIC below 15 kg may be required for only 1 % of blasts over the life of the quarry. However, this will be confirmed with reference to the then current airblast site law.

#### 9.7 Managing Vibration

The MIC (kg) of blasts in the Stages 5 and 6 area of the quarry extension will not exceed the mass of explosives given by the following formula (based on the current 5% exceedances site law):

MIC (kg) =  $(Distance to nearest Receiver (m))^2 / 2,352$ 

Blast design procedures will be implemented with the primary objective of maintaining the levels of ground vibration at the closest residences below 5 mm/s, in accordance with the consent conditions for the development. The consent conditions also state that the blast emissions criteria may be exceeded for up to 5% of the total number of blasts over a period of 12 months.

By incorporating, where required, deck charging of the blastholes in each blast and generally initiating the blast in the direction away from the closest receiver location, it is predicted that emissions from blasting in the proposed extension, using an MIC in accordance with the blasting site law established for the quarry, will result in compliance with the general consent condition of 5 mm/s ground vibration.

The impacts of vibration from quarry blasting at the closest residential receivers and close to the Fig Tree Hill Land southern boundary will be mitigated in line with the reduction of the MIC associated with the control of airblast levels, based on the vibration site law for the quarry extension.

#### 9.8 Managing Flyrock

There are generally two main areas within the blast from which flyrock has the potential to be produced. These are at the blasthole collar (where the stemming length has not been optimised and the explosive column is too close to the upper surface of the rock mass creating crater effects - rifling) and at the face of the blast (where there could be less than optimum burden on a blasthole whereby the explosives gases are able to vent to atmosphere - blowouts, producing flyrock).

For the subject blasting, the front row blastholes will be "Boretraked" in order to identify any areas of less than optimum burden in order that, if required, inert material (rather than explosives) can be placed at this location in the blasthole. Consequently, in relation to flyrock ejection, the latter situation will not occur.

In terms of collar ejection, the minimum stemming length of 3.0 m is considered adequate for the blasthole lengths and has been selected in order to totally contain the explosives and separate them from the collar of the blasthole.

As well, aggregate will be used as the stemming material (not drill dust) again in order to contain the explosives within the blasthole (aggregate is used as stemming material as it "locks" at the collar of the blasthole upon initiation of the blast enabling the explosives gases to be used in fracturing and moving the rock instead of being ejected from the blasthole ("rifling")).

As an additional mitigation measure Cleary Bros will leave a 1 m layer of overburden in place on top of each shot when blasting within 20 m of the Fig Tree Hill Land southern boundary. This layer of overburden will act in much the same way as a conventional blast mat and will significantly reduce the likelihood of flyrock generation in the region of the blasthole collar.

Further, blast mats will be installed over the blast when blasting within 20 m of the Fig Tree Hill Land southern boundary. The blast design procedures for blasting near the Fig Tree Hill Land southern boundary will be determined via reference to the blast emissions site laws (refer to **Section 9.5**). As stated, the site specific quarry extension site laws (for ground vibration and airblast) will be continuously updated and subsequently used to design the next blast. Consequently, the allowable MICs to comply with the nominated ground vibration and airblast criteria at the Fig Tree Hill Land southern boundary will progressively reduce, thereby further reducing the likelihood of flyrock.

#### 9.9 External Blast Design Review

Prediction of ground vibration and airblast will be conducted prior to each blast by the acoustical consultant in order to determine the impact at the critical receiver locations. The ground vibration and airblast site laws will be updated on a regular basis to reflect the blast results obtained.

#### 9.10 Meteorological Considerations

Meteorological data will be made available to, and evaluated by the blasting contractor prior to blasting, as close as practical to the time of blasting. The expected weather conditions and their effect on the airblast (and dust) generated by the blasting will be considered and blast plans and/or timing altered if necessary. Meteorological conditions that will be considered are:

- Prevailing winds including their direction and velocity.
- Temperature inversions.
- Time of day.
- Seasonal effects on weather patterns.
- Cloud cover.

Blasting will be avoided, where possible, under the following meteorological conditions:

- When winds are blowing from the blast site to the nearest receiver at a strength likely to enhance blast emissions impacts.
- Where there is heavy low level cloud.
- Where a temperature inversion is indicated.

#### 9.11 Notifying Landowners or Occupiers of Blast Events

The Dunster's residence(s) and all affected landowners or occupiers within 500 m of a blasting event (including Holcim, formerly Readymix) will be contacted by telephone on the morning of blasting indicating an expected time of firing.

Wherever possible, the blasts will be conducted at the same (nominated) time of day.

If, when notifying Holcim, it is found that a blast is planned for the same day, measures will be taken to ensure the blasts are adequately separated in time.

Additionally, when blasting within 100 m of the Fig Tree Hill Land southern boundary, the owners of The Fig Tree Hill Land will be notified at least 48 hours prior to blasting of the proposed date and expected time of firing with a follow-up phone call on the morning of the blast confirming the time of firing.

#### 10 BLAST MONITORING PROGRAMME

#### **10.1** Blast Monitoring Plan Requirements

Condition 14, Schedule 4 of the 2015 Quarry Extension DA Consent states that:

#### "Blast Management Plan

14. Prior to the commencement of operations in each stage of the development after Stage 1, the Applicant shall prepare, and subsequently implement, a Blast Management Plan for the development in consultation with the landowner(s) of The Fig Tree Hill Land, the EPA and to the satisfaction of the Secretary. This plan must: ......

- d) include a monitoring program for evaluating and reporting on the performance of the development, including:
  - compliance with the blasting criteria in this consent;
  - minimising the fume emission from the site; ....."

#### 10.2 General Procedure

The Programme of Monitoring will be developed with reference to the procedures described in AS 2187.2-1993, "*Explosives - Storage, Transport and Use*" and with reference to the ANZECC's "*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration*", September 1990.

The blast emissions will be quantified for all blast events conducted at the project site.

In the event that the quarry's blast monitoring equipment is unavailable for service, due to installation or calibration requirement throughout the monitoring programme, then blast emissions will be monitored by alternative calibrated instrumentation.

#### **10.3 Monitoring Locations**

A permanent blast monitor emissions (airblast and vibration) has been located at the closest inhabited residence to the quarry's excavation boundary, namely the Dunster's ("The Cottage") residence. The blast monitor location is shown in **Figure 1**.

Figure 1 Blast Monitoring Location



A portable blast emissions monitor (to measure airblast and vibration) will be positioned at the nearest potentially affected residences (or other blast emissions sensitive receivers other than the Dunster's residence) to the blasting operations, if required as a response to community feedback or concerns.

#### **10.4** Instrumentation Requirements

#### 10.4.1 Blast Emission Monitors

Blast monitoring instrumentation will be employed to meet the following primary specifications presented in **Table 5**. The instrumentation will be installed, operated and maintained by suitably qualified or trained personnel. The instruments will be externally calibrated at regular intervals throughout the life of the project.

Table 5	Blast Monitor Specifications

Specification	Seismic	Airblast
Resolution	0.016 mm/s	0.1 dB
Range	0.1 mm/s to 254 mm/s	88 dB to 148 dB
Accuracy	3% at 15 Hz	0.2 dB at 30 Hz
Sample Rate	Minimum 1024 samples per second per channel	
Frequency Response	2 Hz to 250 Hz (3 dB points)	
Communications Link	Keyboard and Modem	
Recording Mode	Full Waveform Recording and archiving	

#### 10.4.2 Permanent Monitor Installation

The Dunster's blast monitor will continue to be permanently installed prior to blasting operations, probably with a remote modem communication link.

#### **10.4.3 Portable Monitor Installation**

The portable blast monitor(s) will be operated manually for each blast requiring the additional monitoring.

Vibration velocity geophones will be coupled to the ground via a "star stake" or concrete plinth embedded in the consolidated surface approximately 25 m from the subject building or structure, with the microphone positioned in the free-field.

#### **10.4.4 Weather Monitoring Equipment**

An automatic anemometer and wind vane station will be located in the vicinity of the quarry and will be considered representative of wind propagation conditions in relation to blast emissions throughout the blast monitoring programme.

The automatic station shall be programmed, as a minimum, to continuously record the meteorological parameters as shown in **Table 1** (Section 5.2).

#### 11 BLAST DESIGN RECORDS AND PREDICTED EMISSION LEVELS

Blast design records will be maintained for individual blast events. The purpose of the records is to assist in the design and optimisation of future events, planning and control of blasting emissions and to provide a traceable system of documentation in case of accident or complaint.

The blasting contractor will provide a description of blast parameters prior to each blast event and include the location co-ordinates (East, North, RL) of the blast site (or the distance from the blast site to the blast monitor(s)) and the maximum explosive mass (MIC) to be detonated in any 8 ms interval.

Section 9.5 and Section 9.7 present MIC limiting equations based on the current blast emission site laws for ground vibration and airblast from the results of blasting in Stages 1 to 4 of the quarry extension. These site laws, in the standard form, are presented below. The site law graphs are presented in Appendices D1 and D2.

The 1% and 5% site laws for ground vibration and airblast are:

#### **Ground Vibration**

PVS (1%) = 715  $(SD_1)^{-1.19}$ PVS (5%) = 507  $(SD_1)^{-1.19}$ 

#### Airblast

where PVS (1% and 5%) and SPL (1% and 5%) are the levels of ground vibration (Peak Vector Sum - mm/s) and peak airblast (dB Linear) respectively, above which 1% and 5% respectively of the total population (of data points) will lie, assuming that the population has the same statistical distribution as the underlying measured sample.

SD1 and SD2 are the ground vibration and airblast Scaled Distances, where:

 $SD1 = Distance / MIC^{1/2} (m.kg^{-0.5})$ 

and,

SD2 = Distance /  $MIC^{1/3}$  (m.kg<sup>-0.33</sup>)

The distances of blasting in Stages 5 and 6 from the Dunster Residence ("The Hill") range from 750 m (far point of Stage 6) to 420 m (near point of Stage 5). Based on the 5% exceedance blast emission site laws presented above, the allowable MICs for compliance with the blast emission levels in the 2015 Consent range from 38 kg at 420 m offset to 216 kg at 750 m offset, in both cases controlled by airblast (rather than ground vibration).

The Quarry Foreman (or the Blasting Contractor) will verify and approve the proposed blast design with respect to potential blast emissions based initially on the current 5% exceedance predictive site laws for ground vibration and airblast.

In order to maximise the benefits of the blast monitoring process, the significant design parameters, emission levels and meteorological data will be collated and maintained by the quarry in a Blast Design Record for each blast event. Cleary Bros Albion Park Quarry Work Instruction No WIAPQ/05 will be used for this purpose.

#### 12 BLAST FUME EMISSIONS

#### 12.1 Mitigation of Fume Emissions

Mitigation measures for fume control during blasting include:

- Fine material collected during drilling must not be used for blast stemming.
- All blastholes would be adequately stemmed with aggregate.
- Blasting to only occur between the hours 9.00 am and 5.00 pm, Monday to Friday, or as otherwise approved by the EPA as per the EPL conditions.
- In excessive wind events (ie prolonged visual dust in a particular area or following receipt of dust monitoring results in exceedance of the dust criteria), temporary halting of blasting activities and resuming when weather conditions have improved following appropriate assessment of weather conditions.

A professional contractor is hired to survey the blast area, create a Blasting Plan and to conduct the blast. Blasting should only occur following appropriate assessment of weather conditions by the Cleary Bros Environment Coordinator (or equivalent role) and the professional and suitably qualified Drill and Blast Superintendent to ensure that wind speed and direction will not result in excess fume (or dust) emissions from the site in the direction of the sensitive receptor locations. This measure will be effective in controlling off-site impacts due to fumes released during blasting operations.

Additionally, the design for each blast will aim to maximise the blast efficiency and minimise the emission of fumes (as well as dust and odour) in order to ensure compliance with site specific blasting criteria.

Fumes can be generated by the mechanisms as outlined in **Table 6** (also refer to the Air Quality Management Plan). Potential indicative control measures are also presented in **Table 6**. It is noted that wet product is used in both wet and dry blastholes to minimise blast fume generation.

Possible Cause	Potential Control Measures	
Explosive Formulation		
Explosive incorrectly formulated or not manufactured to specifications	<ul> <li>Track explosive mix back with supplier</li> <li>Perform visual check at discharge point</li> </ul>	
	<ul> <li>Use supplier who operates under an externally accredited quality system</li> </ul>	
Improper mixing of raw materials / incorrect metering	<ul> <li>Perform visual check at discharge point</li> <li>Ensure Mobile Manufacturing Unit (MMU) calibrated every 6 months</li> </ul>	
Blast design		
Inappropriate priming and/or placement	<ul> <li>Follow manufacturer's recommendations on placement on initiating explosives</li> </ul>	

Adapted from BHP Billiton Mt Arthur Blast Management Plan (MAC-ENC-MTP-015).

Blasting should only occur following an appropriate assessment of weather conditions by the Environment Coordinator and the Drill and Blast Superintendent (or equivalent roles) to ensure that wind speed and direction will not result in excess fume (or dust) emissions from the site in the direction of sensitive receptor locations. This measure will be effective at controlling off-site impacts due to fumes released during blasting operations.

Additionally, the design for each blast will aim to maximise the blast efficiency and minimise the emission of fumes (as well as dust and odour) in order to ensure compliance with site specific blasting conditions.

The blasting schedule will also be made available to the public via the Quarry website.

#### 12.2 Monitoring Programme for Fume Emissions

The fume emissions will be monitored by a visual assessment being conducted by Cleary Bros Quarry Production foreman or his delegate immediately after the blast.

A visual rating of blast fume emissions is approximate at best, but gives some indication of the severity of the event, so is worth recording.

The following factors (taken from the Code of Good Practice: Prevention and Management of Blast Generated  $NO_x$  Gases in Surface Blasting issued by the Australia Explosives Industry and Safety Group Inc.) should be considered for inclusion in a post-blast report:

• Date and time of blast

- Presence of noticeable post-blast NOx gases
- Post-blast NOx gas rating, eg 0-5 (refer Appendix E)
- Extent of post-blast NOx gas event, eg A, B or C (refer Appendix E)
- Duration of any post-blast NOx gas event (measure of time to disperse)
- Direction of movement of any post-blast NOx plume
- Movement of any post-blast NOx gas plume relative to the established exclusion zone and any establishment management zone (ie maintained within, exceeded)
- Climate conditions, including temperature, humidity, wind speed and direction, cloud cover, rain
- Results/readings of any NOx monitoring equipment employed for the blast
- Video results of blast where relevant

Appendix A Report Number 610.04156-R5 Page 1 of 22 2015 CONDITIONS OF CONSENT FOR THE HARD ROCK QUARRY
# **Development Consent**

# Section 80 of the Environmental Planning & Assessment Act 1979

### ANNEXURE A

Figtree Hill Pty Limited v Cleary Bros (Bombo) Pty Limited & Minister for Planning

Land and Environment Court Proceedings No. 10639 of 2005

#### CONDITIONS OF CONSENT

Red type represents 2009 modification Green type represents 2015 modification

#### **SCHEDULE 1**

Development Application:	No. 10639 of 2005	
Applicant:	Cleary Bros (Bombo) Pty Ltd.	
Consent Authority:	Minister for Infrastructure and Planning	
Land:	Lot 1 DP 858245 and Lot 23 DP 1039967, Dunsters Lane, Croom.	
Proposed Development:	Extension of hard rock quarry	
State Significant Development	The proposal is classified as State significant development under section 76A(7) of the <i>Environmental Planning and</i> <i>Assessment Act 1979,</i> as it meets the criteria specified in a declaration made by the Minister for Planning on 3 September 1999.	
Integrated Development	<ul> <li>The proposal is classified as integrated development under section 91 of the <i>Environmental Planning and Assessment Act</i> 1979, because it requires additional approvals under the:</li> <li>Protection of the Environment Operations Act, 1997; and</li> <li>Rivers and Foreshores Improvement Act, 1948.</li> </ul>	
Designated Development	The proposal is classified as designated development under section 77A of the <i>Environmental Planning and Assessment Act</i> 1979 because it meets the extractive industry criteria in schedule 3 of the <i>Environmental Planning and Assessment Regulation 2000.</i>	
Commencement of Consent	Pursuant to section 83(2) of the <i>Environmental Planning and Assessment Act 1979,</i> this consent operates from the date of determination.	
Lapse of Consent	Pursuant to section 95 of the <i>Environmental Planning and Assessment Act 1979</i> , this development consent is liable to lapse five years after the date from which it operates unless the use of any land, building or work the subject of the consent is actually commenced before the date on which the consent would otherwise lapse.	

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#### SCHEDULE 2 DEFINITIONS

Annual review	Annual Review, as required under condition 5 of schedule 6
Applicant	Cleary Bros (Bombo) Pty Ltd
BCA	Building Code of Australia
	Community Consultative Committee
	Shelinarbour City Council Development Application
Department	Development of Planning and Environment
Design event	90 percentile. 5 day rain event
DRE	Division of Resources and Energy within the Department of Trade and
	Investment, Regional Infrastructure and Services
EIS	Environmental Impact Statement
EMS	Environmental Management Strategy
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EFL	Environment Operations Act 1997
Feasible	Equipriment operations and what is practical to
	build or to implement
Fig Tree Hill Land	Lots 4 and 5 in deposited plan 3709 in their present or succeeding
-	titles
Heavy vehicle	Any vehicle with a gross vehicle mass of 5 tonnes or more
Incident	A set of circumstances that:
	• causes, or threatens to cause, material harm to the environment; and/or
	<ul> <li>breaches or exceeds the limits or performance measures/criteria in this consent</li> </ul>
Land	Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this development consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to
	ecosystems that is not trivial
Minister	Minister for Planning, or delegate
NOW	NSW Office of Water
OEH	NSW Office of Environment and Heritage
Privately-owned land	Land not owned by the Applicant or its related companies or where a
	owner
Quarry products	Extractive materials (hard rock products) which are produced at the
	site
Quarrying operations	Includes the removal of overburden and extraction, processing,
	handling, storage and transportation of extractive materials
Reasonable	Reasonable relates to the application of judgement in arriving at a
	decision, taking into account: mitigation benefits, cost of mitigation
	versus benefits provided, community views and the nature and extent
RMS	Roads and Maritime Services
Secretary	Secretary of the Department, or nominee
SEE	Statement of Environmental Effects
Site	Land to which the DA applies
Stage	The quarry development stages as described in the EIS

#### SCHEDULE 3 ADMINISTRATIVE CONDITIONS

#### **Obligation to Minimise Harm to the Environment**

1. The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

#### Scope of Development

- 2. The Applicant shall carry out the development generally in accordance with:
  - a) DA No. 466–11-2003;
  - b) The EIS titled *Proposed Quarry Extension Albion Park*, dated October 2003, and prepared by Perram & Partners;
  - c) Modification Application 10639 of 2005 MOD 1 and the accompanying SEE titled "Albion Park Quarry: Application to Modify Development Consent Increase Production Limit", dated November 2008, as amended by the correspondence to the Department dated 24 June 2009;
  - d) Modification Application 10639 of 2005 MOD 2 and the accompanying Environmental Assessment titled *Modification of Development Consent 10639 of 2005 (LEC) Albion Park Quarry – Increased Production Limit* prepared by Martin Morris & Jones Pty Ltd and dated November 2013; and
  - e) conditions of this development consent.
- 3. If there is any inconsistency between the above, the conditions of this consent shall prevail to the extent of the inconsistency.
- 4. The Applicant shall comply with any reasonable requirement/s of the Secretary arising from:
  - a) any reports, plans, strategies, programs, reviews, audits or correspondence that are submitted in accordance with this consent;
  - b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; and
  - c) the implementation of any actions or measures contained in these documents.

#### **Staged Development**

- 5. Under section 80(4) of the Act, this consent is issued for Stages 1 to 4 of the development only.
- 6. Under section 80(5) of the Act, Stages 5 and 6 must be the subject of another development consent.

A consent granted in accordance with condition 6 does not require a further development application under section 78A of the Act. However, in seeking consent for Stages 5 and 6, the Applicant shall submit a report to the Minister that has been prepared in consultation with the CCC, the landowner(s) of The Fig Tree Hill Land, and relevant government authorities. The report shall be consistent with the original development application (DA 466-11-2003) and shall include:

- a) details of the proposed quarrying operations for Stages 5 and 6;
- b) results of consultation conducted during preparation of the report;
- c) assessment of the environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4 and consultation referred to in subclause (b) above;
- d) assessment of the consistency of Stages 5 and 6 with relevant environmental planning instruments and strategies; and
- e) justification for the extraction of Stages 5 and 6.

Notes: Within 4 weeks of receiving this report, the Minister will endeavour to:

- make the report public;
- seek independent expert advice on the report if deemed to be warranted;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public.

#### **Period of Approval**

7. The Applicant may carry out quarrying operations on the site until 21 February 2036.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary. Consequently, this consent will continue to apply in all other respects other than the right to conduct quarrying operations until the rehabilitation of the site and those undertakings have been carried out to a satisfactory standard.

#### **Limits on Production**

- 8. The production of quarry products from the quarry shall not exceed 900,000 tonnes in any financial year.
- 9. The Applicant shall:
  - a) provide annual production data to the DRE using the standard form for that purpose; and
  - b) include a copy of this data in the Annual Review.

#### Protection of Public Infrastructure

- 10. The Applicant shall:
  - a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
  - b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development.

#### **Operation of Plant and Equipment**

- 11. The Applicant shall ensure that all plant and equipment at the site, or used in connection with the development, are:
  - a) maintained in a proper and efficient condition; and
  - b) operated in a proper and efficient manner.

#### Demolition

12. The Applicant shall ensure that all demolition work is carried out in accordance with AS 2601-2001: *The Demolition of Structures*, or its latest version.

#### Compliance

- 13. Prior to commencement of operations, the Applicant shall commission an independent person(s) or organisation(s), approved by the Secretary, to certify in writing to the satisfaction of the Secretary, that the Applicant has complied with all conditions of this consent applicable prior to that event.
- 14. At least two weeks prior to the commencement of any works, the Applicant shall notify the owners of the Fig Tree Hill Land, in writing, of the date of commencement of works authorised by this consent.

#### SCHEDULE 4 SPECIFIC ENVIRONMENTAL CONDITIONS

#### **IDENTIFICATION OF BOUNDARIES**

- 1. Prior to the commencement of works, the Applicant shall:
  - (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction;
  - (b) submit a survey plan of these boundaries to the Secretary; and
  - (c) ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits.

Note: The limit of extraction includes the area described in the EIS, as amended by the 'Quarry Area' shown on the plan in Appendix 1 (southern boundary), and as amended by the conditions below.

