

Environmental Assessment

Modification of Development Consent 10639 of 2005 (LEC) Albion Park Quarry – Increased Production Limit

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

Dunsters Lane Croom

November 2013



Subject Environmental Assessment In respect of I Modification of Development Consent 10639 of 2005(LEC) Albion Park Quarry – Increased Production Limit **Property** Lot 1 in Deposited Plan 858245 and Lot 23 in Deposited Plan 1039967 Dunsters Lane, Croom Prepared for Cleary Bros (Bombo) Pty Limited Prepared by I **MMJ Wollongong** Town Planning Consultancy Division 6-8 Regent Street Wollongong NSW 2500 Telephone: (02) 4229 5555 Facsimile: (02) 4226 5741 Contacts I Luke Rollinson BurdregPlan DipArchTech MPIA Director - Town Planner Graham Rollinson MPIA CPP Town Planner Job No. 12.50 (Version 4) **Dated** November 2013



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EXECUTIVE SUMMARY

Cleary Bros (Bombo) Pty Limited ("Cleary Bros") is applying to modify the Quarry Development Consent (i.e. Amended Consent) relative to the annual quarry material production limit for export from its Albion Park Quarry from 600,000 tonnes per annum to 900,000 tonnes per annum (*Condition 8 LEC 10639 of 2005 Mod 1*).

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.

The application can be processed as a Modification of Consent and determined in accordance with Part 3A of the Act and, in particular, s.75W. In this regard, it has been shown that the proposed modification will not "radically transform" the Amended Consent which is the performance criteria required for the use of s.75W.

The increase in the annual quarry material production limit will necessitate additional blasting, rock crushing / blending, earth moving and truck movements. However, it must be noted that busy operational days for the existing Quarry operation currently equate to an annual production rate of approximately 1, 380, 000 tpa should these day rates be sustained all year. The proposed increase in the approved annual extraction rate from 600, 000 tpa to 900, 000 tpa will primarily be achieved through increased utilisation of current operational lulls.

The likely impacts to be associated with the increased production rate relate to noise, blasting and vibration, air quality, traffic management and water consumption. 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 Quarry Environmental Management Plan. *Table 4.1* provides a comparison of the controls and performance criteria for the approved development and the modification being sought (refer to *Section 4.1* of this report). Accordingly, there are no further measures proposed to minimise, manage and monitor these impacts.

The increase in the annual quarry material production limit can be achieved by modifying Condition 8 of the Amended Consent without the need to alter any other terms of the Amended Consent or operational characteristics.

Therefore it is considered that the modification sought will be environmentally sustainable.



1.0 Introduction

1.1 Background

Martin Morris & Jones Pty Limited (MMJ Wollongong) has been engaged by Cleary Bros to prepare an Environmental Assessment for a proposed Modification of Development Consent Application ("The Application") for its Albion Park Quarry. The application seeks an increase in the material production limit presently applying to the quarry from 600,000 tonnes to 900,000 tonnes per annum.

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 ("Quarry Consent"). 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 (EP&A) Act 1979.

The Quarry was appealed to the NSW Land & Environment Court (LEC) (Proceedings No. 10639 of 2005). In February 2006, the Court approved the Quarry Consent subject to conditions. The Development Consent issued by the LEC for the quarry operation is attached as *Appendix 1* and describe 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 Court's determination in Annexure A provided for a maximum limit of material production of 400, 000 tonnes per annum (Condition 8).

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

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

This Amended Consent is attached as *Appendix 2*.

The quarry has now been operational for the past 5 years. The quarry has operated consistent with the Amended Consent and in accordance with the Albion Park Quarry Environmental Management Plan.

In this regard, an annual Environmental Management Report is prepared and submitted to the Director-General as required which is also available for public scrutiny through the Cleary Bros website.



1.2 Conceptual Framework

This Environmental Assessment (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 following specialist consultants:-

SLR Global Environmental Solutions: noise, air quality and blasting

assessment:

GTA Consultants: traffic impact;

Perram & Partners environmental impact;

Sandra Duggan SC statutory planning; and

Cleary Bros: quarry industry specialists.

A pre-lodgement meeting for this proposal was held with the Department of Planning & Infrastructure (DPI) on 19 October 2011, and the advice provided has assisted in the preparation of the application documentation.



2.0 Site Characteristics

2.1 Property Description

The site to which the 2005 Quarry Consent applies is situated to the south of Albion Park Rail, and is described as follows:-

Lot 1 in Deposited Plan 858245: approved/operating quarry activities and ancillary

works;

• Lot 23 in Deposited Plan 1039967: processing plant, product storage and sale, site

entrance.

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 "Quarry Environmental Management Plan" (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 5 years, which 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. Two gauges have been installed to measure flow in the watercourse draining the site and in the unnamed creek upstream of the site drainage.

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

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 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.

Table 2.1 TEMPERATURE, RAINFALL, HUMITY AND WIND SPEED

Item	J	F	M	Α	М	J	J	Α	S	0	N	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 (°C)	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
Rainfall 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
Humidity 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



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
- 2. Consistent with current data from annual Environmental Management Report

Wind Data

A wind rose from the Albion Park meteorological station included in the Quarry 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 was established on the project site and provides hourly 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. Test results are provided within the annual Albion Park Quarry Environmental Management Report.