#### BUFFER

2. A minimum buffer of 10 metres must be maintained between the common northern boundary of Lot 1, DP 858245 and the southern boundary of Lot 4, DP 3709. No extraction is permitted within this 10 metre buffer area. The buffer may be used for landscaping, minor drainage works, noise/visual bunds, alignment of the haul road (including batters), as depicted on the plan in Appendix 2.

#### NOISE

#### **Construction of Noise/Visual Bunds**

3. The Applicant shall complete construction of the noise/visual bunds prior to commencing extraction of production material, and shall make all reasonable efforts to complete construction of the bunds within 26 weeks of commencement.

#### **Noise Limits**

4. The Applicant shall ensure that noise generated by the development does not exceed the criteria specified in Table 1.

	Noise Limits dB(A) LAeq (15minute)		
Receiver Locations	Stages 1-2	Stages 3-4	Stages 5-6
'The Hill' residence (Dunster premises)	35	38	35
'The Cottage' residence (Dunster premises)	35	38	35
Approved rural workers dwelling (Dunster premises)	35	38	35
Greenmeadows Residential Estate	41	41	41

Table 1: Noise Criteria for the Development

Notes:

- 1. Staging as depicted in Figure 3.5 of the EIS prepared by Perram and Partners, dated October 2003.
- Receiver locations nominated in Table 5.12 of the report prepared by Richard Heggie and Associates Report No. 30-1079R1 titled 'Noise and Blasting Impact Assessment – Cleary Bros Albion Park Quarry' (13 December 2002). At the time of the DA the above were the nearest affected residences.
- 3. The receiver locations and noise limits in the above table may be varied in the instance that negotiated agreements are entered into by the licensee and affected residents/occupiers or if existing agreements become void, or the nearest receiver location changes due to urban encroachment. These limits may be subject to change with an EPL variation.
- 4. Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Table 1. Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy. The modification factors presented in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- 5. The noise emission limits in Table 1 apply under meteorological conditions of:
  - Wind speed up to 0.5m/s in any direction at 10 metres above ground level; or
    - Temperature gradient (environmental lapse rate) conditions of less than or equal to 0<sub>°</sub>C/100m (lapse).

#### **Operating Hours**

5. The Applicant shall comply with the operating hours in Table 2.

Activity	Days of the Week	Time
Drilling, rock breaking, loading and haulage of material from quarry to processing plant, processing and stockpiling, overburden stripping and other stage preparatory works, all site construction activities, rehabilitation works, general plant and maintenance. Processing, crushing and screening and product transfer to stockpiles	Monday – Friday Saturday	7.00 am – 5.30 pm 7.00 am – 1.00 pm

Table 2: Operating Hours for the Development

- The following activities may be carried out at the premises outside the hours specified in Table 2:
- a) the delivery of materials as requested by Police or other authorities for safety reasons;
- b) emergency work to avoid the loss of lives, property and/or to prevent environmental harm;
- c) workshop activities and other maintenance work inaudible at the nearest affected receiver.

#### **Operating Conditions**

6.

- 7. The Applicant shall:
  - a) implement all reasonable and feasible mitigation measures to minimise the operational and road noise of the development;
  - b) minimise the noise impacts of the development during meteorological conditions under which the noise criteria in this consent do not apply; and
  - c) carry out regular noise monitoring to determine whether the development is complying with the relevant conditions of this consent,
  - to the satisfaction of the Secretary.

#### Noise Management Plan

- 8. The Applicant shall prepare and implement a Noise 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevant noise criteria and operating conditions in this consent;
  - c) describe the proposed noise management system on site; and
  - d) include a monitoring program that:
    - uses attended monitoring to evaluate the compliance of the development against the noise criteria in this consent;
    - evaluates and reports on the effectiveness of the noise management system and the best practice noise management measures; and
    - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

#### 9. Deleted

#### **BLASTING AND VIBRATION**

#### Airblast Overpressure Criteria

10. The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 3 at any point that is located at least 3.5m from any residence or other sensitive receiver on privately-owned land.

Airblast overpressure level [dB(Lin Peak)]	Allowable exceedance	
115	5% of the total number of blasts over any 12 month reporting period	
120	0%	

Table 3: Airblast Overpressure Limits

#### **Ground Vibration Criteria**

11. The Applicant shall ensure that the peak particle velocity from blasting at the development does not exceed the criteria in Table 4 at any residence or sensitive receiver on privately-owned land.

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts over any 12 month reporting period
10	0%

Table 4: Ground Vibration Limits

#### **Blasting Restrictions**

- 12. Blasting operations on the premises may only take place:
  - a) between 9am and 5pm Monday to Friday inclusive;
  - b) are limited to 1 blast each day; and
  - c) at such other times as may be approved by the EPA.

#### **Operating Conditions**

a)

- 13. During quarrying operations on site, the Applicant shall:
  - 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) avoid and/or minimise any blasting impacts, including flyrock, of the development on The Fig Tree Hill Land, or the continued rural use of that land; and
  - c) operate a suitable system to enable the local community to get up-to-date information on the proposed blasting schedule on site,
  - to the satisfaction of the Secretary.

#### Blast Management Plan

- 14. Prior to the commencement of operations in each stage of the development after Stage 1, the Applicant shall prepare, and subsequently implement, a Blast Management Plan for the development in consultation with the landowner(s) of The Fig Tree Hill Land, the EPA and to the satisfaction of the Secretary. This plan must:
  - a) include a summary of monitoring results for the previous quarry stage;
  - b) describe the objectives for noise and blasting at that stage;
  - c) describe the proposed blasting design for that stage, and demonstrate that the design will meet the blast criteria listed in Tables 3 and 4;
  - d) include a monitoring program for evaluating and reporting on the performance of the development, including:
    - compliance with the blasting criteria in this consent; and
    - minimising the fume emissions from the site;
    - describe the measures that would be implemented to:
      - ensure compliance with the blasting criteria and operating conditions of this consent; and
        - mitigate, remediate or compensate for any blasting impacts of the development on The Fig Tree Hill Land or the use of that land.

Note: The plan shall be generally in accordance with the draft Blast Management Plan titled 'Albion Park Quarry Extension, Noise Monitoring Program/Blast Management Plan' dated 10 February 2006 and prepared by Heggies Australia Pty Ltd

#### **AIR QUALITY**

e)

#### Impact Assessment Criteria

15. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not exceed the criteria in Table 5 at any sensitive receiver or residence on privately-owned land.

Pollutant	Averaging Period	Crit	erion
Particulate matter < 10 μm (PM <sub>10</sub> )	Annual	<sup>a,d</sup> 30	) µg/m <sup>3</sup>
Particulate matter < 10 μm (PM <sub>10</sub> )	24 hour	<sup>b</sup> 50	µg/m <sup>3</sup>
Total suspended particulates (TSP)	Annual	<sup>a,d</sup> 90	) µg/m <sup>3</sup>
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a,d</sup> 4 g/m <sup>2</sup> /month

Table 5: Air quality criteria

Notes to Table 5:

- a Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- b Incremental impact (i.e. incremental increase in concentrations due to the development on its own);
- c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003:Methods for Sampling and Analysis of Ambient Air Determination of Particulate Matter Deposited Matter Gravimetric Method; and
- d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.
- e "Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 16 and 17 to develop and implement air quality management system that ensures operational responses to the risks of exceedance of the criteria.

#### **Operating Conditions**

- 16. The Applicant shall:
  - (a) implement best management practice to minimise the dust emissions of the development;
  - (b) regularly assess meteorological and air quality monitoring data to guide the day-to-day planning of operations and implementation of air quality mitigation measures to ensure compliance with the relevant conditions of this consent;
  - (c) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see Note d to Table 5 above);
  - (d) monitor and report on compliance with the relevant air quality conditions in this consent; and
  - (e) minimise surface disturbance of the site, other than as permitted under this consent, to the satisfaction of the Secretary.

#### Air Quality Management Plan

- 17. The Applicant shall prepare and implement an Air Quality 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 by 30 September 2015;
  - b) describe the measures that would be implemented to ensure compliance with the relevant air quality impact assessment criteria and conditions of this consent;
  - c) include a site-specific best management practice determination;
  - d) describe the proposed air quality management system; and
  - e) include an air quality monitoring program that:
    - is capable of evaluating the performance of the development;
    - includes a protocol for determining any exceedances of the relevant conditions of this consent;
    - adequately supports the air quality management system; and
    - evaluates and reports on the adequacy of the air quality management system.

#### METEOROLOGICAL MONITORING

18. For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline.

#### SURFACE & GROUNDWATER

#### Water Supply

19. The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of quarrying operations on site to match its available supply, to the satisfaction of the Secretary.

Note: The Applicant is required to obtain the necessary water licences for the development under the Water Management Act 2000.

#### Water Pollution

- 20. Unless an EPL or the EPA authorises otherwise, the Applicant shall comply with section 120 of the *Protection of the Environment Operations Act 1997* during the carrying out of the development.
- 21. The Applicant shall ensure that the discharges from any licensed discharge point/s comply with the limits in Table 6, unless otherwise agreed by the EPA.

Pollutant	Units of Measure	Maximum Limit
TSS	mg/L	50
рН	рН	6.5 - 8.5

Table 6: Water Discharge Pollution Limits

- 22. Deleted
- 23. Deleted

#### Storm Water Management System

- 24. The Applicant shall ensure that the stormwater management system for the development is designed, constructed and operated to capture and treat polluted waters from storm event(s) of less than, and including a 1:10 year, 24 hour duration, average recurrence interval (that is 225 mm of total rainfall within the 24 hour period).
- 25. Within 5 days of a rainfall event, the Applicant shall ensure that the basins in the stormwater management system are treated and emptied to maintain the required storage volume.

#### Flocculant Management

26. The Applicant shall not use a flocculant, other than gypsum, without the written approval of the EPA.

#### **Monitoring and Management**

- 27. Within 12 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Water Management Plan for the development, in consultation with the NOW and to the satisfaction of the Secretary. This plan must be prepared by a qualified hydrogeologist and include:
  - a) a Water Balance;
  - b) an Erosion and Sediment Control Plan;
  - c) a Surface Water Monitoring Program;
  - d) a Ground Water Monitoring Program; and
  - e) an Integrated Water Management Strategy, if the water balance shows a potential demand for water above that which can be collected from rainfall.
- 28. The Water Balance shall include:
  - a) consideration of the existing quarry and processing site, existing water storage dam and the proposed quarry and haul road;
  - b) the source of all water collected or stored on the site, including rainfall, stormwater and groundwater;
  - c) the estimated water use demand in wet, average and drought years.
- 29. The Erosion and Sediment Control Plan shall:
  - a) be consistent with the requirements of the Department of Housing's *Managing Urban Stormwater: Soils and Construction* manual;
  - b) identify activities that could cause soil erosion and generate sediment;
  - c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters
  - d) describe the location, function, and capacity of erosion and sediment control structures; and
  - e) describe what measures would be implemented to maintain the structures over time.

- The Surface Water Monitoring Program shall include: 30.
  - detailed baseline data on surface water flows and quality; a)
  - surface water impact assessment criteria; b)
  - a program to monitor surface water flows and quality; c)
  - d) a program to manage water releases from the site;
  - a program to monitor bank and bed stability; e)
  - f) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water impact assessment criteria; and
  - a program to monitor the effectiveness of the Erosion and Sediment Control Plan. g)
- 31. The Ground Water Monitoring Program shall include:
  - a) detailed baseline data on groundwater levels and quality, based on statistical analysis;
  - groundwater impact assessment criteria; b)
  - a program to monitor regional groundwater levels and guality; c)
  - d) a program to monitor groundwater level effects on vegetation, and on groundwater supply to adjoining properties; and
  - a protocol for the investigation, notification and mitigation of identified exceedances of the e) groundwater impact assessment criteria.
- 32. The Integrated Water Management Strategy shall include:
  - exploration of a range of options for a sustainable resource alternative for water supply to the a) site:
  - identification of all possible and available sources of water; b)
  - c) consistency with Government Water Reform initiatives and policies;
  - quality of water to meet usage requirements including any possible effects on product; d)
  - costs of supply; e)
  - health and environmental impacts; f)
  - legislative requirements; g)
  - assessment of the feasibility, benefits and costs of options; h)
  - i) a process to identify and evaluate preferred options for implementation; and
  - j) the identification of a timetable for implementation of the selected options.

#### Reporting

- 33. Each year, the Applicant shall:
  - review the Water Management Plan; a)
  - b) update each sub-plan; and
  - report the results of this review in the Annual Review, including: c)
    - the results of monitoring; ٠
    - details of the review for each sub-plan; ٠
    - amendments to the sub-plans; and
    - details of the measures undertaken/proposed to address any identified issues.

#### **FLORA & FAUNA**

#### **Vegetation Clearing Protocol**

- 34. Prior to the commencement of works, the Applicant shall prepare a Vegetation Clearing Protocol for the development in consultation with Shellharbour City Council and the OEH, and to the satisfaction of the Secretary. This plan shall:
  - delineate the areas of remnant vegetation to be cleared; and a) b)
    - describe the procedures that would be implemented for:
      - pre-clearance surveys; ٠
      - progressive clearing;
      - fauna management;
      - conserving and reusing topsoil;
      - collecting seed from the site;
      - salvaging and reusing material from the site; and •
      - controlling weeds. •

#### Southern Remnant Vegetation and Revegetation Area

- 35. The Applicant shall conserve and maintain the southern areas of remnant vegetation marked on the map in Appendix 1.
- 36. The Applicant shall revegetate/rehabilitate and maintain the areas marked 'Area to be Planted' and Weed Control to Promote Natural Vegetation' on the map in Appendix 1. Revegetation shall be in accordance with the Vegetation Management Plan described in Condition 37.

Note: Other revegetation areas shall be covered in the Vegetation Management Plan referred to in Condition 37 below.

#### Vegetation Management Plan

- 37. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Vegetation Management Plan for the development in consultation with Council and the OEH, and to the satisfaction of the Secretary. The plan shall be prepared by a suitably qualified ecologist / bush regenerator, and shall address:
  - a) establishment of baseline data for existing vegetation and habitat in the area;
  - b) vegetation management on all areas of the site outside the working area of the quarry;
  - c) conservation, maintenance and enhancement of threatened communities, including 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands';
  - d) conservation, maintenance and enhancement of threatened plant species, including *Cynanchum elegans* (White Cynachum), *Daphnandra sp.aff micrantha* (Illawarra Socketwood), and Zieria granulata (Illawarra Zieria);
  - e) establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed flying fox;
  - f) ongoing weed control and maintenance;
  - g) a program for how the performance of the measures described in (b) to (f) above would be monitored over time;
  - h) a program for monitoring the effect of quarrying, including water management, on vegetation communities.

#### Reporting

38. The Applicant shall include a progress report on the implementation of the Vegetation Management Plan in the Annual Review.

#### REHABILITATION

#### Rehabilitation

39. The Applicant shall progressively rehabilitate the site to the satisfaction of the Secretary.

#### **Rehabilitation Management Plan**

- 40. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Rehabilitation Management Plan to the satisfaction of the DRE. This plan must:
  - a) identify the disturbed area at the site;
  - b) describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site;
  - c) describe in detail the measures that would be implemented over the next 5 years to rehabilitate the site; and
  - d) describe how the performance of these measures would be monitored over time.
- 41. Within 5 years of providing the Rehabilitation Management Plan to the Secretary, and every 5 years thereafter, the Applicant shall review and update the plan to the satisfaction of the Secretary.

#### **Rehabilitation Bond**

- 42. Within 6 months of the date of this consent, the Applicant shall lodge a suitable rehabilitation and conservation bond for the development with the Secretary. The sum of the bond shall be calculated at:
  - a) \$2.50/m<sup>2</sup> for the total area of disturbance at the development; and
  - b)  $3.00/m^2$  for the total area of the revegetation area,

to the satisfaction of the Secretary.

Notes:

- If the rehabilitation and revegetation area is completed to the satisfaction of the Secretary, the Secretary will release the rehabilitation and conservation bond.
- If the rehabilitation and revegetation area is not completed to the satisfaction of the Secretary, the Secretary will call in all or part of the rehabilitation and conservation bond, and arrange for the satisfactory completion of these works.
- 43. Within 3 years of lodging the rehabilitation and conservation bond with the Secretary, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall review, and if necessary revise, the sum of the rehabilitation bond to the satisfaction of the Secretary. This review must consider:
  - a) the effects of inflation;
  - b) any changes to the total area of disturbance; and
  - c) the performance of the revegetation area.

#### Reporting

44. The Applicant shall include a progress report on the Rehabilitation Management Plan in the Annual Review.

#### TRAFFIC AND TRANSPORT

#### Right of Way

45. Prior to the commencement of works, the Applicant shall formalise the Right of Way for the haulage road, to the satisfaction of the Secretary.

#### Site Access

46. All access to the site is to be via the roundabout at East-West Link Road, except in an emergency, as agreed by the Secretary in consultation with Council.

#### Transport Management Plan

- 47. The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:
  - a) be prepared by a suitably qualified traffic consultant, in consultation with RMS and Council and submitted to the Secretary for approval by 31 August 2015;
  - b) include a drivers' code of conduct for the development;
  - c) describe the measures that would be implemented to ensure:
    - noise generated by heavy vehicles entering and leaving the site is minimised between 10 pm and 6 am;
      - all drivers of vehicles related to the development comply with the drivers' code of conduct; and
    - compliance with the relevant conditions of this consent; and
  - d) include a program to monitor the effectiveness of the implementation of these measures.

#### Cumulative Traffic Impact Study

- 47A. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, cause to be prepared an independent Cumulative Traffic Impact Study. The study must:
  - a) be undertaken by a suitably qualified traffic consultant, whose appointment has been approved by the Secretary;
  - b) be commissioned by 31 August 2015, and completed by 30 November 2015, or as otherwise agreed in writing by the Secretary;
  - c) be co-funded by the operators of the Albion Park, Dunmore and Bass Point quarries, proportionate to the quarries' respective quarry product road transport limits, as approved at 31 August 2015;
  - d) include a comprehensive assessment of current and future projected cumulative traffic impacts of the three quarries on the classified road network, undertaken in consultation with the RMS; and
  - e) identify any reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road, and the likely cost of implementing these measures.
- 47B. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, prepare and implement a program to implement any reasonable and feasible measures identified in the Cumulative Traffic Impact Study not already undertaken by the Applicant, in an equitable manner with the two other quarry operators, to the satisfaction of the Secretary. The program must be submitted to the Secretary for approval by 31 December 2015, or as otherwise agreed in writing by the Secretary.

#### Parking

48. The Applicant shall provide sufficient parking on-site for all quarry-related traffic to the satisfaction of the Secretary.

#### **Road Haulage**

- 49. The Applicant shall ensure that all loaded vehicles entering or leaving the site are covered.
- 50. The Applicant shall ensure all loaded vehicles leaving the site are cleaned of materials that may fall on the road before they are allowed to leave the site.

#### HERITAGE

51. Within 3 months of the date of this consent, and prior to the disturbance of any relic, the Applicant shall prepare and subsequently implement a Heritage Management Plan for the development, in

consultation with the OEH and Council, and to the satisfaction of the Secretary. The plan shall be prepared by a suitably qualified heritage consultant and must include:

- a) a program for baseline dilapidation surveys of residences on The Fig Tree Hill Land and the 'Belmont' property (with the consent of the landowners). Surveys shall be undertaken at least prior to the commencement of each quarrying stage;
- b) archival recording of 'Kyawana' and 'Belmont' properties, the dry stone walls and other heritage elements affected by the development;
- c) a plan for the salvage and on-site reconstruction of the dry stone walls affected by the proposal, in accordance with a conservation and interpretation strategy;
- d) a plan for the conservation and maintenance of the dry stone wall on the eastern boundary of the allotment;
- e) a plan for providing Council the opportunity to salvage any relic proposed to be destroyed by the development, including 'Kyawana';
- f) a procedure for obtaining permits under the Heritage Act prior to disturbance of any relic, and permits under the National Parks and Wildlife Act prior to disturbance of any Aboriginal objects or archaeological remains.
- 52. The dilapidation surveys required under Condition 51 shall be conducted by a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary. The owners of the Fig Tree Hill Land are to supply the applicant with three suggested nominees within 3 months from the grant of this consent. The applicant will submit one engineer from the list to be put forward by the applicant for approval by the Secretary.

#### Reporting

53. The Applicant shall include a progress report on the Heritage Management Plan in the Annual Review.

#### **VISUAL IMPACT**

#### Visual Amenity

- 54. The Applicant shall minimise the visual impacts of the development to the satisfaction of the Secretary.
- 55. The visual/noise bunds and screen plantings shall be designed and established in accordance with a Landscape Plan prepared in consultation with Shellharbour City Council, and to the satisfaction of the Secretary. The Landscape Plan shall be prepared by a suitably qualified landscape architect with heritage experience, and shall have regard to the cultural landscape of Wentworth Hills. The plantings shall be commenced prior to the commencement of extraction and completed within six months of this consent.
- 56. The Applicant shall ensure that the trees in the bund are maintained, and that in the event that trees die that they are replaced within 28 days to the satisfaction of the Secretary.
- 57. Following construction of the visual/noise bunds, the Applicant shall undertake an independent review of their effectiveness, and undertake any improvements to the satisfaction of the Secretary.

#### WASTE MANGEMENT

#### Waste Minimisation

58. The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Secretary.

#### Waste Classification

59. All liquid and non liquid wastes resulting from activities and processes at the site must be assessed, classified and managed in accordance with the EPA's Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (1999), or any other EPA document superseding this guideline.

#### Reporting

60. The Applicant shall describe what measures have been implemented to minimise the amount of waste generated by the development in the Annual Review.

#### EMERGENCY AND HAZARDS MANAGEMENT

#### **Dangerous Goods**

61. The Applicant shall ensure that the storage, handling, and transport of dangerous goods is done in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.

#### Safety

62. The Applicant shall secure the development to ensure public safety to the satisfaction of the Secretary.

#### **Emergency Management**

- 63. Within 6 months of the date of this consent, the Applicant shall document, and subsequently implement, measures to minimise the environmental impacts of any emergency situations that could arise as a result of the operation of the quarry to the satisfaction of the EPA and the Secretary. This documentation must:
  - a) identify any significant threats to the environment and/or public health that could arise from activities associated with the operation of the quarry or construction works associated with the production increase. These threats may include excessive rainfall, pump failures, excess flocculation, power or other utility failure, natural disaster, landslip, accidental spills and discharges, spillage from trucks, fire etc;
  - b) identify any subsequent direct or indirect environmental effects as a result of the threats;
  - c) identify the pollution that would result due to these threats and impacts on operations and what impact the pollution would have on the health of the community and the environment;
  - d) develop actions to effectively respond to the disruption of operations so the risk of pollution is minimised;
  - e) develop a communications strategy for alerting relevant agencies and the potentially affected community in the event of the disruption to operations leading to significant pollution;
  - f) ensure that all relevant employees are familiar with the documentation; and
  - g) when developing this documentation, identify any opportunities to integrate with Cleary Bros Emergency plans.

### **BUSHFIRE MANAGEMENT**

- 64. The Applicant shall:
  - a) ensure that the development is suitably equipped to respond to any fires on-site;
  - b) assist the Rural Fire Service and emergency services as much as possible if there is a fire onsite.
- 65. Within 6 months of the date of this consent, the Applicant shall prepare a Bushfire Management Plan for the development, to the satisfaction of Council and the Rural Fire Service. The plan must have regard to the management of fire regimes and hazard reduction activities so as to avoid negative impacts to threatened species and habitat, endangered communities and populations as well as any cultural assets that may be present.

#### SCHEDULE 5 ADDITIONAL PROCEDURES

#### NOTIFICATION OF LANDOWNERS

1. If the results of monitoring required in schedule 4 identify that emissions generated by the development are greater than the criteria in schedule 4, then the Applicant shall notify the Secretary and the affected landowners and/or existing or future tenants (including tenants of quarry owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the development is complying with the criteria in schedule 4.

#### INDEPENDENT REVIEW

2. If a landowner (excluding quarry owned properties) considers that the operations of the quarry are exceeding the criteria in schedule 4, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land.

If the Secretary is satisfied that an independent review is warranted, the Applicant shall within 3 months of the Secretary advising that an independent review is warranted:

- (a) consult with the landowner to determine his/her concerns;
- (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to determine whether the development is complying with the relevant criteria in schedule 4, and identify the source(s) and scale of any impact on the land, and the development's contribution to this impact: and
- (c) give the Secretary and landowner a copy of the independent review.

#### SCHEDULE 6 ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

#### ENVIRONMENTAL MANAGEMENT STRATEGY

- 1. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, an Environmental Management Strategy for the development to the satisfaction of the Secretary. This strategy must:
  - (a) provide the strategic context for environmental management of the development;
  - (b) identify the statutory requirements that apply to the development;
  - (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
  - (d) 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;
    - manage cumulative impacts; and
    - respond to emergencies;
  - (e) describe the role, responsibility, authority, and accountability of all key personnel involved in environmental management of the development; and
  - (f) include:
    - copies of any strategies, plans and programs approved under the conditions of this consent; and
    - a clear plan depicting all monitoring required to be carried out under the conditions of this consent.

#### **ANNUAL REVIEW**

- 2. By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:
  - (a) describe the development (including rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
  - (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against:
    - the relevant statutory requirements, limits or performance measures/criteria;
    - the monitoring results of previous years; and
    - the relevant predictions in the EIS;
  - (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
  - (d) identify any trends in the monitoring data over the life of the development;
  - (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
  - (f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.

#### **REVISION OF STRATEGIES, PLANS AND PROGRAMS**

- 3. Within 3 months of a modification to this consent or following the submission of an:
  - (a) annual review under condition 2 above:
  - (b) incident report under condition 5 below; or
  - (c) audit report under condition 8 below,

the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.

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

#### COMMUNITY CONSULTATIVE COMMITTEE

4. The Applicant shall maintain the Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version).

Notes:

• The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.

- In accordance with the guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community.
- This condition may be satisfied by a combined CCC covering a number of quarry operations in the region.

#### REPORTING

#### Incident Reporting

5. The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

#### **Regular Reporting**

6. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent, and to the satisfaction of the Secretary.

#### INDEPENDENT ENVIRONMENTAL AUDIT

- 7. Within 2 years of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
  - (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been endorsed by the Secretary;
  - (b) include consultation with the relevant agencies;
  - (c) assess the environmental performance of the development, and whether it is complying with the relevant requirements in this consent and any relevant EPL (including any assessment, plan or program required under these approvals);
  - (d) review the adequacy of any approved strategy, plan or program required under these approvals; and
  - (e) recommend measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and may include additional experts in any field specified by the Secretary.

8. Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

#### ACCESS TO INFORMATION

- 9. For the duration of the development, the Applicant shall:
  - (a) make copies of the following publicly available on its website:
    - the EIS;
    - current statutory approvals for the development;
    - approved strategies, plans and programs required under the conditions of this consent;
    - a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
    - a complaints register, which is to be updated monthly;
    - minutes of CCC meetings;
    - the annual reviews of the development (for the last 5 years);
    - any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit;
    - any other matter required by the Secretary; and
    - (b) keep this information up-to-date,

to the satisfaction of the Secretary.

APPENDIX 1 REVEGETATION/REHABILITATION AREA





APPENDIX 3 LANDSCAPE BUND, HAUL ROAD AND BATTERS



#### Appendix B Report Number 610.04156-R5 Page 1 of 1

#### EPA RESPONSE TO A REVIEW OF THE NOISE MANAGEMENT PLAN

#### **Dick Godson**

From:	Matthew Fuller < Matthew.Fuller@epa.nsw.gov.au>
Sent:	Thursday, 24 September 2015 6:15 PM
To:	Helen Nicolaidis
Subject:	CB Blast Management Plan and Noise Management Plan

Hi Helen,

Although the EPA do not generally review and approve site specific Management Plans, I do not see any major deficiencies with the above plans.

If you have any concerns regarding the acequacy of either of these plans Cleary Bros could have them reviewed by a suitably gualified consultant.

Regards Matt Fuller Regional Operations Officer | NSW Environment Protection Authority | 會: (02) 42244100 | Mobile 會: 0409 524 540 | 종: (02) 42244110 | 승:<u>Matthew.Fuller@epa.nsw.gov.au</u>

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If you are not the intended recipient, please notify the sender and then delete it immediately. Any views expressed in this email are those of the individual sender except where the sender expressly and with authority states them to be the views of the Environment Protection Authority.

#### PLEASE CONSIDER THE ENVIRONMENT BEFORE PRINTING THIS EMAIL

Appendix C Report Number 610.04156-R5 Page 1 of 2 STAGES 5 AND 6 NOISE LEVEL CONTOURS



# Appendix D1

Report Number 610.04156-R5

Page 1 of 1

### PVS GROUND VIBRATION VELOCITY SITE LAW - 106 DATA POINTS



SLR Consulting Australia Pty Ltd

Appendix D2 Report Number 610.04156-R5 Page 1 of 1

### PEAK LINEAR AIRBLAST SITE LAW - 116 DATA POINTS



Scaled Distance m/kg^1/3

SLR Consulting Australia Pty Ltd

Appendix E Report Number 610.04156-R5 Page 1 of 3 VISUAL NOX FUME RATING SCALE AND FIELD COLOUR CHART



# **APPENDIX 2 - VISUAL NOX FUME RATING SCALE**

The following table, together with the Field Colour Chart in Appendix 3, details how NOx gases from a surface blast can be assessed.

Level	Typical Appearance
Level 0 No NOx gas	
Level 1 Slight NOx gas 1A Localised	
1B Medium	Contraction of the second
1C Extensive	
Level 2 Minor yellow/orange gas 2A Localised	
2B Medium	- Burnach
2C Extensive	and the second state of th
Level 3 Orange gas	
3A Localised	the second
3B Medium	
3C Extensive	2 A Los Martin
Level 4 Orange/red gas	
4A Localised	and the second
4B Medium	
4C Extensive	
Level 5 Red/purple gas	
5A Localised	
5B Medium	And All
5C Extensive	

Assessing the amount of NOx gases produced from a blast will depend on the distance the observer is from the blast and the prevailing weather conditions. The intensity of the fume produced in a blast should be measured on a simple scale from 0 to 5 based on the table above. The extent of the fume also needs to be assessed and this should be done on a simple scale from A to C where:-

- A = Localised (ie Fume localised across only a few blast holes)
- B = Medium (ie Fume from up to 50% of blast holes in the shot)
- C = Extensive (ie Extensive generation of fume across the whole blast)



# **APPENDIX 3 - FIELD COLOUR CHART.**

Pantone colour numbers have been included in the following Field Colour Chart to ensure colours will be produced correctly thereby ensuring a reasonable level of standardisation in reporting fume events across the blasting industry.

Level	Colour	Pantone Number
Level 0		Warm Grey 1C
No NOx gas		(RGB 244, 222, 217)
Level 1 Slight NOx gas		Pantone 155C
		(RGB 244, 219, 170)
Level 2		Pantone 157C
Minor yellow/orange gas		(RGB 237, 160, 79)
Level 3		Pantone 158C
Orange gas		(RGB 232, 117, 17)
Level 4		Pantone 1525C
Orange/red gas		(RGB 181, 84, 0)
Level 5		Pantone 161C
Red/purple fume		(RGB 99, 58, 17)



# **APPENDIX 8:**

"Transport Management Plan – prepared by The Transport Planning Partnership P/L (16 November 2015)"

# CLEARY BROS QUARRY ALBION PARK

# Transport Management Plan

Prepared for: Cleary Bros (Bombo) Pty Ltd 16 November 2015



The Transport Planning Partnership Pty Ltd ACN: 607 079 005

# **Cleary Bros Quarry Albion Park**

# **Transport Management Plan**

Version: 03

Date: 16/11/15

TTPP Reference: 15003

**Quality Record** 

Report Name	Date	Version	Approved By	Signature
15003r01	28/09/2015	v01	Jason Rudd	Jan Russ
15003r01	29/09/2015	v02	Jason Rudd	Jon Russ
15003r01	16/11/2015	v03	Jason Rudd	Jon Russ

# 1. INTRODUCTION

### 1.1 Background

On 25 June 2015, a Notice of Modification was issued under delegation on behalf of the Minister for Planning for modifications approved by the NSW Land and Environment Court associated with the Cleary Bros Quarry at Albion Park.

The modifications related to the proposed increased in annual production of the Quarry to a maximum of 900,000 tonnes within any one financial year.

The modification (10639 of 2005 \_MOD 2) was approved subject to conditions of consent. Included in the conditions was the requirement for the preparation of a Transport Management Plan (TMP). The condition (No. 47) is reproduced herein:

#### Condition 47 - Transport Management Plan

The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary. This plan must:

- a) Be prepared by a qualified traffic consultant, in consultation with RMS and Council and submitted to the Secretary for approval by 30 September 2015;
- b) Include a drivers' code of conduct for the development;
- c) Describe the measures that would be implemented to ensure:
  - Noise generated by heavy vehicles entering and leaving the site is minimised between 10pm and 6am;
  - All drivers of vehicles related to the development comply with the drivers' code of conduct;
  - Compliance with the relevant conditions of consent; and
- d) Include a program to monitor the effectiveness of the implementation of these measures.

# 1.2 Purpose of this TMP

The purpose of this TMP is to satisfy the requirements of Condition 47 of the consent as detailed above.

The TMP has been prepared by The Transport Planning Partnership Pty Ltd (TTPP) on behalf of Cleary Bros (Bombo) Pty Ltd who operate the Albion Park Quarry. TTPP is an independent traffic and transport consultancy and has been approved by the Department of Planning and Environment (DoPE) to prepare this TMP.

This TMP has been prepared in consultation with RMS and Shellharbour City Council. Feedback obtained from these agencies has been included in Section 2 of this TMP.

As such, once submitted to the Secretary, the requirements of Condition 47(a) have been met.

This TMP includes the following:

- Details of the consultations with RMS and Council
- Measures to ensure that the transport related conditions of consent are met;
- Drivers' Code of Conduct ; and
- A program for monitoring the effectiveness of the TMP and Drivers' Coder of Conduct

As noted above, this TMP sets out program for the monitoring of the effectiveness of the TMP and the associated Drivers' Code of Conduct. It is envisaged that, subject to the results of the monitoring program, the Drivers' Code of Conduct and / or the TMP may need to be updated or modified to ensure that the objectives of the TMP are being effectively met.

# 2. CONSULTATION WITH AUTHORITIES

# 2.1 Background

Both the RMS (Southern Region) and Shellharbour City Council's traffic engineering section was contacted regarding the consultation requirement to comply with Condition 47.

The following sections provides a summary of the discussions with RMS and Council.

# 2.2 RMS

The RMS was provided by TTPP an outline of the methodology which would be implemented in the preparation of the TMP. Discussions with Mr Chris Millett (RMS) indicated that the RMS did not require a face to face meeting to discuss the TMP associated with the Albion Park Quarry and that the RMS did not have any issues with the proposed methodology.

It is noted that the RMS indicated that further consultation would be required in the preparation of the Cumulative Traffic Assessment required in response to Condition 47A and 47B of the consent.

### 2.3 Shellharbour City Council

Council was also provided by TTPP an outline of the methodology which would be implemented in the preparation of the TMP. Luke Preston (Council) advised that as all truck access to and from the site was via regional roads under the control of RMS that Council was not the relevant authority and suggested that all consultation with regard to the TMP should be directed to the RMS.

# 3. TRANSPORT MANAGEMENT PLAN (TMP)

# 3.1 Truck Haulage Routes

All truck haulage of product from the Albion Park Quarry occurs and will continue to occur directly via the regional road network.

Access to and from the regional road network has been facilitated by the construction of the East-West Link running between Croome Road and the Princes Highway.

In accordance with the 2004 consent for the Quarry, all truck haulage is to occur via the roundabout at the intersection of the East - West Link Road / Durgadin Drive / Site Access haul road. Similarly no haulage is to occur via Dunsters Lane unless in an emergency, as directed by the NSW Police or with approval by the Secretary.

The availability of direct access to the regional road network eliminates the need to utilise local roads for product haulage. The use of regional roads significantly minimises the potential amenity and acoustic implications to local residential properties.

# 3.2 Noise Minimisation

Noise minimisation associated with the haulage of product from the Quarry can be effected with the implementation of and adherence to the following measures:

- Adherence to the approved operating hours of the Quarry as specified in the Consent.
- Utilisation of regional road network for truck movements to and from the Quarry. The use of the local road network for truck movements is not permitted unless in an emergency or with approval from the Secretary.
- Use of truck's compression brakes outside of the Quarry to be restricted unless required for safety reasons.
- When parked or waiting for a period of time, truck engines shall be turned off to eliminate unnecessary engine idle noise.

These measures are set out in the Drivers' Code of Conduct.

All of the above measures would apply to all periods where truck haulage is undertaken, but shall be particularly applied and observed for periods where haulage occurs between 10pm and 6am as is permitted by the Consent.

With regard to noise minimisation between 10pm and 6am, it is recommended that the following additional measures be implemented:

- The extent to which haulage between 10pm and 6am is required be minimised.
- Trucks exiting the Quarry between 10pm and 6am shall be staggered at no less than 5 minute intervals to reduce the noise associated with trucks travelling in a convoy.
- All trucks to access the Quarry via the section of East West Link Road between the Princes Highway and the Quarry Access road.
### 3.3 Truck Drivers Conduct of Code

A Truck Drivers' Code of Conduct has been prepared for approval and implementation. The code is contained in Appendix A.

The Code includes driver behaviour requirements relating to:

- Site safety
- Road network safety
- Noise minimisation

It is envisaged that the Drivers Code of Conduct would form part of the overall site induction program with truck drivers required to read, understand and pledge to uphold the behaviour expected by a truck driver accessing the Albion Park Quarry.

### 3.4 Monitoring Program

The following monitoring program shall be implemented to ensure that the TMP and Drivers Code of Conduct is performing effectively and achieving the objectives of the various transport related consent conditions.

Monitoring will be based on feedback provided by the surrounding community via a formal and informal complaints and positive messages.

It is noted that under the Conditions of Consent for the Quarry's operation (10639 of 2005 \_MOD 2) there is no restrictions to the hours of operation for road haulage and no limits to the volume of trucks within any given period. As such monitoring of truck volumes and hours of operation are not relevant for compliance with the consent.

#### 3.4.1 Implementation of TMP and Drivers Code of Conduct

The TMP and Drivers Code of Conduct shall be included with all new site induction and truck driver registrations.

Over the course of 6 months, all existing drivers shall be:

- provided with a copy of the TMP and new Drivers Code of Conduct
- offered information session regarding the TMP and Code of Conduct

The intention is that within 6 months all truck drivers will have signed the Drivers' Code of Conduct declaration and agreed to be bound by its behavioural requirements.

It is noted that Albion Park Quarry truck drivers currently operate under a behavioural code addressing safety and to an extent noise minimisation.

#### 3.4.2 Annual Review of Drivers Code of Conduct

Annually Truck Drivers will be required to demonstrate their understanding of the TMP and Drivers Code of Conduct via a refresher course. This refresher course would include any amendments that were made to the Code of Conduct to improve its effectiveness.

#### *3.4.3 Monitoring and Complaints / Compliments Register*

A complaints and compliments register detailing matters such as truck driver behaviour and truck related noise issues has been established and maintained by Cleary Bros (Bombo) Pty Ltd.

The register shall be reviewed annually to determine if any systemic issues are arising from the implementation of the TMP and Drivers' Code of Contact.

A copy of the current Cleary Bros Complaints / Compliment Register and Form is attached at Appendix B.

An extract from the registers procedures is provided below:

Positive and Negative feedback will be documented using Form 9.2 Customer & Stakeholder complaint / compliment and Form 9.3 Customer & Stakeholder Complaint / Compliment Register. From this assessment, CB will decide on appropriate action if any, according to the feedback received. Appropriate action may include:

- Arranging a meeting to discuss and / or resolve issues.
- Calling Client to acknowledge feedback.
- Writing a letter responding to the feedback.

"Formal observation of compliance" is carried out using a "Biannual Management Review" which is part of Cleary Bros Integrated Management System that is externally accredited for Safety, Quality and Environment.

As such in addition to the complaints / compliments register, Quarry management will undertake formal observations of compliance at six monthly intervals and will document and undertake any remedial actions with employees or sub-contractors that may be necessary as a result of these observations.

#### 3.4.4 Driver Feedback

Cleary Bros have established a mechanism to enable truck drivers to provide feedback on the implementation of the Drivers Code of Conduct and other measures which could be considered for implementation into the Code.

This mechanism is referred to as "Toolbox Talks". Toolbox talks are held at a frequency of one per month and usually cover a topic relating to the general operations or to provide an update on a recent change to the operating procedures. Toolbox Talks are intended to be a two way conversation between management and the workers. Workers are encouraged to raise any new issues in this forum.

In addition, Cleary Bros has an "open door" policy where all employees and subcontractors are free to raise any issues at any time with Management.

#### 3.4.5 Loads Covered and Clean Trucks

All laden trucks leaving the Quarry shall be inspected at the weighbridge to ensure that loads are satisfactorily covered and trucks are clean of quarry materials.

# Appendix A - Albion Park Quarry Truck Drivers' Code of Conduct



# Truck Drivers' Code of Conduct

This document sets out the requirements for all employees of and contractors to Cleary Bros (Bombo) Pty Ltd

# DECLARATION

I, the undersigned, hereby agree to abide by Cleary Bros (Bombo) Pty Ltd Truck Driver Code of Practice for the transportation of Quarry products from the Albion Park Quarry to their final destination/s in a safe manner.

I have read and understand the requirements outlined in the attached document and will, to the best of my ability, comply and assist with their implementation, requirements and ongoing administration.

The subject document to which this declaration relates is attached as part of the overall document and signing of this declaration confirms that signee has read and understood the entire document:

#### TRUCK DRIVER

Full Name:	
Organisation:	
Signature:	
Date:	
Cleary Bros (Bombo	)) Pty Ltd
Company Witness:	
Date:	

# **LEARY BROS** Albion Park Quarry

# DRIVER CODE OF CONDUCT

# 1. General Requirements

Heavy vehicle drivers hauling from the Albion Park Quarry must:

- Have undertaken a Site Induction carried out by an approved member of the Quarry staff or suitably qualified person under the direction of the Quarry management;
- Hold a valid driver's licence for the class of vehicle that you operate;
- Operate the vehicle in a safe manner within and external to the Quarry site;
- Comply with the direction of authorised site personnel when within the site;
- All drivers are to use seat belts when driving;
- All drivers are to drive to the sign posted speed limit, both on the public roads and within the quarry.
- Bad language on the UHF radio is not permitted. Think about how you like people to speak in front of your own family. They could be our customer.
- Personal hygiene to be maintained. It is not difficult to be clean and tidy, customers take note of this, and if you are of poor appearance they will remember you.

## 2. Site Access

All access to the site is to be via the roundabout at East-West Link Road, except in an emergency,

# 3. Heavy Vehicle Speed

The speed limit within the Quarry site is 40 km/h (unless sign posted otherwise in an area) which is to be strictly maintained.

Drivers are to observe the posted speed limits, with speed adjusted appropriately to suit the road environment and prevailing weather conditions, to comply with the Australian Road Rules. The vehicle speed must be appropriate to ensure the safe movements of the vehicle based on the vehicle configuration.

# 4. Heavy Vehicles Driver Fatigue

Fatigue is one of the biggest causes of crashes for heavy vehicle drivers.

The heavy vehicle driver fatigue law commenced in NSW on 28 September 2008 and applies to trucks and truck combinations over 12 tonne GVM (however there are Ministerial Exemption Notices that can apply).

Under the law, industry has the choice of operating under three fatigue management schemes:

- Standard Hours of Operation
- Basic Fatigue Management (BFM)
- Advanced Fatigue Management (AFM)

All heavy vehicle drivers operating out of the Albion Park Quarry are to be aware of their adopted fatigue management scheme and operate within its requirements.



# 5. Heavy Vehicle Compression Braking

Compression braking by heavy vehicles is a source of irritation to the community generating many complaints especially at night when many residents are especially sensitive to noise.

In some instances compression braking is required for safety reasons however when passing through or adjacent to residential areas a reduction in the speed of the vehicle is recommended to reduce the instances and severity of compression braking.

No compression braking beyond the quarry gate. Compression braking should only be used if required for safety reasons. Brakes must be applied so as not to create excessive noise should vehicles be driving through residential areas.

## 6. Heavy Vehicle Noise

The extraction operation hours from the quarry extension are limited to the following:

- • Monday to Friday 7.00am to 5.30pm
- • Saturday 7.00am to 1.00pm
- • Sunday and Public Holidays no extraction permitted.

Crushing, loading and transport of quarry materials is permitted at the sales processing area outside of the above hours.

At commencement of a driver's shift, it may be that drivers arrive early and may need to wait to be loaded. If this occurs drivers are to wait with their engines turned off to eliminate unnecessary engine idle noise.