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 extractive area.



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 guarried.

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 annual Albion Park Quarry Environmental Management Report.

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 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.

2.3 Planning Controls

At the time the original Development Consent was issued by the Minister for Infrastructure and Planning (May 2005) and the determination by the Land and Environment Court (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 permit *"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* provided the mechanism whereby development consent for quarrying within the 1(r1) zone was issued.

These planning controls were also in place at the time the Amended 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 land 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 contained to those parts zoned RU1 and RU2 with the quarry haul road encroaching within the zone E3 land.

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.

As mentioned within Section 1.1, both DA-466-11-2003 and the Development Consent were approvals granted by the Minister and the Court on appeal as State Significant Development for the purposes of *s.76A(8)(c)* of the *EP&A Act*. This 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 Projects. The Development Consent was from that date taken to be an approval granted pursuant to Part 3A and Part 3A applied to the Development Consent as if it were a Project Approval granted pursuant to Part 3A: EP&A Act, Schedule 6 clause 88. The Development Consent was modified pursuant to Part 3A and became the Amended Consent.

On 27 June 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 *clause 8J* of the *Environmental Planning and Assessment Regulation*) specifically continues to 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."



3.0 Modification Proposal

3.1 Purpose

The Application seeks to modify the Amended Consent applying to the extension of the existing hard rock quarry at Lot 1 in DP 858245 and Lot 23 in DP 1039967, Dunsters Lane, Croom by increasing the quarry material production limit from 600,000 tonnes per annum to 900,000 tonnes per annum. This may be achieved by amending *Condition 8* of the Amended Consent to be:-

"8. The production of quarry products from the quarry shall not exceed 900,000 tonnes per annum."

The changes to quarry operations to increase production include an increase in the extraction rate, an increase in transport movements (both internal and external) and an increase in processing hard rock to market demand. The resultant environmental impacts considered in this EA are noise, blasting and vibration, air quality, traffic management and water consumption. *Table 4.1 : Comparison of Development Criteria* (refer to *Section 4.1* of this report) clearly shows that the majority of the matters required for environmental assessment for this modification will not be changed, should support for the modification be forthcoming.

3.2 Need

The production of hard rock from the Albion Park quarry has historically fluctuated according to market demand. The current annual production limit of 600,000 tonnes per annum equates to a monthly average of 50,000 tonnes. During the decade of 2000 – 2010, the actual monthly production ranged from less than 20,000 tonnes to approximately 90,000 tonnes associated with market demand and with no detrimental environmental effect.

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. Factors contributing to this demand increase are primarily related to market conditions and reduction in available resources to meet these conditions as discussed below.

The additional quarries located at Albion Park, Bass Point, Dunmore and Bombo, together with processed steel blast furnace slag produced at Port Kembla, provide hard rock and recycled material to produce rock and coarse aggregates for the Illawarra, South Coast, and Sydney market. Quarry operators, Boral Limited, Hanson, and Holcim Australia Pty Ltd also provide aggregates to their concrete and road sealing plants throughout the Sydney metropolitan area.



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 \$330m shopping development at Shellharbour, the Port Kembla Harbour development and the Princes Highway upgrade north of the Jervis Bay intersection and north of Milton, 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 Crown Central GPT project (Wollongong), Shellharbour Marina construction, Princes Highway upgrades (ie. south Kiama to Toolijoola, and south Nowra to BTU Road), as well as the South Coast rail line upgrade. 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 4* confirms that an increase in quarry production 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 increase the annual production limit from 600,000 tonnes per annum to 900,000 tonnes per annum as proposed.

At the time of seeking consent for the Quarry, it was not Cleary Bros' intention that production be limited. The Environmental Impact Statement exhibited in 2003 the (Perram & Partners 2003) addressed production capacity in the following terms:

"The proposed quarry extension will be worked at the same rate as would have occurred had the existing Cleary Bros' quarry had ongoing reserves of hard rock. The rate of extraction will be governed by market conditions, varying up or down from year to year with the level of local construction activity, and with an underlying trend in line with economic growth in the Sydney and Illawarra regions.

Accordingly, the application seeks approval for a continuation of market-driven production. Cleary Bros expects the current production rate of up to 400,000 tonnes of hard rock per annum to be maintained for the foreseeable future."



The specialist reports in the original EIS (Perram & Partners – October 2003) including noise, air quality, traffic and blasting were completed on the basis of a peak production of 86,500 tonne/month. This is equivalent to an annual production rate of 1,038,000 tonnes.

The 2003 EIS prediction was sustained until 2007 when market demand led to increased quarry product sales. In order for Cleary Bros to continue to supply rock in response to market demand, it became necessary to vary the production limit included in the development consent.

The current restriction of 600,000 tonnes per annum imposed by the consent is causing difficulties for Cleary Bros in supplying its customers. The likely impact of supply not meeting demand may result in unreasonably escalating prices. This would increase construction costs across a wide range of commercial and public infrastructure projects.