# 7. Load Covering

Loose material on the road surface has the potential to cause road crashes and vehicle damage.

All loaded trucks departing from the Quarry site are required to have an effective cover over their load for the duration of the trip. The load cover may be removed upon arrival at the delivery site.

All care is to be taken to ensure that all loose debris from the vehicle body and wheels is removed prior to leaving the site and again after unloading.

Drivers must ensure that following tipping that the tailgate is locked before leaving the site.

Quarry management is to monitor loose material on the side of the haulage route from quarry operations and take appropriate action (removal or suppression) regularly.

# **Albion Park Quarry**

# 8. Customer Relations

- Ensure paperwork is correct
- Always wear appropriate PPE and required safety equipment
- Never enter a customer premises without permission or walk around a customers' premises unsupervised
- Always be polite
- Learn and practice good communication skills
- Always be on time or let someone know if you cannot be
- Do not use bad language around staff members particularly women
- Personal hygiene, it is not difficult to be clean and tidy, customers take note of this and if you are of poor appearance they will remember you.
- Ensure weights are correct
- Respect religious beliefs of any customer
- Do not under any circumstances make racial comments

# Appendix B - Cleary Bros Complaint / Compliment Register and Form

The attached document is an "uncontrolled" copy of the Cleary Bros Complaint / Compliment Register and Form which has been included for the purpose of this TMP.

The Cleary Bros Complaint / Compliment Register and Form may be updated from time to time.

# **Customer & Stakeholder Complaint / Compliment**

	ID No.
Site/Location:	Date/Time:
Name of person providing feedback:	
Client:	
Contact Details:	
Address (if follow up required):	

#### Feedback Positive/Negative to do with:

I boubaok I bolare	integative to do intel				
Health & Safety	Environmental	Employees	Charges	Service	Other

Where did the incident occur?		
Details/ Positive or Negative:		

#### If there are any further details please attach all relevant information to this form

Your Suggestion is important to us			
How do you suggest we resolve the issue to your s are in a similar position are not confronted with this	atisfaction and/or ens s issue again?	ure that you and o	ther customers who
Action Required By:	Date:		
	Office Use:		
Response to Feedback:			
How has the feedback been followed up:			
Perceived Effectiveness of Response			
Feedback Received via:			
Verbal Phone	Email	Letter	Other
Non Conformance/ Corrective Action Form Required?	Yes / No	Number:	
Divisional Managers signature:		Dated:	
		Dateu.	

## Please ensure that this form is completed and returned to relevant Divisional Manager

		Date of Verification Close Out								
	ear:	s) of Follow up								
_	Y	Date(								
		Agreed Completion Date								
	Location:	Summary of Action (if any)								
		Summary of Complaint/Compliment								
		Date Raised								
	Division:	Form No.								

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Form 9.3



# **APPENDIX 9:**

"Cumulative Traffic Impact Study – prepared by The Transport Planning Partnership P/L (14 April 2016)"



 Planning Services

 Resource Assessments

 Name:
 Genevieve Seed

 Phone:
 9228 6489

 Email:
 genevieve.seed@planning.nsw.gov.au

Ms Helen Nicolaidis Cleary Bros (Bombo) Pty Ltd PO Box 210 Port Kembla NSW 2505

Dear Ms Nicolaidis

#### Albion Park, Bass Point and Dunmore Quarries Cumulative Traffic Impact Assessment

I refer to your email dated 20 April 2016 and accompanying revised Cumulative Traffic Impact Study required by the development consents for the Albion Park, Bass Point and Dunmore Quarries.

The Department considers that the study has achieved the expected goals of the relevant conditions of the consents for these quarries and the Secretary has approved the study.

Should you have any further enquiries, please contact Genevieve Seed.

Yours sincerely

Howard Reed

Howard Reed /.6 · /6 Director Resource Assessments

cc: Ms Pip Cox, Graduate Environmental Manager - Hanson Construction Material Pty Ltd Mr John Imrie, Development Manager - Boral Resources (NSW) Pty Ltd

# ALBION PARK, BASS POINT & DUNMORE QUARRIES

# **Cumulative Traffic Impact Assessment**

Prepared for:

Cleary Bros (Bombo) Pty Ltd Hanson Construction Materials Pty Ltd Boral Resources (NSW) Pty Ltd

14/04/2016

The Transport Planning Partnership Pty Ltd ACN: 607 079 005

# ALBION PARK, BASS POINT & DUNMORE QUARRIES

# **Cumulative Traffic Impact Assessment**

Version: 04

14/04/2016

TTPP Reference: 15003

**Quality record** 

Report name	Date	Version	Approved by	Signature
15003r02	27/11/15	V01	Jason Rudd	Jon Russ
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# APPENDICES

A. RMS TRAFFIC VOLUME DATA

# 1 INTRODUCTION

Cleary Bros, Hanson and Boral each operate a hard rock quarry in the Illawarra Region, south of Wollongong. The relevant quarries are:

- Albion Park Quarry (Cleary Bros)
- Bass Point Quarry (Hanson)
- Dunmore Quarry (Boral)

Each of the three quarries has recently received conditional approval to increase their annual quarry production limits.

A condition of consent for each of the quarries requires that a jointly funded "Cumulative Traffic Impact" study be prepared to:

- assess the current and future projected cumulative impacts of the three quarries on the classified road network; and
- identify (if necessary to address adverse cumulative traffic impacts) reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road.

An extract of Condition 47A and 47B as it appears in the Albion Park Quarry Consent (No. 10639 of 2005) is reproduced below.

#### Cumulative Traffic Impact Study

- 47A. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, cause to be prepared an independent Cumulative Traffic Impact Study. The study must:
  - be undertaken by a suitably qualified traffic consultant, whose appointment has been approved by the Secretary;
  - b) be commissioned by 31 August 2015, and completed by 30 November 2015, or as otherwise agreed in writing by the Secretary;
  - c) be co-funded by the operators of the Albion Park, Dunmore and Bass Point quarries, proportionate to the quarries' respective quarry product road transport limits, as approved at 31 August 2015;
  - d) include a comprehensive assessment of current and future projected currulative traffic impacts of the three quarries on the classified road network, undertaken in consultation with the RMS; and
  - e) identify any reasonable and feasible measures that can be implemented to minimise the traffic and road safety impacts of quarry trucks on Mount Ousley Road, and the likely cost of implementing these measures.
- 47B. The Applicant shall, in conjunction with the operators of the Bass Point Quarry and the Dunmore Quarry, prepare and implement a program to implement any reasonable and feasible measures identified in the Cumulative Traffic Impact Study not already undertaken by the Applicant, in an equitable manner with the two other quarry operators, to the satisfaction of the Secretary. The program must be submitted to the Secretary for approval by 31 December 2015, or as otherwise agreed in writing by the Secretary.

It is noted that the condition is identical in the consents for the Dunmore Quarry and Bass Point Quarry with the exception of the dates for report commissioning and preparation.

The Transport Planning Partnership (TTPP) Pty Ltd have been engaged by Boral, Cleary Bros and Hanson and approved by the Department of Planning and Environment (DoPE) to prepare the Cumulative Traffic Impact study.

TTPP considers that the objectives of the cumulative assessment are as follows:

- Identify the combined (cumulative) traffic generation potential of the 3 approved quarries (Albion Park, Bass Point and Dunmore);
- Identify the growth of traffic on the classified road network associated with the combined potential increase in quarries production levels;
- Assess the implications of the cumulative quarry traffic generation; and
- Identify mitigation or improvements measures (if required) to address the identified implications.

These study objectives were discussed and agreed with the RMS as required by the condition of consent. Details of the consultation with RMS are provided in Section 3 of this report.

It is noted that this report and the assessment provided herein has been updated to incorporate and address comments provided by the DoPE in their correspondence dated 7 December 2015.

# 2 BACKGROUND

## 2.1 Site Location

The locations of the three quarries within the context of the Illawarra Region that are to be considered as part of the Cumulative Traffic Impact Assessment presented in this report are shown in Figure 1.



Source: Google Maps

## 2.2 Access to the Classified Road Network

The Albion Park Quarry is conditioned to be accessed via the East West Link linking to the Princes Highway. The new access to the East West Link has been constructed and the Quarry is operating product haulage movements via this access in accordance with the consent condition. Both the East - West Link and Princes Highway are classified regional roads.

The Bass Point Quarry is accessed via a private Haul Road linking to Dunmore Road / Shellharbour Road and the Princes Highway. Shellharbour Road is a classified regional road. It is noted that only Bass Point Quarry utilises local roads to distribute quarry product. Levies for local road use paid by Hanson to Shellharbour Council are conditioned separately.

The Dunmore Quarry has a direct access to the Princes Highway via a grade separated interchange.

Once on the Princes Highway, each Quarry has access to the regional (classified) road network, including the F6 link to Sydney.

## 2.3 Approved Quarry Production Levels

**Table 1** provides a summary of the pre and post approval production levels for each of the quarries that can be transported by road as detailed in the consents for each Quarry.

 Table 1
 Approved Annual Production Levels MTPA (Material Transported Via Road)

	Albion Park	Bass Point	Dunmore	Total
Pre Modification Approved Production Level (million tonnes per annum)	0.6	1.5 <sup>1.</sup>	1.0	3.1
Post Modification Approved Production Level (million tonnes per annum)	0.9	3.0	1.5	5.4
Net Potential Increase of Approved Production Transported via Road	0.3	1.5	0.5	2.3

Notes: 1. Bass Point Pre Modification is actual production via road rather than approved.

2. Bass Point proposes to also transports additional product via ship.

3. Dunmore Quarry also transports additional product via rail

It is noted that both Dunmore Quarry and Bass Point have additional production levels that can be transported via non road haulage namely rail and ship.

Through TTPP's discussions with representatives of each Quarry operator, it is interesting to note the approved production levels for each Quarry is somewhat of a theoretical maximum in that each Quarry will to a large degree be competing for the same customers. For example each of the three quarries bid to supply materials for the Berry Bypass project.

It is considered unlikely that all three quarries will operate to their maximum consented production levels in the same year. Thus any traffic assessment based on all three quarries operating simultaneously at full production levels for a one year period is conservative and assessing what is considered by TTPP to be an unrealistic worst case.

Notwithstanding the above, the assessment presented in this report is based on the conservative "worst case" scenario.

#### 2.4 Hours of Operation

The hours of operation for each quarry vary to some degree and this has the potential to influence the amount of product transported from each quarry at any one time.

The Albion Park Quarry has no restrictions with regard to the haulage of product from the quarry other than the annual limit of 900,000 tonnes per year.

The Bass Point Quarry can haul product from the quarry 24 hours per day, 7 days a week with the following maximum limits for the dispatch of laden trucks from the quarry:

- 7am 10pm: 40 in any one hour
- 10pm 7am: 23 in any one hour
- 24 hour period: 500 max

The Dunmore Quarry has approval to undertake road haulage as follows:

- Monday to Saturday: 24 hours per day
- Sunday: 8am to 6pm for 15 Sundays a year

#### 2.5 Combined Quarries Average Annual Road Haulage Volumes

Based on the approved production increases for each quarry as described in **Table 1** annual average haulage volumes have been estimated by TTPP. These estimates are then compared with the estimated volumes documented in the development applications.

It is assumed that an average truck load of product will be 33 tonnes per truck. This average truck load is based on the majority of the quarry fleets being a combination of semi trailers and truck and dog vehicles.

The annual average truck movements associated with maximum allowable annual production of the quarries is summarised in **Table 2**.

Table 2 Average Annual Haulage volumes - No. of Laden Trucks Leaving Qual
---

	Albion Park	Bass Point	Dunmore	Total
Pre Modification Approved Production Level (Trucks per annum)	18,180	45,450 <sup>.</sup>	30,300	93,930
Post Modification Approved Production Level (trucks per annum)	27,270	90,910	45,450	163,630
Net Potential Increase of Trucks Haulage Volumes	9,090	45,460	15,150	69,700

Notes: 1. The number in this table are to be doubled in order to estimate the total number of truck movements, namely laden leaving the guarry and returning empty.

For the purpose of this assessment it is assumed that there are 275 effective work days per year once quarry shut down, public holidays and limited if any haulage on Sundays and half day Saturdays have been accounted for.

Using these assumptions the average daily increase in truck haulage volumes for each have been estimated as follows:

- Albion Park Quarry: 33 laden trucks per weekday
- Bass Point Quarry: 165 laden trucks per weekday
- Dunmore Quarry : 55 laden trucks per weekday
- Cumulative (Total): 253 laden trucks per weekday

It is understood that the volume of haulage trucks entering and leaving the quarries varies on a day to day basis.

It is noted that the nature of the limit on annual production levels for each quarry means that days where above average truck volumes are undertaken there will be similarly days where truck volumes are lower than the average.

#### 2.6 Estimated Maximum Additional Peak Hour Road Haulage

The various traffic reports submitted with the Development Applications for each quarry have been reviewed with regard to the future increases in the peak period road haulage volumes expected to occur with the quarries production level increases.

The hourly road haulage of each quarry various significantly from day to day and hour to hour. The number of peak hour loads for each of the three quarries is more aligned with client demands than a particular time of day and as such it is not practical to identify existing or predict future patterns of product haulage for each quarry.

Actual existing haulage data for each of the three quarries was included in the various traffic assessments for the individual quarries or the project application material. It is upon such data that the additional traffic (existing versus future) associated with each approved production level increase has been estimated and documented in the quarry traffic assessments and reproduced in this cumulative assessment.

Notwithstanding the above, the approved future operating conditions for each of the three quarries will determine the additional cumulative impact of quarry product haulage. Each of the environmental assessments for the quarries included an estimate of the additional product haulage vehicle movements that would be expected within a typical peak one hour period.

Should each of the quarries additional peak hour haulage occurs simultaneously, then this would be considered to be the worst case scenario for the cumulative impact of the approved production level increases.

A summary of the estimated additional peak period haulage volumes is presented in **Table 3**.

From Table 3 it is noted that Bass Point and Albion Park quarries typically generate peak haulage movements at different times of the day.

Furthermore, as set out in the environmental assessment documents, the Albion Park Quarry does not expect to increase its current level of peak haulage activities but rather that there will be more days per year where peak haulage levels will be undertaken. This reflects the quarry's production and vehicle loading capacity.

As shown in Table 3, should all three quarries simultaneously operate with typical peak period generation, then the net increase in peak period haulage vehicles for three quarries is estimated to be **17 laden vehicles per hour**.

	Albion Park	Bass Point	Dunmore
No. of Existing Peak Haulage Trucks Leaving the Quarry (Trucks per Hour)	20	13	10
No. of Future Peak Haulage Trucks Leaving the Quarry (Trucks per Hour)	20	25	15
No. of Additional Haulage Trucks Leaving the Quarry (Trucks per Hour)	0	12	5
Peak period for Quarry Haulage	9am - 12noon	12 noon - 3pm	Varies
Approved Hourly Limit of Haulage Trucks Leaving the Quarry	n/a	40 per hour (7am-10pm)	n/a

# Table 3Additional Quarry Peak Period Additional Truck Haulage Volumes<br/>(No. of Laden Trucks Leaving the Quarries per Hour)

#### 2.7 Cumulative Truck Distributions

Discussions have been undertaken by TTPP with each of the quarry operators regarding the potential future markets for the additional annual levels of quarry product. These discussions have been used to formulate an expected distribution of haulage vehicle movements on the classified road network.

Cleary Bros (Bombo) Pty Ltd indicated that they expect strong demand from local markets in the foreseeable future. Notwithstanding this, a conservative estimate has been used whereby it is expected that some 80% of haulage movements will be to the southern Sydney Region via Mount Ousley Road.

Hanson Construction Materials Pty Ltd indicated that a significant proportion of current haulage volumes were 'ex bin' (ie sold directly from the site to external customers, as opposed to being transported by Hanson's vehicles to other sites. These details were considered to be confidential.

Notwithstanding the above, it is estimated that some 80% of haulage movements from Bass Point Quarry may use Mount Ousley Road. This estimate is likely to be conservatively high as no allowance has been made for trucks travelling to Port Kembla.

Boral Resources Pty Ltd indicated that they expected a strong local market for its additional product noting that the impending closure of Boral's Burrier Quarry, near Nowra. It is estimated that some 60% of haulage trucks will travel to destinations north of the Dunmore Quarry while some 40% will travel south.

The proportional distributions have been applied to the estimated additional average daily haulage volumes described in Section 2.5 above.

The distribution of the additional daily haulage volumes is summarised in Figure 2.



Figure 2 Distribution of Additional Ave. Daily Haulage by Laden Trucks

Source: Google Maps

**Figure 2** indicates that the average additional truck haulage volumes heading to Mount Ousley Road associated with the approved production levels of the three quarries would be 191 trucks per weekday. This represents an additional 382 truck movements (191 laden northbound + 191 unladen southbound) along Mount Ousley Road per day.

Furthermore, **Figure 2** indicates that approximately 75% of the combined additional product from the 3 quarries is anticipated to travel north along Mount Ousley Road.

Of the additional 191 trucks per weekday on Mount Ousley Road the following proportions are assigned to each of the 3 quarries:

- Albion Park Quarry: 14%
- Bass Point Quarry: 69%
- Dunmore Quarry: 17%

The same distributions have been applied to the maximum additional peak hour haulage associated with simultaneous peak haulage of all three quarries (ie. 17 haulage movements). The results are that some additional 13 laden haulage movements per hour are expected to travel north and some 4 laden movements per hour to the south should each quarry operate at is future peak levels.

# 3 CONSULTATION WITH RMS

A meeting was held between RMS representatives and TTPP in October 2015 to discuss the cumulative impact assessment as required by the consents for each quarry.

The objectives of the meeting were established to be:

- To provide the RMS with the background to the cumulative assessment, including its need to address conditions of consent.
- Establish RMS' expectations as to the definition of the classified road network as it relates to the impact assessment of the 3 quarries and the extent to which the study shall focus on Mount Ousley Road.
- Obtain RMS comments as to the existing operational performance of the classified road network (specifically Mount Ousley Road). Ie. are there any existing capacity pinch points?
- Identify planned and potential improvements planned for the classified network.
- Determine to what extent does the RMS consider the quarries additional traffic may impact on network operation and if so are there specific items / works that could be implemented to address such impacts.
- Obtain any recent traffic flow data for the classified roads in the study area to assist in the assessment of the cumulative impacts of the three quarries.

The key items of the discussion with regard to the assessment were:

- With regard to funding for classified roads, the RMS stated that there is no current mechanism or policy which enables the RMS to collect a levy for classified road use by heavy vehicles. Funding for classified road is via State government funding or works specifically required to address / mitigate impacts of a particular development.
- As stated within the RMS submissions to DoPE for each quarry, the RMS reiterated that they had no objections to the proposed increase of production levels of each quarry individually. This statement was on the basis that in isolation each quarry's production increase would not in its self adversely impact on the operation of the classified road network.
- With regard to the cumulative impacts of the three quarries increasing production, the RMS noted that the combined additional haulage volumes was unlikely to have a measureable impact on the operation of the classified road network, even along Mount Ousley Road however there had been no cumulative assessment demonstrating the extent of impact.
- The RMS suspected that the combined additional haulage volumes of the three quarries would represent a small percentage of total traffic flows along Mt Ousley Road however the assessments to date have not presented such information to confirm or counter this suspicion.
- Mount Ousley Road was identified as the key pinch point in the classified road network surrounding the quarries.

- With regard to capacity and safety improvements along Mount Ousley Road, the RMS has a number of projects being carried out to improve safety for road users in this area including:
  - Safety upgrade for northbound traffic entering the M1 from Picton Road (complete)
  - o Interchange at the intersection of M1 and Old Mount Ousley Road.

Each of these projects has been developed with a view to accommodating future traffic growth in the corridor.

- The RMS noted the significant capacity improvements that would be offered by the planned Albion Park Rail bypass.
- It was discussed that major local projects such as the Berry Bypass and Albion Park Rail bypass would require significant volumes of quarried material and the presence of 3 local and competing quarries would be advantageous for the project with regard to haulage distances. This reinforces the expected distribution of additional quarry material to be more focused on local markets rather than the traditional northbound haulage of material to the Sydney region.
- It was discussed that the implications of the combined additional haulage of the three quarries should consider the cumulative implications to the classified road network closer to the quarry sites rather than focus on Mount Ousley Road where the potential for realistic additional capacity improvements are limited.
- It was agreed that any measures to mitigate the cumulative implications of the quarries (if required) should also to consider what each quarry has committed to undertaken as part of their Traffic Management Plans, noting that a key factor in reducing vehicle accidents is driver behaviour.

# 4 CUMMULATIVE TRAFFIC IMPACT ASSESSMENT

## 4.1 Background Traffic Volumes on the Classified Road Network

The RMS has provided TTPP with recent traffic volume data for the classified road network for use as part of this cumulative traffic impact assessment.

A summary of the traffic volume data is provided in **Table 4**. Full details are reproduced in Appendix A.

Road	Location	Average Daily Traffic Volume (ADT)	Year	% Heavy Vehicles	Annual Growth Rate
Southern Freeway (F6) 7.104	Gwynneville at Gipps Road Overbridge	77,996	2012	-	2.2%
Southern Freeway (F6) 7.594	Unanderra north of Northcliffe Drive	61,465	2013	9.1%	1.6%
Princes Highway (SH1) RD001	At Shellharbour Road (MR522)	30,311	2014	10.9%	4.0%
Princes Highway (SH1) 7.804	Kiama at Bombo Railway Station	34,367	2014	9.3%	2.3%

#### Table 4 Surveyed Daily Traffic Volumes on Classified Road Network

Source: RMS (2015)

It is noted that the surveyed traffic volumes presented in Table 4 above, include vehicle movements associated with the existing haulage operations of the Albion Park, Bass Point and Dunmore Quarries.

The surveyed traffic volumes and the associated historical growth rates over the past 5-7 years have been used to estimate traffic volumes for the year 2015 and 2030.

Road	Location	Average Daily Traffic Volume (2015)	Average Daily Traffic Volume (2030)
Southern Freeway (F6) 7.104	Gwynneville at Gipps Road Overbridge	83,258	115,395
Southern Freeway (F6) 7.594	Unanderra north of Northcliffe Drive	63,448	80,505
Princes Highway (SH1) RD001	At Shellharbour Road (MR522)	31,523	56,772
Princes Highway (SH1) 7.804	Kiama at Bombo Railway Station	35,157	49,448

## Table 5 Estimated 2015 and 2030 Daily Traffic Volumes on Classified Road Network

Source: RMS (2015)

## 4.2 Road Network Daily Traffic Volumes with Cumulative Quarry Haulage

The additional road haulage movements associated with the annual production level increase of the three quarries as described above in Section 2 have been added to the estimated road network flows as presented in Section 4.1.

The results are summarised in Table 6.

Road	Location	Average Daily Traffic Volume (2015)	With Additional Movements of 3 Quarries	% Increase Associated with 3 Quarries
Southern Freeway (F6) 7.104	Gwynneville at Gipps Road Overbridge	83,258	83,640	0.46%
Southern Freeway (F6) 7.594	Unanderra north of Northcliffe Drive	63,448	63,830	0.60%
Princes Highway (SH1) RD001	At Shellharbour Road (MR522)	31,523	31,919	0.55%
Princes Highway (SH1) 7.804	Kiama at Bombo Railway Station	35,157	35,281	0.35%

#### Table 6 Estimated 2015 Daily Traffic Volumes on Classified Road Network

The results shown in **Table 6** indicate that the cumulative traffic volume impact of the Albion Park, Bass Point and Dunmore Quarries on Mount Ousley would in 2015 represent an increase of less than  $\frac{1}{2}$  a percent (0.46%).

It is considered that such an increase is an insignificant implication to the operational capacity of the classified road network and specifically Mount Ousley Road. The proportion of the additional quarry related traffic will further decrease over future years as background traffic flows increase.

Furthermore, the proportion of the additional quarry related traffic on the classified road network within close proximity to the quarries' locations is also considered to be insignificant being less than 1% of total existing traffic flows.

The analysis presented in **Table 6** confirms the RMS's suspicion that the additional quarry related traffic would represent a very small proportion of the total traffic along Mount Ousley Road.

4.3 Road Network Peak Hour Traffic Volumes with Cumulative Quarry Haulage

The RMS was consultant to obtain traffic flow information for Mount Ousley Road and in particular hourly flows and percentage of heavy vehicles.

However traffic flow data for Mount Ousley Road was not available.

Notwithstanding the above, a RMS count station on the Southern Freeway at Unanderra (07.594) which is along the 3 quarries haulage route towards the north indicated that peak period flows in February 2015 were in the order of :

- AM Peak Hour (8-9am)
  - Northbound: 3,539 vehicles / hour
  - Southbound: 1,639 vehicles / hour
  - o Total: 5,178 vehicles / hour
- PM Peak Hour (5-6pm)
  - o Northbound: 2,215 vehicles / hour
  - Southbound: 3,023 vehicles / hour
  - o Total: 5,237 vehicles / hour

Assuming, based on 2012 RMS daily traffic data, that the proportion of heavy vehicles in the peak hour flows is similar at 9.1% then the peak hour heavy vehicle flows are estimated to be:

- AM Peak Hour: 471 heavy vehicles per hour
- PM Peak Hour: 477 heavy vehicles per hour

The addition of 26 two way truck movements per hour (13 laden quarry trucks) would represent an increase of heavy vehicle movements of 5-6% at this point on the F3 Freeway.

#### 4.4 Warrants for Capacity Improvements on Mount Ousley Road (F6)

The analysis presented in Section 4.2 above indicates that road capacity improvements along Mount Ousley Road are not warranted to accommodate the additional truck haulage movements associated with the approved increases to annual production at the Albion Park, Bass Point and Dunmore Quarries.

Furthermore, discussions with the RMS have indicated that while Mount Ousley Road is considered to be a pinch point in the classified road network, significant capacity improvements are not at this stage considered practical, feasible or warranted.

It is noted that there is no current arrangement under which the RMS could seek or obtain a contribution or levy for improvement works associated with the approved development of the three quarries or other developments in the Illawarra whereby the development itself does not trigger the need for such capacity improvements.

4.5 Warrants for Capacity Improvements on Other Sections of Classified Network

The analysis presented in Section 4.2 above also indicates that road capacity improvements of the Princes Highway closer to the three quarry sites are not warranted to accommodate the additional truck haulage movements associated with the approved increases to annual production at the Albion Park, Bass Point and Dunmore Quarries.

The various intersection operation analysis presented in the traffic assessments submitted with the quarries' development applications clearly indicate that there is significant spare capacity within the network, even when accounting for the cumulative implications of increased production of the three quarries.

#### 4.6 Warrants for Safety Improvements

TTPP undertake discussions with each of the 3 quarry operators with the view to obtaining an operators perspective on road safety issues facing quarry truck drivers.

The operators each highlighted that the key factor in safety was the driver behaviour of their truck drivers and that of other general road users. The geometry of the roads and the site access were generally stated to be of a satisfactory standard with regard to safety.

In addition to the discussions, site inspections were undertaken at each of the Quarries access routes to and from the classified road network. The access arrangements were determined to be satisfactory and in accordance with RMS (and Australian Standard) sight distance requirements.

Therefore, it is considered that safety improvements associated with the three Quarries should be focused on driver behaviour. Each of the three quarries is required to develop and implement a Traffic Management Plan (TMP) for quarry traffic. This TMP is required to include a *Driver Code of Conduct*.

The TMP and Drivers Code of Conduct shall include details regarding:

- vehicle operating speeds;
- fatigue management;
- haulage routes;
- communications; and
- legal restrictions relating to driving under the influence of drugs and alcohol.

It is also noted that the RMS has recently completed an upgrade for northbound traffic entering the Mount Ousley Road from Picton Road.

The objectives of the upgrade were to:

- Reduce the frequency of crashes resulting from vehicles overtaking slow vehicles.
- Improve road safety by allowing vehicles entering from Picton Road to accelerate to a suitable speed for merging with the Princes Motorway traffic.
- Improve the safety and efficiency of the Princes Motorway, especially in wet and peak periods.
- Reduce potential environmental impacts.

The REF for the upgrade identified that for the 5 year period between 2008 and 2012 that there were 9 reported crashes in the vicinity of the Princes Motorway / Picton Road intersection with 78% involving rear end or lane change crashes.

The upgrade removes the need for vehicles to stop by removing the T-junction and providing a new road alignment (acceleration lane) where Picton Road meets Princes Motorway. Discussions with RMS have indicated that they consider the upgrade to be a success.

# 5 CONCLUSIONS

The assessment presented in this report has considered the potential traffic implications to the classified road network associated with the cumulative additional traffic generation of the Albion Park, Bass Point and Dunmore quarries approved increases in allowable annual production levels.

The analysis has determined that the combined average additional daily traffic generation of the three quarries if operating at fully approved production levels would be in the order of 253 additional laden haulage trucks per day leaving the quarries.

The analysis has determined that the generation of 253 additional haulage trucks (or 506 truck movements) would represent an insignificant increase to total traffic volumes on the classified road network including both Mount Ousley Road and the Princes Highway closer to the quarry sites.

Furthermore, the peak hour cumulative additional haulage truck movements has been estimated to be 13 laden trucks (26 truck movements) to the north of the quarries and 4 laden trucks to the south. These represent an insignificant proportion of the total traffic and heavy vehicle flows along the quarries haulage routes.

Based on the insignificant level of traffic volume increases, it is concluded that warrants for capacity improvements to the classified road network are not warranted in order to accommodate the combined increased production of the Albion Park, Bass Point and Dunmore quarries.

Notwithstanding the above, it is considered that maintaining and improving road safety is to be established as a key requirement for the operation of truck haulage of quarry product. In this regard the development and maintenance of a Traffic Management Plan and Driver Code of Conduct is required for each quarry. The above recommendations would be considered reasonable and feasible measures that can be readily implemented by the three quarry operators.

Furthermore, the findings and conclusions of this cumulative traffic impact assessment does not removal the need for Quarry operators to comply with other traffic related conditions within each individual consent for the Albion Park, Bass Point and Dunmore quarries.

# **APPENDIX A**

# **RMS Traffic Volume Data**

Site	Perman	Road Nun	Road Name	Location	Permanent ADT	Permanent Year	Sample Count ADT	%HV
7.104	Y	F6006	SOUTHERN FWY,F6	GWYNNEVILLE-AT GIPPS RD OVBR	77996	2012		
7.104	Y	F6006	SOUTHERN FWY,F6	GWYNNEVILLE-AT GIPPS RD OVBR	76528	2011		
7.104	Y	F6006	SOUTHERN FWY,F6	GWYNNEVILLE-AT GIPPS RD OVBR	75653	2010		
7.104	Y	F6006	SOUTHERN FWY,F6	GWYNNEVILLE-AT GIPPS RD OVBR	73803	2009		
7.104	Y	F6006	SOUTHERN FWY,F6	GWYNNEVILLE-AT GIPPS RD OVBR	71643	2008		
7.104	Y	F6006	SOUTHERN FWY, F6	GWYNNEVILLE-AT GIPPS RD OVBR	69771	2007		
7.594	N	F6006	Southern F'way	Unanderra			55723	9.10%
7.594	Y	F6006	SOUTHERN FWY	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	61465	2013		
7.594	Y	F6006	SOUTHERN FWY,F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	58948	2012		
7.594	Y	F6006	SOUTHERN FWY,F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	59000	2011		
7.594	Y	F6006	SOUTHERN FWY,F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	57887	2010		
7.594	Y	F6006	SOUTHERN FWY,F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	56561	2009		
7.594	Y	F6006	SOUTHERN FWY,F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	55493	2008		
7.594	Y	F6006	SOUTHERN FWY, F6	UNANDERRA-N NORTHCLIFFE DR INTERCH'G	55950	2007		
RD001	Y	HW1	SH1 Princes Hwy	At MR522	30311	2014	26450	10.90%
RD001	Y	HW1	Princes Hwy	At Shellharbour Rd	29717	2013		
RD001	Y	HW1	PRINCES HWY, HW1	AT MR522	28243	2012		
RD001	Y	HW1	PRINCES HWY, HW1	AT MR522	27068	2011		
RD001	Y	HW1	PRINCES HWY, HW1	AT MR522	25928	2010		
7.804	Ν	HW1	Princes Hwy Kiama	At Bombo			35743	9.30%
7.804	Y	HW1	PRINCES HWY	KIAMA-AT BOMBO RLY STN	34367	2014		
7.804	Y	HW1	PRINCES HWY	KIAMA-AT BOMBO RLY STN	33810	2013		
7.804	Y	HW1	PRINCES HWY,SH1	KIAMA-AT BOMBO RLY STN	32588	2012		
7.804	Y	HW1	PRINCES HWY,SH1	KIAMA-AT BOMBO RLY STN	31925	2011		
7.804	Y	HW1	PRINCES HWY,SH1	KIAMA-AT BOMBO RLY STN	31406	2010		
7.804	Y	HW1	PRINCES HWY,SH1	KIAMA-AT BOMBO RLY STN	30443	2009		
7.804	Y	HW1	PRINCES HWY,SH1	KIAMA-AT BOMBO RLY STN	29143	2008		
7.804	Y	HW1	PRINCES HWY, SH1	KIAMA-AT BOMBO RLY STN	29407	2007		



# **APPENDIX 10:**

*"Water Management Plan Review (18 January 2013)"* 



18 January 2013

# CLEARY BROS ALBION PARK QUARRY Water Management Plan Review

Submitted to: Helen Nicolaidis Cleary Bros (Bombo) Pty Ltd PO Box 210 Port Kembla NSW 2505

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## **1.0 INTRODUCTION**

Golder Associates Pty Ltd (Golder) has prepared this report for Cleary Bros (Bombo) Pty Ltd (Cleary Bros) to document proposed changes to the Water Management Plan (WMP) at the Albion Park Quarry located in Albion Park, NSW (the site). The site, formerly dairy pasture, currently operates as a hard rock quarry.

Golder previously prepared a WMP for the site as part of the Quarry Environmental Management Plan (EMP), which was prepared in conjunction with an application to extend the quarry into a new area adjacent to the pre-existing pit. The Golder WMP was entitled: *Cleary Bros Quarry, Albion Park, Surface Water and Groundwater Management Plan and Water Quality Monitoring* (October 2005). This document has been prepared in accordance with the provision for a periodic review of the monitoring programme, as recommended in the WMP. Clearly Bros engaged Golder to evaluate the WMP on the basis of monitoring undertaken since 2005, including monitoring events performed by Golder (refer to Golder 2006 and 2007 letter reports: Reporting of Surface Water and Groundwater Sampling at Albion Park).

This report considers the original recommendations of the WMP, the monitoring results collected to date and the requirements of the Department of Planning and Infrastructure (DPI), and presents reasoned argument in support of changes to the WMP.

## 2.0 SCOPE OF SERVICES

Cleary Bros have engaged Golder to assess the viability and appropriateness of a number of proposed changes to their WMP. The proposed changes under consideration are detailed in the Cleary Bros Scope of Works (email dated 6 February 2012; APPENDIX A). The scope of this assessment comprised:

- Interpretation of available surface water level data and hydrographs;
- Interpretation of groundwater level data and hydrographs;
- Interpretation of surface water and groundwater chemistry, including field measurements and laboratory analyses;
- Produce a technical report documenting the above surface and groundwater levels and chemistry, and discuss recommendations in relation to the changes proposed by Cleary Bros and in accordance with the DPI requirements.

Golder has not assessed the data directly from the data source; the data used in this assessment was supplied by Cleary Bros (emails dated 6 February 2012 and 20 June 2012). It is understood the water quality data has been collected by ALS Group (ALS) using acceptable sampling methods, and that the reliability of the data has been verified and accurately transcribed from the data source. Stream flow measurements were collected using transducers installed at flow monitoring stations, which were last downloaded by Ecowise and processed by Golder in February 2006. Golder has not independently verified the quality of the data, and has relied on the data as provided by Cleary Bros.

## 3.0 SITE DESCRIPTION

The Albion Park Quarry is located on Signal Hill along Dunsters Lane off the Princes Highway (Figure 1), approximately 22 km south of Wollongong. The target of the site excavation is the latite (volcanic) bedrock. One of the properties of latite is its hardness and resistance, and as such is used in road construction as a base material. The land originally approved for extraction has an area of 16.96 hectares. The immediate lands bordering the site are mainly in use for hard rock quarry industry, with the exception of a dairy farm.

The site topography consists of steeply sloping hills sloping in a roughly south to south-easterly direction (Figure 1). There are two main creeks that run through the depressions and valleys between the hills and generally drain to the Rocklow Creek catchment.

The planned quarry extension from Stage 1 to Stage 6 is shown in Figure 2. Cleary Bros commenced construction of the associated haul road in November 2007 to provide access to the new extraction area. Preparatory works continued within the extraction area until 30 June 2009, and production commenced in July 2009. To date, works have been extended into the Stage 1 and Stage 3 block, with an estimated 80%



of the stage complete. Groundwater seepage and surface runoff from the pit area collects in a sump located at the eastern end of the pit as illustrated on Figure 1 and Figure 2. The current base of the pit, around the sump, lies at approximately 65.7 m AHD (survey by KF Williams and Associates, dated 11 July 2012); the water in the sump is approximately 5 to 10 m deep.

Since the quarry extension commenced, the landform modifications that have occurred are outlined in a site rehabilitation plan implemented by Cleary Bros. The rehabilitation comprises a revegetation area (up to 100 m wide) along the extent of the southern border of the extension area (i.e. along Stages 1, 3 and 6). Planting in Revegetation Area 1 and 2 is complete. Planting in Revegetation Areas 3, 4 and 5 has not yet commenced.

The site groundwater and surface water conditions are summarised below. Detailed discussion of the topography, land use, hydrology and hydrogeology is contained in the WMP (Golder 2005).

## 3.1 Groundwater

A site conceptual groundwater model was developed for the WMP. The model distinguishes groundwater flow in two distinct 'aquifer' units within the local profile:

- A perched (shallow) groundwater system within the thin residual soil overlying the fresh bedrock. This
  perched water table is superficial and supports limited and intermittent groundwater flow, including flow
  to the two watercourses. The direction of the perched groundwater is expected to be towards WC 2.
- 2) The regional (deep) aquifer system developed within the volcanic bedrock. This aquifer system is recharged through precipitation, seepage and upgradient recharge areas. The bedrock is inferred to have low permeability as a consequence of its fractured nature (secondary porosity) and tight flow conditions within the aquifer. The regional groundwater flow direction within bedrock tikely follows the westerly bedding dip direction.

Based on a comparison of the pit floor elevation relative to measured groundwater levels in the surrounding aquifer systems, groundwater seepage is expected to flow into the excavation.

## 3.2 Surface Water

Watercourse 1 (WC 1; Figure 1) is an ephemeral creek that drains a large part of the area of the quarry extension area. The intermittent nature of this creek means that the water intercepted from this watercourse by the quarry activities represents surface water runoff, rather than baseflow from groundwater. Land use within the upper surface water catchment (WC 1) is agricultural.

Watercourse 2 (WC 2) is a perennial creek that drains eastward from the WC 2 and "Unnamed Creek" confluence (Figure 1). Previous monitoring (Golder, 2006 and 2007) indicated that WC 2 has higher flows than WC 1 and that the water chemistry is similar to that of nearby groundwater samples. Watercourse 2 is likely to be supplemented by baseflow from shallow groundwater and has the potential to be affected by guarrying activities.

The NSW Department of Environment and Climate Change (NSW DECC<sup>1</sup>) has identified the area in the vicinity of the quarry as containing significant biodiversity values, including endangered species reportedly located along the watercourses within a rainforest area. The NSW DECC (in a letter dated 18 December 2003; refer to WMP) raised the issue of potential impacts to sensitive ecosystems in the vicinity of the quarry as a result of water table drawdown and potential impacts to surface water and groundwater quality resulting from quarry activities.



<sup>&</sup>lt;sup>1</sup> The relevant functions of the DECC are currently performed by the Office of Environment and Heritage (OEH) NSW





## 4.0 OPERATING ARRANGEMENT

## 4.1 Potential Impacts Scenarios Identified

An Environment Impact Study (EIS) prepared by Perram and Partners (October 2003) identified two potential environmental impacts from site operations:

- drawdown of the water table reaching water supply wells and affecting pasture on neighbouring properties; and
- changes during the life of the quarry in existing riparian (creek) and groundwater flow (quantity and quality) affecting the rainforest around WC 1 and WC 2 down hydraulic gradient from (south of) the quarry.

Local flow directions in the vicinity of the quarry were predicted to be affected once the excavation depth penetration successively reaches the levels of the perched and then the deep aquifers (i.e., flow will be directed into the quarry from each aquifer unit). In addition, the management method described in the WMP involving the re-injection of groundwater to the aquifer was expected to have influenced the groundwater flow field in the vicinity of the re-injection area. Reinjection of water has occurred through flow infiltration of the excavated levels at the base of Stage 3 and therefore infiltration trenches have not been required. This is evidenced by the increasing water levels in the deep boreholes and the success of the rainforest restoration and new plantings.

## 4.2 Monitoring Program

A monitoring programme was developed in the WMP to monitor the groundwater and surface water levels, water quality, and flow at the site. The programme is summarised in the following sections.

## 4.2.1 Monitoring Locations

Under the WMP, the monitoring locations and requirements are outlined in as shown in Table 1 below. The number of surface water flow gauge stations and groundwater sampling points are also shown on Figure 1.

	Groundwater	Surface Water Two surface water monitoring points at the south eastern corner of the Site: one up-gradient of the confluence of the two watercourses; and one downstream of the confluence.			
Number of sampling points	Three monitoring wells pairs (2 shallow, 3 deep)				
Frequency of sampling <sup>1</sup>	Three monthly in the first two years, then six monthly.	Fortnightly for one year, then three monthly for a year, then six monthly.			
Field measurements	Water level, EC. pH, Temperature.	2. pH, Temperature. EC, pH, temperature.			
Laboratory testing <sup>1,2</sup>	pH, TDS, TSS, Na, K, Ca, SO <sub>4</sub> , Cl, NO <sub>3</sub> , NO <sub>2</sub> , alkalinity, TKN, CO <sub>3</sub> /HCO <sub>3</sub> , oil and grease, BOD, TOC, ammonia, total phosphorus, and dissolved metals.	Fortnightly sampling: pH, EC, and turbidity Else: pH, TDS, TSS, Na, K, Ca, alkalinity, SO <sub>4</sub> , CI, CO <sub>3</sub> /HCO <sub>3</sub> , oil and grease, and dissolved metals.			

#### Table 1: Groundwater and Surface Water Monitoring Program (From WMP Table A, Golder 2005)

1. The analytes and monitoring frequency will be revised after the collection of data over the first three years.

2. Full metals suite (dissolved) includes As, Cd, Cr, Cu, Fe, Hg, Pb, Ni, Zn

## 4.2.2 Surface Water Monitoring

Two surface water monitoring sites were installed in the watercourses at the southern part of the site:



- Station 1, or the Eastern Surface Water Station, is the monitoring station for WC 1, approximately 100
  m upstream of the Unnamed Creek confluence;
- Station 2, or the Western Surface Water Station, is located in WC 2 approximately 270 m downstream of the confluence of WC 1 and the Unnamed Creek.

Surface water quality sampling also occurs at Stations 1 and 2, as summarised in Table 1. For flow, automated level loggers were installed at each site (Station 1 and Station 2).

#### 4.2.3 Groundwater Monitoring

The groundwater monitoring well pairs were installed at the southern part of the site, including two shallow wells to approximately 11 m depth and three deep well to about 25 m depth in September 2004. Groundwater levels and water quality (Table 1) are monitored from these wells:

- MW1S (shallow) and MW1D (deep) located in the vicinity of Station 1;
- MW2S and MW2D located up-gradient of Station 2; and
- MW3D is the most western selected location. Installation of MW3S was abandoned due to access constraints.

## 4.3 Monitoring Requirements

The current monitoring requirements defined in the WMP, and the proposed changes, as mooted in the Cleary Bros email dated 6 February 2012, are discussed below.

#### 4.3.1 Surface Water Field Parameters

Surface water field parameters are monitored to assess if the water in the creek has been protected from upgradient changes in water quality due to site activities.

Changes in the surface water quality may negatively impact on the rainforest ecosystems present surrounding the site. Variations of the water quality in the creek can be caused by the site activities if there is a significant change in runoff water quality (i.e., sedimentation related to excavation or other activities at the site) and in baseflow water quality from shallow groundwater. One objective of the WMP, during the life of the proposed quarry, was to propose appropriate management (maintenance and monitoring) of riparian flow. The quarry development consent, limits any discharge water to the creeks with a pH range between 6.5 and 8.5.

The WMP specifies that the frequency of field testing (pH, conductivity, temperature and turbidity) should be "Fortnightly for one year, then three monthly for a year, then six monthly" Table 1 and will that this monitoring regime be revised after the collection of data over the first three years.

This monitoring regime commenced at the site in February 2009 and has continued fortnightly since that date up to the present.

#### 4.3.2 Surface Water Flow Measurements

Surface water flow is monitored to assess whether there have been any changes in baseflow in WC 2 such that the protection the rainforest ecosystem might be compromised.

The quarry may affect surface water (flow and quality) in two different ways:

- The pit will intercept all runoff from upstream land.
- The pit will directly capture incident rainfall without releasing a useful portion of it as runoff to downstream locations.

Downgradient areas of the site (at WC 2) are likely to be supplemented by baseflow from the shallow perched groundwater, and may therefore have a decreased through-flow of groundwater as the pit expands.



Monitoring and assessment of the hydraulic system with respect to water supply to the creek is one of the key elements of the WMP. To manage the watercourse baseflow and the rainforest ecosystem, the WMP proposed reinjection of water in the shallow aquifer. As per DPI requirements the site water monitoring program is a three-year program at the end of which creek flow data, groundwater level data and rainfall data have been analysed together in the form of a water budget to enable the re-injection parameters to be confirmed, which is outside the scope of this review.

Specific stream flow measurements frequency at Station 1 and Station 2 were not prescribed in Table 1. However, the stations were equipped with automatic data loggers to record flow every 15 minutes in August 2005. Section 7.2.1 of the WMP advises that "once a relevant set of flow data is collected, then surface water flow data and rainfall data will be compared to evaluate the creek water supply from general runoff and groundwater".

Both flow meters have been problematic since their installation (damaged by cattle and infested by insects) Flow data is available at Station 1 every 15 minutes from August 2005 to September 2006. Note: logger malfunction was observed from January to April 2006. Station 2 download records indicate download and connection problems since August 2005, followed by observations of cattle and insect damage. Data logging resumed at both Stations 1 and 2 after in June 2006 but were damaged and ceased in September 2006.

#### 4.3.3 Groundwater Level Measurements

Groundwater levels are monitored to assess the hydraulic connection, or demonstrate lack of it, between the shallow perched and deep regional groundwater as a means of assessing impacts to baseflow contribution to the water courses.

The perched aquifer is believed to be very shallow, and may be highly variable due to precipitation (rain) infiltration. With little or no hydraulic connection to the aquifers, the watercourse water supply would be derived from runoff water and outflow from the perched aquifer.

Site groundwater level measurement frequencies are defined in the WMP (see Table 1) as ".... three monthly in the first two years, then six monthly". Three groundwater monitoring well locations (MW1, MW2, MW3) were selected at the southern part of the site, and wells installed in September 2004. This included two shallow wells (MW1S and MW2S, to approximately 11 m depth) and three deep wells (MW1D, MW2D and MW3D, to approximately 25 m depth). However, installation of MW3S (shallow) was abandoned due to access constraints (Section 7.2.2 of WMP).

The deep monitoring well, MW3D was installed, but was destroyed prior to extraction works. Mr. Terry Perram had discussions with Golder whilst preparing the first Annual Environmental Management Report (AEMR) for Cleary Bros., in 2009/2010 (Cleary Bros, 2010). An extract of this AEMR follows:

"The need to replace deep monitoring well MW3D has been discussed with Golder Associates during preparation of this AEMR. Golder considered a number of factors:

- While a record of historic data has been obtained from MW3D, that may not be reliable as a "before quarrying" case for comparison with data obtained from a replacement well in a nearby location.
- MW3D was difficult to install because of local conditions, which is the reason a second shallow well was not installed at the time.
- The remaining wells at the MW1 and MW2 sites should be adequate to monitor the groundwater effects of the quarry.

Golder recommended that MW3D not be replaced at this time, but should future monitoring results from the other wells indicate deteriorating conditions, an additional well be considered in a suitable location at that time

Consequently it is recommended that a deep monitoring well to replace the destroyed MW3D not be installed at this time."



Groundwater levels have been monitored in the four current wells biannually since December 2008.

#### 4.3.4 Water Quality Monitoring

In accord with the WMP, surface water and groundwater quality are monitored to assess whether the water in the creek has been protected from up-gradient changes in water quality due to site activities.

As discussed in Section 4.3.1, variations of the water quality in the creek can be caused by the site activities if there is a significant change in runoff water quality in shallow groundwater quality.

The results of previous work were interpreted by comparison with the Australia New Zealand Environment Conservation Council (ANZECC) Water Quality Guidelines – Trigger Values for Toxicants in Freshwater (95% protection of species; ANZECC, 2000). Prior to any quarrying activities at the site, the ranges of concentration of the analytes have been established ("historical data", Golder 2005, supplemented by Golder 2006, Golder 2007) and considered as base-line concentrations. It has been observed during the baseline monitoring the site that these concentrations are generally within the 95% ANZECC 2000 guideline. Ongoing monitoring will be compared be compared to these initial concentrations.

The WMP specified that site groundwater quality, for analytes listed in Table 1, was to be measured on a basis "....three monthly in the first two years, then six monthly". This has been carried out six-monthly in the MW1 and MW2 well pairs since December 2008 by ALS (previously Envirolab).

The surface water monitoring from WC 1 and WC 2, as provided in the WMP, was specified to be carried out on a "... fortnightly for one year, then three monthly for a year, then six monthly". This monitoring has occurred quarterly every year since March 2009 by ALS (previously Envirolab).

## 5.0 DATA REVIEW AND ASSESSMENT

## 5.1 Preamble

The general intent of the *Groundwater and Surface Water Monitoring Program*, presented in the WMP (Golder, 2005), provided for a robust monitoring program based on a network of monitoring stations. It also provided for a review of the rigor of the monitoring program after the collection of data over the first three years, or, in the case of surface water monitoring, when "... a relevant set of flow data is collected ...".

Golder has been requested by Cleary Bros., to undertake a review of the monitoring with the view to revising the monitoring program components. On this basis, the data analysis and discussion in following sections, components of the monitoring program will be recommended for revisions.

This data assessment has focused on considerations that test the validity that sufficient historical data has now been collected and that there are no major anomalies or adverse trends are present in the data, such that a change (increase, decrease, variation) is warranted or justifiable without prejudicing the value or quality of the monitoring and put the environment at risk of adverse impact:

- frequency of monitoring;
- monitored parameters;
- monitoring methodology; and/or
- monitoring locations.

## 5.2 Surface Water Monitoring

#### 5.2.1 Surface Water Quality - Field Parameters

The surface water monitoring data provided for WC1 and WC 2 field parameters (pH, EC, temperature and turbidity) is shown on Figure 4 (the data provided by Cleary Bros is presented in APPENDIX B). The data set shows fortnightly measurements from February 2009 until June 2012 and shows:

The temperature readings are seasonally cyclical and generally consistent between sites.



The pH data are generally consistent and measured values were reported within the range of pH 6.1 to 8.9, and typically fall within the acceptable range of pH 6.5 to 8.5 (Section 4.3.1). Watercourse 1 is generally more acidic (pH 6.1-8.3, mean = pH 7.4) whereas WC 2 is slightly more alkaline (pH 6.9-8.7, mean = pH 7.7), but both generally exhibit a similar temporal pattern. The pH data was consistent with the range and mean of the baseline data for WC 1 (pH 6.6-7.5, mean = pH 7.0) and WC 2 (pH 7.0-8.0, mean = pH 7.6) recorded during 2004-5 and as documented in the WMP (Golder, 2005).

Two minor anomalies occurred: the most acidic reading of pH 6.1 occurred in February 2010 in WC 1; and an alkaline reading of pH 8.7 in July 2010 in WC 2. The pH 6.1 measurement coincides with elevated turbidity and occurred during a period of heavy rainfall after an extended dry period (according to Bureau of Meteorology; BOM, 2012). Both of these measurements were temporary, and pH quickly returned to the typical range.

The conductivity measurements presented in Figure 4 show that WC 2 has consistently higher conductivity (443-2,100 μs/cm, mean = 1,110 μS/cm) than WC 1 (160-910 μs/cm, mean = 470 μS/cm). There is a decreasing conductivity trend in both data sets from 2009. The peak observed in 2009 coincides with a high turbidity measurement. The data is variable with time but have since appeared to become more settled over the last 12 months with mean results of 340 and 900 μs/cm, respectively, for WC 1 and WC 2 during this period.

Historic data also showed that WC 2 had consistently higher conductivity (390-1630  $\mu$ s/cm, with a mean of 1,010  $\mu$ S/cm) than WC 1 (120-730  $\mu$ s/cm, with a mean of 465  $\mu$ S/cm) during 2004-2005 (Golder, 2005). The ranges do not show a significant variation from the more recent data recorded from 2009-12. Figure 4 shows turbidity measurements are generally not consistent between the two sites over the three year data set. The highest turbidity measurement was 5,900 NTU in WC 1 (this is not seen on Figure 4 to allow a more meaningful representation of the full dataset). It has been observed in the WMP that turbidity peaks generally correspond to rainfall events. The differences are likely to be attributed to upstream conditions for WC 2 prior to the water course running parallel to the southern section of the site. The quality of water for WC 2 is from areas upstream of the site and there is no influence from Cleary Bros operations at WC 2, as discharge of the site occurs downstream from WC 2.

#### 5.2.1.1 Recommendations for revision of the monitoring program

Cleary Bros have requested that Golder consider whether sufficient historical data has now been collected and that there are no major anomalies in the data. It is proposed to now commence six monthly testing for the pH, conductivity, temperature and turbidity in WC 1 and 2.

Based on the above information, the data collected do not show any major anomalies, adverse trends or potential risks. Changes in turbidity and pH may be attributed to rainfall events, particularly a period of heavy rainfall which occurred in early 2010, causing noticeable changes to these parameters.

The data collected complies with the WMP requirements outlined in Section 4.0. As per Cleary Bros' request for a review of the frequency of monitoring in the WMP (APPENDIX A), this assessment finds that the data is sufficiently robust to recommend that six monthly testing for the field parameters (pH, turbidity, temperature, EC) in surface water will be satisfactory.

#### 5.2.2 Surface Water Quality

The surface water quality monitoring data supplied by Cleary Bros. for Watercourses 1 and 2 has been collected on a quarterly basis by ALS since March 2009 until June 2012. The data is summarised in the following sections.

#### Alkalinity and Bicarbonate

The reported alkalinity concentrations are presented in Figure 3. In comparison with the historical data range of approximately 100 mg/L to 200 mg/L (WC1) and 200 – 350 mg/L (WC2) the current data set is generally within a similar range.



The bicarbonate results are identical to the alkalinity results. Bicarbonate analyses give only a portion of the total alkalinity of a system, whereas total alkalinity measures all carbonate species. Bicarbonate is the dominant carbonate species at around neutral pH (i.e. Figure 4), as is evident at the site.



Figure 3: Quarterly Watercourse (WC) Quality Monitoring (Alkalinity), March 2009 - June 2012

#### **Oil and Grease**

The oil and grease data (reported as "Soxhlet Oil & Grease, (chloroform)") for surface water cannot be presented as a graph as only three concentrations have been measured above detection limit (0.1 to 0.3 mg/L, June and December 2009) in WC 1 and WC 2.

Oil and grease are analysed to monitor the movement of hydrocarbon-based fuels and lubricants around the site. The haul road has been in place since 2007 and pit expansion has occurred since July 2009. At the same time, oil and grease was detected in all of the current groundwater monitoring wells (MW1 and MW2) in June and December 2009 (<0.1 to 13 mg/L; refer to the AEMR, Cleary Bros 2010). Detected concentrations are below the Environmental Protection Licence criterion of 30 mg/L.

All other concentrations were below the detection limit of 5 mg/L,

#### Non-Detected Dissolved Metals (Cadmium, Mercury, Nickel)

The catchment rocks are naturally elevated in nickel due to the nature of the geology (hard rock volcanics). Elevated concentrations of nickel and cadmium have been measured in the groundwater, but not in the surface water. There were no detected concentrations of cadmium, mercury or nickel in the current data set or historically at the site.

#### **Dissolved Metals and Metalloids**

The surface water data for arsenic, chromium, lead and zinc cannot be plotted as only one data point was measured above the detection limit in the current data set (See APPENDIX C). Historically, chromium, lead



and zinc have been detected at low concentrations which did not exceed the ANZECC 95% guideline. Arsenic was not previously detected but the current data set showed a low concentration (0.009 mg/L) in WC 1 in March 2010, and at a low concentration (0.003 mg/L) in Watercourse 2 (5 March 2005). This occurred during the same changes observed in other parameters and groundwater levels at the end of the drought period in 2010.

#### 5.2.3 Recommendations for revision of the monitoring program

Based on Table 1, the analytes listed have been considered for revision after assessment of the data collected over the first three years. Cleary Bros have requested that Golder consider the monitoring data collected to date, and whether revisions to the analytical suite are warranted on the basis of the reported concentration trends. The following analytes were considered for revision in this assessment for the following reasons (refer to APPENDIX A):

- Bicarbonate results identical to alkalinity
- Oil and grease low concentrations detected
- Dissolved cadmium, mercury and nickel not detected in any sample or historically
- Dissolved arsenic low concentrations detected
- Dissolved chromium, lead and zinc not detected in the current data set

The six monthly surface water sampling frequency at sampling sites WC1 and WC2 complies with the WMP requirements outlined in Section 4.0.

The concentrations measured at the sites demonstrate that:

- Bicarbonate is calculated from, and is equivalent to, Total Alkalinity. If the system changes (i.e. the pH moves away from neutral range) the bicarbonate concentration will become unrepresentative. This can be checked from ongoing pH monitoring. The data review indicates that, as bicarbonate is calculated from total alkalinity, it is acceptable to remove bicarbonate from the list of groundwater analytes.
  - The data review indicates it is acceptable to remove bicarbonate from the list of surface water analytes.
- 'Oil and grease' show low to non-detected concentrations. However, at this time, the pit has not reached the maximum stage of development.
  - Despite the previous results, Golder recommends that 'oil and grease' is not removed from the list of analytes. The use of mechanical vehicles during quarrying operations indicates a reasonable potential for release of lubricants and fuels.
- Of the dissolved metals and metalloids in the streams, cadmium, chromium, nickel, lead, arsenic and zinc have previously been detected in groundwater but have remained close to or below the laboratory limit of reporting (LOR) in the surface watercourses. Dissolved arsenic is the only analyte from this list which was detected above the LOR, albeit at low concentrations, in the current data set (March 2009 to June 2012). Chromium, lead and zinc have been detected at low concentrations historically, but were not reported above the LOR in the current data set. Dissolved mercury, cadmium and nickel have never been detected.
  - On the basis that the baseline monitoring results have been reported close to or below the LOR, Golder recommends that arsenic, cadmium, chromium, lead, mercury, nickel and zinc be discontinued from the routine monitoring program, and only analysed on an exception basis as described below.

Based on the water quality data set, electrical conductivity has been identified as a potential indicator of a range water quality changes. During the interim six monthly monitoring rounds, it is recommended the full metals suite is analysed where the in-situ conductivity in:



- WC 1 is 1,000 µS/cm or greater; or
- WC 2 is 1,700 µS/cm or greater.

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#### 5.2.4 Surface Water Flow Measurements

Two flow meters were installed by Golder at Station 1 (the eastern site) and Station 2 (the western site) as part of the WMP. The solar panel powered flow meters used automatic data loggers to capture pressure head data from the creek flow levels. The loggers were set to record every 15 minutes and were to be downloaded periodically. Cleary Bros have advised that both data loggers have been problematic since their installation (damaged by cattle and infested by insects).

The available discharge and flow monitoring data for Stations 1 and 2 are shown in Figure 5 and Figure 6 (tabulated data is provided on CD in APPENDIX D).

There are some irregularities in the surface water data, such as:

- The April June 2006 data water level gap;
- A period of zero discharge for January June 2006;
- Shifts in the recording dates and times (some of the raw data was desynchronised);
- Sudden shifts in the water level. The notable changes in water level are by -0.25 m in late September 2005 followed by a change of +0.2 m in November 2005;
- As a result, it is not clear on the water level graph when the watercourse is dry, even by comparison with zero discharge on the discharge chart (Figure 5).

It is unknown whether the above inconsistencies are attributable to the logger malfunctioning, being moved, and/or the problematic site conditions as described by Cleary Bros., above. Despite these inconsistencies in the data, the available flow and discharge measurements show:

- Increases in discharge correspond to increases in water level (where there is data for comparison);
- The peaks in discharge and overflow generally correspond with rainfall events (BOM, 2012).

Previous work has included stream flow observations while sampling in March (period of above average rainfall) and in September (period of below average rainfall) in 2007 (Golder 2007):

- At Station 1, the March flow was estimated at 2 L/min. The watercourse was dry during the September observation;
- At Station 2, the observed March flow was not quantified but was considerably higher than that of Station 1. During September observations, an estimated 2 L/min was flowing through WC 2 in the dry period.

The available information agrees with previous discussion that WC 1 is an ephemeral stream, largely influenced by rainfall and runoff, whereas WC 2 is likely to be supplemented by baseflow from shallow groundwater and has the potential to be affected by quarrying activities. It is not possible to tell from the limited data set whether quarry activities have impacted on streamflow in either watercourse.







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## 5.2.4.1 Recommendations for revision of the monitoring program

Based on the above information, while enough data has been collected to establish the general flow characteristics of the courses i.e. ephemeral versus perennial flow, there is insufficient data to provide baseline water levels and flows for both WC 1 and 2 for the purposes outlined in the WMP (Section 4.0).

Downstream of the site, the WC 2 area has been identified as containing significant biodiversity values. To manage the Watercourse baseflow and the rainforest ecosystem, the WMP proposed reinjection of water in the shallow aquifer, which was to be evaluated at the end of a three year period to enable the re-injection parameters to be confirmed.

The deep boreholes indicate that the water levels are increasing. In addition, Kevin Mills and Associates (ecologist) inspects the revegetation and rehabilitation works on a 6 monthly basis. In July 2012 Kevin Mills stated that "There have been no impacts upon or incursions into the native vegetation or restoration works". In addition, Kevin Mills and Associates have carried out an inspection on November 2012 to provide additional comments on the vegetation in the creek line and surrounds. A copy of his letter dated 3 December 2012 is attached as APPENDIX E and states "There have been no impacts upon or incursions into the native vegetation or incursions into the native vegetation within the revegetation or restoration works that could be related to the reported fluctuations in the water table."

Station 1 lies at approximately 65 to 70 mAHD, Station 2 approximately 70 mAHD as shown on Figure 1. The surface water catchment above 85 mAHD, and possibly the perched aquifer, has been excavated during Stages 1 and 2 of the expansion. Station 1 is less affected as flow is ephemeral, or from runoff only, whereas Station 2 has had a portion of both surface and groundwater sources excavated. It is not possible to obtain baseline flow rates now that a significant portion of the Stage 3 works is in progress.

On the basis of this review, Golder recommends that measurements for stream flow, in particular baseflow measurements, be implemented as soon as possible and before expansion to other Stage areas. A more reliable and robust method of water level and flow measurements is required to monitor the effects of quarry expansion and the removal of groundwater from the system. These are discussed further under Recommendations (Section 6.0).

## 5.3 Groundwater Monitoring Program

#### 5.3.1 Groundwater Level Measurements

The groundwater level monitoring data provided for the site is shown in Figure 7. The data set includes recent data provided by Cleary Bros (email dated 20 June 2012; APPENDIX A) and previous data reported by Golder (2007). The water level measurements were taken quarterly from 2004 to 2007, and biannually for the recent data set (APPENDIX F). The water level data has been converted from m depth to water and is represented in m Australian Height Datum (m AHD) on Figure 7.

The observed groundwater levels indicate:

- In shallow wells MW1S and MW2S, the water levels follow a similar pattern at elevations between 65 and 70 m AHD (0.8 m below ground level (bgl) and 3.6 m bgl in MWS1; and 5.4 m bgl and 10.1 m bgl in MWS2);
- The currently monitored deep wells, MW1D and MW2D, generally indicate a similar pattern. A decline in water levels is seen from April 2005 to early 2007 (up to 15 m for MW2D). This is followed by a steady rise (10 to 15 m) in the recent data set. This is likely due to the climatic conditions moving to a wetter regime (in particular, the heavy rain events which occurred at the end of 2009 to early 2010) following a period of extended drought conditions. The water levels have since recovered above the historical (2004) water levels;
- From the available data, the MW3D water level response to the drawdown from April 2005 shows a similar response to MW1D, attributed to the likely causes discussed above. The magnitude of groundwater level response in MW1D and MW3D are similar and are limited when compared with MW2D. The significant response in MW2D may be due to well location in relation to the excavation





and/or fractures present within the bedrock, which may provide a conduit for groundwater flow. It is reasonable to expect that the maximum impact in MW3D to quarry activities is seen in Figure 7 and that a similar response to MW1D would have been expected in terms of the recent water level recovery.

- The base of the pit, near the edge of the sump, is currently at approximately 65.7 m AHD. Monitoring well pair MW2 is located 120 m south of the pit and the most recent water levels (June 2012) were 66 m AHD (MW2S) and 71.9 m AHD (MW2D). The groundwater levels in the vicinity of the quarry therefore measure above the base of the pit. This suggests that the sump observed in Figure 1 is, to some extent, comprised of groundwater. This would seem to confirm the EIS prediction that groundwater can be recharged through water storage at the base of the pit to maintain historical levels.
- The groundwater levels between the shallow and deep aquifers in MW1 and MW2 each follow distinctly separate water level trends. The deep water levels significantly decline and rise again whereas shallow water levels remain between 65 m AHD to 70 mAHD, and do not show any correlation to the deep water level trends. This indicates that there is no significant hydraulic connection between the deep and shallow aquifers as predicted in the EIS; and
- The limited data for MW3D from 2004 2007, prior to the well being destroyed indicates a minor decline similar to that observed in MW1D, which is most likely due to the dry conditions in this time period.









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**B** Golder

## 5.3.1.1 Recommendations for revision of the monitoring program

The six-monthly sampling frequency complies with the WMP requirements outlined in Section 4.0. Based on the available information, the water levels between the shallow and deep wells are respectively consistent (vary according to similar patterns). The lack of temporal correlation between the hydrographs for the existing deeps wells (MW1D and MW2D) and the shallow wells (MW1S and MW2S) indicates that there is no significant hydraulic connection between the shallow and deeper groundwater systems, as predicted in the EIS.

The water level data from the existing monitoring wells indicate a recovering trend in water levels since September 2007. As per Cleary Bros' request for a review of the available data from the existing monitoring wells(APPENDIX A), this review finds that the data is sufficient to provide early warning of adverse impacts and recommends MW3D need not be replaced at this time.

However, at this time, the pit has *not* reached the maximum stage of development and the effect on the deep groundwater system cannot be definitively confirmed. If a declining water level trend develops in the existing monitoring wells in response to future quarrying activities, then the requirement for installing a third well pair in an appropriate location will need to be reconsidered. It is recommended that the hydrographs are reviewed on an annual basis until the full extent of quarrying is achieved to assess whether drawdown or depressurisation effects develop in response to quarrying.

#### 5.3.2 Groundwater Quality Monitoring

The tabulated water quality data for the monitoring well network, as provided by Cleary Bros, is presented in APPENDIX G. The water quality samples have been collected six-monthly since December 2008. Prior to that, samples collected by Golder from December 2004 to September 2005 provide historical data ranges for comparison (refer to APPENDIX G).

#### Alkalinity and Bicarbonate

The alkalinity concentrations are shown in Figure 8. In comparison with the historical data range of approximately 200 mg/L to 600 mg/L (across all wells), the concentrations are declining. There may be a number of reasons for the observed variations, potentially including fluctuations in rainfall.

The bicarbonate results are identical to the alkalinity results, indicating that bicarbonate is the dominant species contributing to alkalinity at the pH range of the groundwater systems.



Figure 8: Biannual Groundwater Quality Monitoring (Alkalinity), December 2008 - June 2012

#### Nitrite as N

The nitrite as nitrogen (N) data cannot be presented as a graph as only 2 data points were greater than the detection limit at time of analysis (refer to APPENDIX G). The detected concentrations of 0.004 mg/L in



December 2008 and 0.02 mg/L in December 2009 were in the shallow bores (MW2S and MW1S, respectively). These low concentrations were well below the historical data range of 0.06 mg/L.

#### Ammonia as N

The results for Ammonia as N are shown in Figure 9. The data predominantly shows non-detected to low concentrations (<0.1 mg/L). Three measurements (MW1S and MW2D) were recorded above this range between December 2009 and 2010 including an ANZECC 2000 guideline (95%) exceedance during June 2010 (MW1S).

The historical data range indicates slightly elevated concentrations in MW1S and MW2D. Aside from the exceedance, however, there are no major anomalies with the historical data range. The exceedance period, which also coincides with changes in field parameters at this time, indicates a response to the end of the drought period at this time.



Figure 9: Biannual Groundwater Quality Monitoring (Ammonia as N), December 2008 – June 2012

#### Mercury

The mercury data cannot be presented as a graph as no mercury has been detected to date (APPENDIX G),

#### Dissolved Metals (Cadmium, Chromium, Lead) and Arsenic

The results for the arsenic, cadmium and lead are shown in Figure 10. Chromium has not been plotted to as only one data point was measured above the detection limit.

The arsenic and cadmium data predominantly show non-detected to low concentrations (<0.002 mg/L). Lead generally shows low concentrations but on two occasions two or more well samples were close to or exceeded the ANZECC 95% guideline (Figure 10).

During an event in 2010, all three metals showed significantly elevated concentrations. This included ANZECC guideline (95%) exceedences of cadmium (MW2S) and lead (all wells) during December 2010 (Figure 10). The historical data shows lead concentrations were noted to exceed the ANZECC criteria in some of the monitoring wells (maximum observed for MW3D 0.06 mg/L on 16 December 2004). The concentrations are currently (June 2012) all below detection limits.

#### 5.3.2.1 Recommendations for revision of the monitoring program

Based on Table 1, the groundwater analytes listed will be considered for revision after assessment of data the collected over the first three years. Cleary Bros have requested that Golder consider whether sufficient data has been collected to indicate that impacts to groundwater quality have not developed in response to



quarrying activities. It is proposed that the following analytes are discontinued from the water quality monitoring programme for the following reasons (refer to APPENDIX A):

- Bicarbonate results identical to alkalinity
- Nitrite as N and ammonia as N low concentrations detected
- Dissolved mercury never detected for the duration of the monitoring program
- Dissolved arsenic low concentrations detected
- Dissolved cadmium, chromium and lead low concentrations detected

The six monthly sampling frequencies for MW1 and MW2 well pairs complies with the WMP requirements outlined in Section 4.0. Sampling has not been carried out for MW3D which was destroyed as discussed in Section 4.3.3.

Based on the available information, the water levels between the shallow and deep wells are respectively consistent. The water levels measured in the existing deeps wells (MW1D and MW2D) demonstrate there is no significant hydraulic connection between the shallow perched aquifer (MW1S and MW2S) and the deep aquifer.

The groundwater quality data provided was sufficient to demonstrate that:

- Bicarbonate is equivalent to alkalinity at the neutral pH measured at the site (pH 7.0 8.2). If the system changes (i.e. the pH moves away from neutral range) the bicarbonate concentration will become unrepresentative. This can be checked from ongoing pH monitoring. The data review indicates that, as bicarbonate is calculated from total alkalinity, it is acceptable to remove bicarbonate from the list of groundwater analytes.
- Nitrite as N and ammonia as N are measured as an indicator of either quarrying activities (such as ammonium nitrate used in blasting) or fertiliser associated with farming land use. Aside from the 2010 event showing elevated ammonia, which may be attributed to the same 2010 storm events previously discussed, the concentrations overall are low and have not indicated an impact from quarry activities.
  - Assuming that Cleary Bros use an ammonium nitrate based explosive as part of their quarrying activities, nitrate is considered the better analyte to continue to monitor, since it is likely to be the strongest indicator of potential water quality impacts related to explosives residues. Ammonia as N is also an indicator of quarry activity and based on the site activities and environmental impacts, Golder do not recommend this analyte be discontinued from analysis.
  - As nitrate is the primary form of nitrogen dissolved in streams and groundwater, and is currently being monitored, the data review indicates it is acceptable to remove nitrite as N
- Concentrations of dissolved metals, such as lead, may be attributed to the composition of the volcanic bedrock aquifer. The following dissolved metals have shown non-detected or low concentrations of dissolved arsenic, cadmium, chromium and lead that have fallen well below the ANZECC 95% guidelines.
  - It is recommended that arsenic, cadmium, chromium, lead and mercury be discontinued from routine monitoring, however should be analysed by exception in accordance with the criteria below.

Based on the water quality data set, electrical conductivity has been identified as a potential indicator of a range water quality changes. During the six monthly monitoring rounds, it is recommended the full metals suite is analysed where the in-situ conductivity in:

- MW1S is 1,600 µS/cm or greater;
- MW1D is 1,300 µS/cm or greater;







- MW2S is 1,300 µS/cm or greater; and
- MW2D is 1,800 µS/cm or greater.

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Figure 10: Biannual Groundwater Quality Sampling (Dissolved Metals and Dissolved Arsenic), December 2008 - June 2012



## 6.0 CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 Surface Water Monitoring

#### 6.1.1 Surface Water Quality – Field Parameters

Based on the information, the data collected do not show any major anomalies. The data collected complies with the WMP requirements outlined in Section 4.0.

The data collected complies with the WMP requirements outlined in Section 4.0. As per Cleary Bros' request for a review of the frequency of monitoring in the WMP (APPENDIX A), this assessment finds that the data is sufficiently robust to recommend that six monthly testing for the field parameters (pH, turbidity, temperature, EC) in surface water will be satisfactory.

#### 6.1.2 Surface Water Quality

The six-monthly sampling frequency WC1 and WC2 complies with the WMP requirements outlined in Section 4.0.

As per Cleary Bros' request for a review of analytes for surface water quality monitoring in the WMP (APPENDIX A), this assessment indicates:

- It is acceptable to remove bicarbonate from the analyte list;
- Based on previous results, Golder recommend that 'oil and grease' analyte is not removed from the list of analytes, since the nature of quarrying is such that it relies on the use of mechanical vehicles, which have a reasonable chance of releasing lubricants and fuel in their daily operations;
- Based on the results of the baseline monitoring, Golder recommends that the following analytes are discontinued from analysis, subject to a contingency monitoring plan (Section 6.1.3)::
  - Dissolved metals and metalloids:
    - Arsenic
    - Mercury
    - Cadmium
    - Nickel
    - Chromium
    - Lead
    - Zinc

#### 6.1.3 Contingency Monitoring Plan

The reduced metals suite (i.e. the full suite minus the discontinued analytes above) will continue to be collected every six months. Due to the outlier which was measured (arsenic) in the data set, the potential risk for contamination must still be considered and a contingency plan is therefore recommended.

Based on the water quality data set, electrical conductivity has been identified as a potential indicator of a range water quality changes. During the interim six monthly monitoring rounds, it is recommended the *full metals suite* is analysed where the *in-situ* conductivity in:

- WC 1 is 1,000 µS/cm or greater;
- WC 2 is 1,700 µS/cm or greater.



#### 6.1.4 Surface Water Flow Measurements

Golder recommends that measurements for stream flow, in particular baseflow measurements, be implemented as soon as possible and before expansion to other Stage areas. This recommendation is consistent with the following Conditions of Consent:

- Condition 30.a of Schedule 4: Detailed baseline data on surface water flows and quality; and
- Condition 30.c of Schedule 4: A program to monitor surface water flows and quality.

Continuous stream flow loggers were originally established at two monitoring locations on the site; however, these transducers and solar powered data logging stations were problematic and reliable data was not collected. An alternative method of water level and flow measurements is therefore proposed to monitor the effects of quarry expansion.

A site visit was undertaken by Golder in January 2013 and monitoring locations Watercourse 1 and Watercourse 2 were inspected to assess station access and consider appropriate monitoring methods for the site conditions. On the basis of this visit Golder has recommended an upgrade to the existing weir at Watercourse 1 and the construction of a new weir at Watercourse 2. The recommendations are outlined in a separate technical memo (Golder reference no. 127626002-004). The weirs will both have standardized rating tables for estimating discharge based on simple depth measurements. The data monitoring frequency will be reduced relative to a continuous logger as manual measurements will be required by Cleary Bros staff, however the compromise is considered appropriate to enable stream flow data to be recorded at these locations where site conditions have precluded the successful use of continuous loggers. The indicative monitoring frequency will be monthly, with an emphasis on dry weather monitoring to support baseflow estimates – details will be provided in the forthcoming addendum once the additional hydrological analysis has been completed.

Additional hydrological assessments (e.g. catchment runoff estimates) are required to support the design, installation and monitoring program development for the weirs at Watercourse 1 and Watercourse 2. A final monitoring design and methodology for Cleary Bros is expected to be available in February 2013 (which will be issued under a separate cover that will form an addendum to this WMP). This is likely to include weir design drawings and specifications but will also include a surface water monitoring plan that includes:

- frequency of inspections and measurements;
- methodology for the operation of weirs including water level readings and converting the water level reading at the weir to the theoretical flow rate;
- methodology for the operation of the stream velocimeter and calculating discharge using the area velocity method (if required);
- details on correct documentation of inspections; and
- details on maintenance requirements and frequency.

## 6.2 Groundwater Monitoring

#### 6.2.1 Groundwater Level Measurements

The six-monthly sampling frequency in wells MW1 and MW2 complies with the WMP requirements. Monitoring has not been carried out for MW3D which was destroyed as discussed in Section 4.3.3.

Golder recommends that there is no imperative to replace monitoring well MW3D at this time, based on the recovering water level trend in MW1D and MW2D since mid-2007. However, the pit has not reached the maximum stage of development and the effect on the deep system cannot be definitively confirmed. Until the maximum pit depth has been reached and sufficient data can demonstrate there are no impacts, an additional well in a suitable location must still be considered should future monitoring results from wells MW1 and MW2 indicate deteriorating conditions.

#### 6.2.2 Groundwater Quality Monitoring

The six-monthly sampling frequency for MW1 and MW2 well pairs complies with the WMP requirements. Sampling has not been carried out for MW3D which was destroyed as discussed in Section 4.3.3.

As per Cleary Bros' request for a review of analytes for groundwater quality monitoring in the WMP (APPENDIX A), this assessment indicates:

- It is acceptable to remove the following from the analyte list:
  - Bicarbonate
  - Nitrite as N
- Based on previous results, Golder recommend that ammonia as N is not removed from the list of analytes, since the nature of quarrying is such that it relies on the use of explosives, which have a reasonable chance of releasing explosives residues, including ammonia.
- Based on the results of the baseline monitoring, Golder recommends that the following analytes are discontinued from routine analysis, subject to a contingency monitoring plan (Section 6.2.3):
  - Dissolved metals and metalloids:
    - Arsenic
    - Mercury
    - Cadmium
    - Chromium
    - Lead

The data review considers the remaining analytes outlined in the WMP are sufficient to form a meaningful dataset for future monitoring.

#### 6.2.3 Contingency Monitoring Plan

The reduced metals suite (the full suite minus the discontinued analytes above) will continue to be collected every six months. Due to the outliers which were measured (lead, cadmium) in the data set, the potential risk for contamination must still be considered and a contingency plan is therefore recommended.

Based on the water quality data set, electrical conductivity has been identified as a potential indicator of a range of changes to water quality. During the interim six monthly monitoring rounds, it is recommended the *full metals suite* is analysed where the *in-situ* conductivity in:

- MW1S is 1,600 µS/cm or greater;
- MW1D is 1,300 µS/cm or greater;
- MW2S is 1,300 µS/cm or greater; and
- MW2D is 1,800 µS/cm or greater.



## 7.0 REFERENCES

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## **Report Signature Page**

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# APPENDIX A Cleary Bros Scope of Work



#### Cleary Bros Albion Park Quarry Water Management

**Reference**: Cleary Bros Quarry, Albion Park, Surface Water and Groundwater Management Plan and Water Quality Monitoring prepared by Golder and Associates dated October 2005 ('the Plan'')

**Scope of Work**: Povide a Technical Report supporting the following changes to Cleary Bros Quarry Environmental Management Plan:

#### 1. Watercourse 1 and 2: pH, conductivity, temperature and turbidity testing frequency

The testing of pH, conductivity, temperature and turbidity commenced in February 2009 and has continued fortnightly since this date until the current day. "The Plan" (Table A, page 19) advises the frequency of this testing should be "Fortnightly for one year, then three monthly for a year, then six monthly." A summary of the results will be forwarded, noting that there are no major anomalies in the data.

Cleary Bros considers that sufficient historical data has now been collected (refer attached Feb 2009 to Jan 2011) and proposes to now commence the six monthly testing for the pH, conductivity, temperature and turbidity in Watercourse 1 and 2.

#### 2. Watercourse 1 and 2 flow measurements

Two flow meters were installed by Golder using automatic data loggers that were powered by a solar panel in Watercourse 1 and 2 as part of the Water Management Plan. Both flow meters have been problematic since their installation (damaged by cattle and infested by insects) and Cleary Bros does not consider that the flow meters are suitable or robust enough for the site. Flow data is available from August 2005 to September 2006 (refer separate **forwarded** email from Golder's Ruby Diamante dated 11/11/2010). Cleary Bros view is that enough historical data has been collected to date to establish the flow characteristics of the watercourses.

"The Plan" (Cl 7.2.1, page 21 states that "Once a relevant set of flow data is collected, then surface water flow data and rainfall will be compared to evaluate the creek water supply from general runoff and groundwater".

Cleary Bros proposes that an alternative physical method of measuring flow (eg V-notch weir) be proposed by Golder i.e. a system where a site foreman or an environmental field representative (Foreman or Environmental Officer) could physically measure the flow once a month.

#### 3. Borehole MW3

As reported in "the Plan" (Cl 7.2.2, page 21), the third bore hole location MW3S "second monitoring well of the pair not installed due to access constraints". The deep monitoring well, MW3D was destroyed prior to extraction works. Terry Perram had discussions with Golder and Associates whilst preparing the first Annual Environmental Management Report for Cleary Bros in 2009/2010. An extract of this AEMR follows:

"The need to replace deep monitoring well MW3D has been discussed with Golder Associates during preparation of this AEMR. Golder considered a number of factors:

- While a record of historic data has been obtained from MW3D, that may not be reliable as a "before quarrying" case for comparison with data obtained from a replacement well in a nearby location
- MW3D was difficult to install because of local conditions, which is the reason a second shallow well was not installed at the time
- The remaining wells at the MW1 and MW2 sites should be adequate to monitor the groundwater effects of the quarry.

Golder recommended that MW3D not be replaced at this time, but should future monitoring results from the other wells indicate deteriorating conditions, an additional well be considered in a suitable location at that time

Consequently it is recommended that a deep monitoring well to replace the destroyed MW3D not be installed at this time."

Cleary Bros has **attached** a copy of the monitoring from the two other boreholes located on site (MW1D / MW1S and MW2D / MW2S) to demonstrate the consistent results of these two boreholes.

Cleary Bros proposes that MW3D does not require replacement, as discussed above on the basis of those results and earlier discussions with Golder

#### 4. Monitoring Data

Revise the Monitoring Data as described below:

#### Groundwater monitoring

Discontinue analysis for the following analytes:

- Bicarbonate (results identical to alkalinity)
- Nitrite (negligible results)
- Ammonia (negligible results)
- Mercury (not detected)
- Arsenic, cadmium, chromium and lead.

#### Surface Water Monitoring

Discontinue analysis for the following analytes:

- Bicarbonate (results identical to alkalinity)
- Oil and grease (negligible results)
- Cadmium, mercury and nickel (not detected in any sample or historically)
- Arsenic, chromium, lead and zinc



# APPENDIX B Tabulated Surface Water Field Data



Surrace water	Conductivil	v (uS/cm)	DH DH		Temperature ('C)		Turbidity (NTU)	
	WC 1	WC2	WC 1	WCZ	WC 1	WC2	WC-1	WC 2
20/02/2009	710	1100	7.3	7.6	in and the	and the second	25	3.7
6/03/2009	870	1500	7.2	7.5	18.3	17.1	7.6.	8.6
3/04/2009	650	1500	Ť	7.4	21.4	20.7	8.8	2.6
15/04/2009	600	1000	7.2	7.9	20	22.1	.5.7.	
29/04/2009	560	1300	7.1	7.6	15.1	16.7	4	10
14/05/2009	530	1200	7.4	8.1	15	16.7	4.3	2.7
27/05/2009	600	1500	7.3	7.8	16	16	2	4.6
9/06/2009	560	1500	7.1	7.6	11.1	13	4.2	0.5
25/06/2009	420	1400	7.3	7.6	12.7	13.1	36	50
7/07/2009	500	1600	2	7.5	9.3	11.7	22	63
5/08/2009	590	1800	7	7.5	11.2	12.6	12	.25
19/08/2009	580	1900	7.2	7,3	14.2	13.1	.5.6	890
2/09/2009	730	2100	7.1	7.1	13.8	16.7	4.4	260
17/09/2009	660	2000	7.4	7.4	20.3	19.8	5.4	370
30/09/2009		1900		7.3		18.6		110
15/10/2009	850	1300	6.9	7.6	17.2	17.3	2.6	27
30/10/2009	690	1300	7	7,6	20.6	20.1	2.9	. 11
27/11/2009	620	1700	6.9	7.5	27.1	29.1	4,9	7.7
8/12/2009	740	1400	7	7.7	22.4	22.7		
24/12/2009		1500		7.4		24		8.1
6/01/2010	710	1200	6.4	7.4	23.6	23.9	5,9	2.5
19/01/2010	760	1300	6,5	7.4	18.5	19	38	2.6
5/02/2010	330	1100	6.1	7.5	28.5	26.2	5890	14
5/03/2010	515	1090	7.01	8.08	-		30.8	17.8
16/03/2010	610		7.3		22.5		2.9	
31/03/2010	500	1540	3	6.9	20	20:3	109	1.4
15/04/2010	520	1230	6,9	7.1	18.8	19.5	19.6	51.4
29/04/2010	630	1240	6.7	7.5	17.7	19,4	6.3	18.8
7/05/2010	650	1240	3.1	7.6	12.3	11.5	17.3	13.2
20/05/2010	6290		7.4		18.1		4.8	
7/06/2010	290	890	7.8	8.2	12.3	13.5	96.1	7
23/06/2010	500	1190	7,5	7.6	13.7	14	13.3	5.7
7/07/2010	540	1200	2.3	8.5	11.3	12.7	45.4	3.3
23/07/2010	590	1290	7.2	8.7	10.2	10.3	3.4	4.2
6/08/2010	270	1030	.7.7	7.4	12.1	11.7	88.7	3.6
19/08/2010	410	1150	7.4	7.5	14.7	14.3	12.9	5.3
6/09/2010	460	1250	7.4	8.4	11.9	12.8	11.1	6.7
16/09/2010	220	580	7.6	8.1	15.3	15.8	94.1	164
1/10/2010	400	1050	7.6	7.8	14,4	16.2	27.8	1.2
13/10/2010	370	820	7.5	8.2	20.7	21.5	21.1	.4.9
28/10/2010	450	1010	7.6	8.3	19.3	18.5	3.3	5040
10/11/2010	320	830	7.5	7.8	18.9	19.5	-45	6.3
24/11/2010	360	800	7.6	7.7	34.3	24,3	9	11.1
3/12/2010	270	520	7.8	8	19.9	21.5	51,1	29.9
9/12/2010	320	940	7.4	8.1	21.7	22.9	17,7	3.9
22/12/2010	430	1060	7.2	6.9	23.3	21.8	2,4	44.3
5/01/2011	850	600	U	6.9	21.9	20.6	37.1	3.2
20/01/2011	490	870	7.8	7.7	25.3	24.4	38.8	172
3/02/2011	720	1180	6.9	8.2	29.3	27.2	7	6.6
16/02/2011	570	1120	7.3	7.6	19.9	19.2	11.7	
4/03/2011	910	1680	7.3	7.7	19.6	19.3	35.2	7.6
18/03/2011	540	1270	8.3	7.9	22.4	22	.45.9	9.7
1/04/2011	288	527	7,1	7.8	20.8	20.8	11.7	11
15/04/2011	370	630	7.5	8.3	15.0	19.1	-4.7	1.1
27/04/2011	449	689	7)4	8.2	19.6	19.6	9.4	15.6
11/05/2011	520	1030	7.9	8	13.3	15.1	3.4	0.8
26/05/2011	400	958	7.6	8	14.1	14.9	34	4
3/06/2011	258	761	7.7	8.4	10.6	15.6		-9.0
9/06/2011	338.	965	7.8	8	10.3	15.7	16.9	3,2
24/06/2011	324	989	7.8	8.2	13	15.3	19.6	8.5
5/07/2011	401	1050	1.9	-6.2	3.9	11.8	40.8	122
21/07/2011	205	529	7.6	8	12.6	13	16.4	123
2/08/2011	902	986	1.8	7.6	14.1	14.5	10.0	2.0
16/08/2011	293	981	1.8	4.6	14.1	14.3	43	1.4
31/08/2011	366	920	7.6	-1.3	12.5	13.5	3.0	1.9
14/09/2011	457	1020	1.1	8	15.9	17.9	14.2	2.2
28/09/2011	347	628	1,3	8.1	12.9	19.1		2.2
12/10/2011	372	9,23	7.8	1.1	16.5	10.1	26	30
26/10/2011	204	131			20.5	20.8		7.3
3711/2011	114	25.2	2.0	64	17.5	19.2	37.9	250
23/11/2011	302	F94	1.8		17.5	19.5	53	124
3/12/2011	350	907	20	2.0	10.0	20	4.9	9.4
21/12/2011	353	1160	7.0	74	25.6	28.4	3.6	18.1
19/01/2012	424	1010	26	76	14 5	76.5	3.6	1.4
18/01/2012	472	1010	0.0	26	10.1	10 5	2.9	1.5
1/02/2012	913	374	1	7.9	56.5	- 21.4	15.0	12.6
1/02/2012	113	103	F-3	13	10.9	20.1	514	76
1/05/2012	100	- 443 C40	2.4	76	20.5	20.9	12.8	.5.2
14/03/2012	271	1100	7.4	7.0	17.8	18.7	83	0.8
12/04/2012	402	0014	7.3	24	16.3	174	4.4	12
24/04/2012	431	93/	7.4		16.1	10.9	4.4	2.9
24/04/2012	335	5/1	1.5	6.4	10.1	12.1	3.0	34
3/05/2012	335	570	2.5	11	12.1	111	41	19
£3/05/2012	422	2/4	7,3	20	11.2	10.1	45	4.9
5/06/2012	996	207	7,4	1.4.3	4.4-4	4564		-310

#### Surface Water Data as supplied by Cleary Bros (email dated 20 June 2012)







# APPENDIX C Tabulated Surface Water Quality Data


	l
	l

# Surface Water Quality Data as supplied by Cleary Bros (email dated 20 June 2012)

### Oil and Grease (mg/L)

Historical Range*	<5	\$
5/6/12	<5	\$5
7/3/12	<5	Ś
5/12/11	<5	\$
5/9/11	<5	<5
3/6/11	<5	\$
4/3/11	<5	<5
3/12/10	<5	<5
6/9/10	<5	<5
7/6/10	ŝ	<5
5/3/10	€	<5
8/12/09	0.2	<0.01
17/9/09	<0.01	<0.01
60/9/6	0.3	0.1
6/3/09	<0.01	<0.01
Location	WC 1	WC 2

### Alkalinity (mg/L)

	3														
Location	6/3/09	60/9/6	17/9/09	8/12/09	5/3/10	7/6/10	6/9/10	3/12/10	4/3/11	3/6/11	5/9/11	5/12/11	7/3/12	5/6/12	Historical Range*
WC1	160	140	200	220	168	63	129	46	180	51	125	66	61	126	110-190
WC 2	220	200	270	210	186	174	186	154	265	186	228	208	209	406	190-340

### Bicarbonate {mg/L}

Location	6/3/09	60/9/6	17/9/09	8/12/09	5/3/10	7/6/10	6/9/10	3/12/10	4/3/11	3/6/11	5/9/11	5/12/11	7/3/12	5/6/12	Historical Range*
WC1					1										110-190
WC2					l ne result	s tor bicarbo	nate are ide	intical to the	results for s	aikalınıty.					190-340







## Dissolved Metals and Arsenic (mg/L)

Location							Water	course 1						
	6/3/09	60/9/6	17/9/09	8/12/09	5/3/10	7/6/10	6/9/10	3/12/10	4/3/11	3/6/11	5/9/11	5/12/11	7/3/12	5/6/12
Arsenic	<0.01	<0.01	•	<0.01	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.01	<0.01		<0.01	<0.001	1000.0>	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	<0.01	<0.01	•	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	<0.01	<0.01	æ	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	<0.01	<0.01	•	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	<0.01	<0.01	-	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	<0.01	<0.01		<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Location							Water	pourse 2						
	6/3/09	60/9/6	17/9/09	8/12/09	5/3/10	7/6/10	6/9/10	3/12/10	4/3/11	3/6/11	5/9/11	5/12/11	7/3/12	5/6/12
Arsenic	<0.01	<0.01	×	<0.01	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.01	<0.01		<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	<0.01	<0.01	*	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	<0.01	<0.01	96	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	<0.01	<0.01	34	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	<0.01	<0.01	ж	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	<0.01	<0.01	/6	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

- means less than the limit of detection. v .
- December 2004 to September 2005 (Golder)

## For the Data Assessment, the client data was edited to show:

	APPENDIX G for guideline values)
Bolded text denotes detection of analytes	Bolded text with grey shading denotes ANZECC 95% guideline exceedence (note: none for surface water; see
0.002	0.004





### APPENDIX D

**Tabulated Surface Water Flow Data** 

On CD provided





### **APPENDIX E** Ecological Report (KMA Pty Ltd)



### KMA KEVIN MILLS & ASSOCIATES ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS ABN 346 816 238 93

Tel: (02) 4236 0620 Mobile: 0429 848 094

email: k.mills@bigpond.net.au

12 Hyam Place Jamberoo NSW 2533

Ms Helen Nicolaidis Cleary Bros (Bombo) Pty Ltd 39 Five Islands Road (PO Box 210) Port Kembla NSW 2505

3 December 2012

Dear Helen

### Re. Comment on watertable monitoring results at Albion Park Quarry - November 2012

Further to my site inspection on 23 November 2012, I can provide the following information regarding the above matter at the company's Albion Park Quarry.

The monitoring results of the distance of water table from the top of the bore hole in several bores in the vicinity of the quarry indicate fluctuations since 2008. In general, the deep bore holes show an increase in water level while the shallow bore holes have shown a slight decrease over that period.

To determine if watertable fluctuations could be affecting plant growth, I inspected the rainforest and creek area in the vicinity of the bores. I could see no impact that could be related to a lowered or raised watertable. There have been no impacts upon or incursions into the native vegetation within the revegetation or restoration works that could be related to the reported fluctuations in the watertable.

Please feel free to contact me if I can be of further assistance.

Yours sincerely KEVIN MILLS & ASSOCIATES Dr Kevin Mills Managing Director

Keen



### **APPENDIX F**

**Tabulated Groundwater Level Data** 



Borehole	Dec- 08	Jun- 09	Dec- 09	Jun- 10	Dec- 10	Aug- 11	Dec- 11	Jun- 12	Historical Range (m)*
MW1D	22.13	21.62	21.24	20.2	18.21	12	12.72	9.26	21.52-24.35
MW1S		0.96	3.61	0.89	3.1	0.75	0.92	2.8	0.05-11.02
MW2D		18.22	14.92	9.13	7.25	6.69	2.34	3.47	8.76-15.84
MW2S	5.72	5.35	6.47	7.05	7.64	10.1	8.18	9.36	8.62-9.02
MW3D								25	7.93-9.95

### Groundwater Level Data (in m below datum) as supplied by Cleary Bros (email dated 20 June 2012)

\* Sept 2004 to Sept 2005 (Golder)

### Note: client supplied data was converted to m AHD from Surveyed Elevations (from Golder , 2007)

Borehole	Datum Elevation mAHD
MW1D	70.73
MW2D	75.32
MW3D	87.62





### APPENDIX G

**Tabulated Groundwater Quality Data** 



### Groundwater Quality Data as supplied by Cleary Bros (email dated 20 June 2012)

### Nitrite (mg/L)

Borehole	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12	Historical Range*
MW1D	<0.02	<0.02	<0.01	< 0.01	<0.01	< 0.01	<0.01	<0.01	<0.06
MW1S		<0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.06
MW2D	(4)	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.06
MW2S	0.004	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.06

### Ammonia (mg/L)

Borehole	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12	Historical Range*
MW1D	<0.02	<0.02	<0.1	<0.01	0.05	0.04	<0.01	0.04	0.22
MW1S		<0.02	0.2	0.98	0.07	0.09	0.04	0.05	<0.03- 0.56
MW2D	183	<0.02	<0.1	0.52	0.09	<0.01	<0.01	0.04	<0.03-0.2
MW2S	<0.02	<0.02	<0.1	0.02	0.08	0.02	<0.01	0.03	<0.03-0.1

### Alkalinity (mg/L)

Borehole	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12	Historical Range*
MW1D	310	200	170	183	123	28	33	46	340-620
MW1S		230	410	444	40	95	193	16	200-570
MW2D		250	83	110	160	175	33	106	350-630
MW2S	220	250	260	242	253	168	226	404	330-590

### Bicarbonate (mg/L)

Borehole	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12	Historical Range*
MW1D						10 - 11 S			340-620
MW1S	1 .	-	< 1: 1				11 12 14		200-570
MW2D	1	The results	for bicarbo	inate are id	entical to t	he results 1	or alkalinit	у.	350-630
MW2S	1								330-590



Borehole		_		MV	V1D			
	Dec-08	Jun-11	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12
Arsenic	· · · ·	<0.01	<0.01	0.001	0.002	<0.001	<0.001	<0.001
Cadmium	<0.01	<0.01	<0.01	0.0002	0.0002	<0.0001	<0.0001	<0.0001
Chromium	<0.01	< 0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	<0.01	<0.01	<0.01	0.003	0.047	0.002	<0.001	<0.001
Mercury	<0.001	<0.01	<0.01	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0003

### Dissolved Metals and arsenic (mg/L)

Borehole				MV	V1S			
	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12
Arsenic	2 Î	<0.01	<0.01	0.005	0.006	0.001	0.004	<0.001
Cadmium		<0.01	<0.01	<0.0001	0.0002	<0.0001	<0.0001	<0.0001
Chromium	2	< 0.01	< 0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Lead		<0.01	<0.01	<0.001	0.01	<0.001	<0.001	<0.001
Mercury		<0.01	< 0.01	<0.0001	< 0.0001	<0.0001	<0.0001	<0.0003

Borehole				MV	V2D			
	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12
Arsenic		<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	2	<0.01	<0.01	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	14	<0.01	<0.01	0.001	<0.001	<0.001	<0.001	<0.001
Lead		<0.01	<0.01	0.002	0.004	<0.001	<0.001	<0.001
Mercury		<0.01	<0.01	<.0001	<0.0001	<0.0001	<0.0001	<0.0001

Borehole	MW2S									
	Dec-08	Jun-09	Dec-09	Jun-10	Dec-10	Aug-11	Dec-11	Jun-12		
Arsenic	4	<0.01	<0.01	<0.001	0.002	0.001	<0.001	<0.001		
Cadmium	<0.01	<0.01	<0.01	<0.0001	0.0171	0.0001	<0.0001	<0.0001		
Chromium	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001		
Lead	<0.01	<0.01	<0.01	<0.001	0.012	<0.001	<0.001	<0.001		
Mercury	<0.001	<0.01	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		

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means less than the limit of detection.

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December 2004 to September 2005 (Golder)

### Note: For the Data Assessment (Section 5.0) the client data above has been edited to show:

0.002 0.004 Bolded text denotes detection of analytes

Bolded text with grey shading denotes ANZECC 95% guideline exceedence

### The 95% guidelines are (in mg/L):

Arsenic - 0.013	Lead - 0.0034
Cadmium - 0.0002	Mercury – 0.006
Chromium – n/a	



Golder Associates Pty Ltd 124 Pacific Highway St. Leonards, New South Wales 2065 Australia T: +61 2 9478 3900





### **APPENDIX 11:**

"Environmental Report – prepared by Kevin Mills & Associates (May 2016)"

### ENVIRONMENTAL REPORT FOR STAGES 5 AND 6 ALBION PARK HARD ROCK QUARRY CLEARY BROS (BOMBO) PTY LIMITED

May 2016

Dr Kevin Mills Kevin Mills & Associates Jamberoo NSW. 2533

### **1** INTRODUCTION

Cleary Brothers (Bombo) Pty Limited is preparing an Environmental Report to be lodged in conjunction with a Sect. 75W modification application for hard rock extraction within Stages 5 and 6 of the Albion Park Quarry extension. During consultation with a representative of the Department of Planning it was advised that the assessment report should focus on the environmental performance to date from quarrying operations within Stages 1 to 4 and utilise this data to predict the impacts of Stages 5 & 6.

Under Clause 6 of Schedule 3 of the Development Approval dated 21 February 2006, a report is required for Stages 5 and 6 that, among other things, "include assessment of environmental, social, agricultural and economic impacts of Stages 5 and 6, based on the environmental performance of Stages 1 to 4."

This report addresses the flora and fauna components of the Assessment Report for Stages 5 and 6, the extent of which is shown on the plan at **Appendix 1**.

The Clauses from 34 to 38 in Schedule 4 of the above approval indicate the specific conditions that must be met and are relevant here to the development of Stages 5 and 6.

### 2 ADDRESSING THE CONDITIONS OF CONSENT

The following conditions of consent are relevant to Stages 5 and 6; each is discussed below.

"34. Prior to the commencement of works, the Applicant shall prepare a Vegetation Clearing Protocol for the development in consultation with Shellharbour City Council and the DEC (NPWS) [now OE&H] and to the satisfaction of the Director-General. This plan shall: a) delineate the areas of remnant vegetation to be cleared, and b) describe the procedures that would be implemented to: - pre-clearance surveys,

- progressive clearing;
- fauna management;
- conserving and reusing topsoil;
- collecting seed from the area;
- salvaging and reusing material from the site; and
- controlling weeds."

The above condition of consent was satisfied within the Vegetation Management Plan (VMP) prepared by KMA (Oct. 2007). That document contained a clearing protocol and covers Stages 5 and 6.

*"35. The Applicant shall conserve and maintain the southern areas of remnant vegetation marked on the map in Appendix 1."* 

The creek-side regrowth rainforest and the natural rainforest in the deeper part of the gully south of the quarry has been fenced and retained. There have been no detrimental impacts upon this vegetation since the beginning of quarrying operations.

There has been no negative impact upon the following threatened species, located in the rainforest and nearby to the south of the quarry: *Cynanchum elegans* (White Cynanchum), *Daphnandra johnsonii* (Illawarra Socketwood) and *Zieria granulata* (Illawarra Zieria).

"36. The Applicant shall revegetate/rehabilitate and maintain the areas marked 'Area to be Planted' and 'Weed Control to Promote Natural Vegetation' on the map in Appendix 1. Revegetation shall be in accordance with the Vegetation Management Plan described in Condition 37."

The works described in the Vegetation Management Plan prepared in 2007 have been progressing since approval was granted. As noted in the monitoring reports, regularly prepared following site inspections by the consultant, significant problems have arisen in establishing tree plantings on the regeneration area. This matter is addressed below.

"37. Within 6 months of the date of this consent, the Applicant shall prepare, and subsequently implement, a Vegetation Management Plan for the development in consultation with Shellharbour City Council and the DEC (NPWS) [now OE&H], and to the satisfaction of the Director-General. The plan shall be prepared by a suitably qualified ecological/bush regenerator, and shall address:

- a) establishment of baseline data for existing vegetation and habitat in the area;
- b) vegetation management of all areas on the site outside the working area of the quarry;

c) conservation, maintenance and enhancement of threatened communities, including 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodland';

d) conservation, maintenance and enhancement of threatened plant species, including Cynanchum elegans (White Cynanchum), Daphnandra sp. aff. micrantha [now Daphnandra johnsonii] (Illawarra Socketwood) and Zieria granulata (Illawarra Zieria);

e) establishment and maintenance of vegetation/habitat for threatened fauna species, including the Grey-headed flying-fox;

f) ongoing weed control and maintenance;

g) a program for how the performance of the measures described in (b) to (f) above would be monitored over time;

h) a program for monitoring the effect of quarrying, including water management on vegetation communities.

The Vegetation Management Plan was prepared in 2007 and continues to guide the management of the vegetation regeneration and management on the site.

38. The Applicant shall include a progress report on the implementation of the Vegetation Management Plan in the AEMR."

### Regeneration Area

As part of this study, an unscheduled inspection was undertaken of the regeneration area in mid-April 2016. The problem of death of many of the tree plantings was again discussed on site, primarily the issue of browsing by Swamp Wallabies and Feral Goats. Several hundred Goats are currently reported to be it the general area. Evidence of their browsing on the plantings is obvious; e.g. chewed bark and broken branches. Photographs of plantings are provided at **Appendix 2**.

The following responses to the problems have been agreed to by the Company.

(i) Fencing will be undertaken in three locations, one in each of the planting Zones 1, 2 and 3. The fence will be of plain wire (i.e. no barbwire) and mesh, which will exclude browsing animals. This fence can be moved onto new areas as the plants become large enough to survive without it.

(ii) Further plants will be obtained for planting within the three fenced areas. The following species have proved the most viable on the site and will be used in this program.

Based on the plants that are growing well in the planting area -Acacia maidenii Ehretia acuminata Eucalyptus quadrangulata Eucalyptus tereticornis Pittosporum undulatum Synoum glandulosum In wet areas, perhaps try – Melaleuca linariifolia Melaleuca styphelioides

(iii) There is a need to ensure that herbicide spraying is undertaken in a careful manner to avoid impacting upon plantings. While this is not a major problem in the past, broad scale spraying is not needed except where grass swards develop. Annual weeds are not a major issue, as long as the immediate vicinity of the plants is free from competition. Spraying is best constrained to the immediate area around each planting.

(iv) Some follow-up control of Lantana is required along the edges of the existing forest.

(v) Co-operation with adjacent land owners in the control of Feral Goats will be beneficial to all land owners.

### Stages 5 and 6 Area

The area covered by Stages 5 and 6 of the quarry extension supports small regrowth patches of native rainforest vegetation and woody weeds; these were described in the reports accompanying the original development application. An inspection of the area in April 2016 found that the paddocks are much the same as in 2003 and 2007, although there is a higher cover of wattles and woody weeds; see **Photograph 3**.

### Visual Screen plantings

An inspection was carried out along the screen plantings to the north and northeast of the quarry site. Generally, the trees are growing satisfactorily, forming a relatively complete screen in most places. The plantings combined with the earthen bund provide an adequate screen to the quarry working; see **Photograph 4**.

### Agricultural values

The EIS for the quarry expansion (Perram & Partners 2003) noted that a small area of grazing land used by a local dairy farm would be lost as their dry run. That report concluded that this was not important to the viability of the farm. Grazing by cattle has not occurred on this land for some years; the value of the land for agricultural pursuits is minimal.

### 3 CONCLUSION

The conditions of consent as they concern flora and fauna and relate to Stages 1 to 4 have been met. The problems with the plantings in the regeneration area are being addressed and will eventually be overcome.

As noted in the original EIS, there will be a loss of small regrowth patches of native rainforest vegetation and woody weeds within the footprint of Stages 5 and 6. This has previously been assessed and lead to the need for regenerating the area south of the quarry adjoining the exiting forest along the creek.

Stages 5 and 6 will remove part of the catchment of the small watercourse enfettering the deep gully to the south. The drainage from this area will eventually be captured in the quarry and discharged back into the creek system, as is the case with the current quarry workings.

### 4 **REFERENCES**

KMA (2007). *Vegetation Management Plan. Albion Park Hard Rock Quarry, Cleary Bros (Bombo) Pty Limited.* Prepared for Cleary Bros, Port Kembla, October.

Perram & Partners (2003). Proposed Quarry Extension, Alboin Park. Cleary Bros (Bombo) Pty Ltd. Port Kembla, October.



The treed areas on Stages 5 and 6 are mainly woody weeds and wattles, with small stands of regrowth rainforest in the main patches.



Photograph 1. Part of the Zone 3 planting area; advanced trees recently planted.



Photograph 2. Plantings in planting Zone 1.



Photograph 3. Woody weeds and wattles on the Stage 5 area.



Photograph 4. Screen planting along the northern side of the quarry site.



### **APPENDIX 12:**

*"Certificate of Compliance provided by Taylor Brammer Landscape Architects (4 December 2008)"*  REFERS TO CONDITION 4-2 PLANTED OUT BUFFER AREA



### **Certificate of Compliance**

Landscape Construction

Date: 4 December 2008

Project: Albion Park Quarry – Lots 1 and 2 Dunsters Lane, Croom

Project No.: 05-056W

DA No.: 614/2006

The completed landscape works for the above project were inspected on Friday 28 November 2008 in the company of Wayde Peterson (Project Manager, Cleary Bros (Bombo) Pty Ltd) and Karen Thorogood (RK Evans Landscaping).

The attached photographs are evidence of the inspection.

The works have been completed as per the documentation with the following acceptable amendments:

- a) The plant species list has been amended (due to availability of endemic species) with the approval of Dr Kevin Mills who prepared the original VMP for the project (a notated email is attached summarizing Dr Mills discussion with Wayde Peterson of Cleary Bros);
- b) The newly mounded areas have been hydromulched with appropriate low growing grass species rather than jutemaster matting originally specified. RK Evans will continue to remove any overspray on plant leaves from the hydromulch process; and
- c) The planting area as marked on the attached A3 plan is still to be completed prior to the end of December 2008.

Iain Brammer BLArch AAILA Registered Landscape Architect Director

### taylor brammer landscape architects pylu

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have the planting crew	booked to st	art on tues			·	
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treblus brunianus	•	363 no	Teona australis	use evenlyptus d	eteticornic	
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### **APPENDIX 13:**

"Correspondence from NSW Department of Trade and Investment (25 September 2012)"



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25/09/2012

Graeme Granger Technical Manager Cleary Bros. PO Box 210 Port Kembla NSW 2505

Dear Mr Granger

### Short fall in construction material supply to the Sydney and Illawarra regions

NSW Trade & Investment – Mineral Resources Branch is aware of the recent closure of the No.6 blast furnace at Bluescope, with one of the consequences being a reduction in the availability of steel slag which is used as an alternative construction material product for road base and aggregates applications.

In NSW, latite flows are quarried at a number of sites to the west of Kiama in the Albion Park area, producing construction materials to supply the Sydney and Illawarra markets. The latite resource in the Albion Park area has long been identified by the Mineral Resources Branch as being a regionally significant source of hard rock material suitable for construction material applications.

The Mineral Resources Branch is of the opinion that the shortfall in supply of construction materials resulting from the closure of Bluescope's No, 6 furnace could be met by increasing production of construction materials at existing quarries such as those located at Albion Park.

Should you have any queries regarding the above advice please contact Cressida Gilmore on 02 49316537 or email cressida.gilmore@industry.nsw.gov.au.

Yours sincerely

Presite Cilam

Cressida Gilmore Team Leader Land Use

NSW Department of Trade and Investment, Regional Infrastructure and Services RESOURCES & ENERGY DIVISION PO Box 344 Hunter Region Mail Centre NSW 2310 Tel: 02 4931 6666 Fax: 02 4931 6726 ABN 51 734 124 190 www.dtiris.nsw.gov.au