4.0 Environmental Review

4.1 Planning Considerations

As detailed in *Section 2.3* of this Assessment, the proposed Modification of Consent application may be considered and determined in accordance with the provisions of *s.75W* of the *EP&A Act*, as applicable.

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

However, in <u>Williams v Minister for Planning</u> (2009) 164 LGERA 204 Justice Biscoe 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 increase the annual limit of quarry material production, 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:-

- 1. The Development Consent granted consent to 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 a modification 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 approved quarry extraction area 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. No changes to the existing development consent will be required, apart from an amendment to *Condition 8* (as aforementioned); and
- 7. It will be shown that environmental impacts of the modification will be acceptable.

Clauses 6 and 7 of Schedule 2 to the EP&A Regulation 2000 identify the form and content that is required within an Environmental Impact Statement (EIS) associated with "designated development". An appropriate EIS (Perram and Partners – October 2003) accompanied the original development application as required and the proposed modification has been assessed relative to those matters for consideration contained within the EIS for the approved development, which are summarised within the following table.

TABLE 4.1 : COMPARISON OF DEVELOPMENT CRITERIA

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	No change 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 The Cottage 35dBa	Additional utilisation of existing plant, equipment & transport vehicles	Predicted Original Current Mod. EIS The Hill 38 34 34 Cody res 52 45 45 The Cottage 48 34 34	Nil				
Blasting & Vibration	Greenmeadows 41dBa 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)	Additional blasts	Greenmeadows 41 36 36 Modification 112.3dB 2.72mm/s < 1 blast per day (max)	Nil				
Air Quality	Schedule 4 Cl.16-20 Dust Deposition <4g/m²/month (annual average) <10g/m²/month (PM10) 24hr <50mg/m³	Additional utilisation of existing plant, equipment & transport vehicle	Dust Deposition Current Mod. 2.1g/m²/m <4g/m²/m 2.7g/m²/m <10g/m²/m 30mg/ m³	Nil				
Transport/Traffic	Schedule 4 Cl.46 Site access via East West link roundabout.	Additional truck movements to/from quarry	No change to current level of service at East West link roundabout. Site access is via roundabout	Nil				
Flora/Fauna	Schedule 4 Cl.34-38	No change	No change	Nil				
Landscape & Visual Characteristics	Schedule 4 Cl.54-57	No change	No change	Nil				
Indigenous & Non- Indigenous Heritage	Schedule 4 Cl.51	No change	No change	Nil				
Socio-Economic	No Limitation	(2) Additional employees	Increased employment	N/A				



Note 1: The quarry life span was estimated at 30 years. This equates to an average annual extraction rate of 550,000 tonnes. An 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 and accordingly, an increase in the annual production rate will not require an amendment to the period of approval.

As can be seen from the above, the Modification Application (apart from the change to the material production limit per annum) does not alter or vary any other terms of the consent. In particular, the development even after modification will continue to operate in accordance with the terms of the consent. Further, it will be shown that, notwithstanding the increase in the annual limit of material production, all constraints on the performance of the development will be met without any change.

Therefore, it is considered that the Modification Application is capable of being characterised as a development which by modification does not radically transform the Amended Consent, which is the performance criteria required for the use of *s.75W*. As such, the application can be determined in accordance with the provisions of *s.75W*.

The land use planning provisions now applying to the site under *Shellharbour LEP 2013* are similar to those provisions that were applicable to the site at the time the consent was issued and subsequently amended. As this proposed modification does not seek to alter any of the physical characteristics of the approved development (i.e. extent of extraction area, access, provision of services and the like), the provisions of *Shellharbour LEP 2013* and relevant *SEPPs* will not be compromised. In this regard, the Amended Consent is a lawful consent and the Modification Application can be determined under the provisions of the Act as detailed above.

4.2 Air Quality

In 2002, SLR Consulting (formerly Heggies Pty Ltd) was commissioned to prepare an air quality impact assessment for the initial quarry extension proposal (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 Albion Park hard rock quarry, 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 for another increase in the extraction rate at the Albion Park 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 indicated that all relevant air quality assessment goals would be complied with for the life of the operation.

SLR Consulting has again been commissioned to conduct additional atmospheric dispersion modelling for an increase in the annual extraction rate at the Albion Park hard rock quarry. The objective of the assessment is to assess the potential air quality impacts associated with increasing the extraction rate to 900, 000 tpa. The report and findings of this assessment are attached as *Appendix 5*.

The proposed increase in annual extraction rate is relatively minor (12.5%) compared to that assessed in the previous assessment at 800,000 tpa (Heggies, 2008) and no major changes in the infrastructure or local topography (such as new stockpiles or bunds) will be required for the proposed annual production rate increase. The local meteorology and dispersion patterns of relevant pollutants are therefore likely to be similar. Given this, additional modelling to quantify the incremental and cumulative impacts at surrounding areas for the proposed operations is not considered to be warranted and a semi-quantitative assessment has been performed instead.

Particulate emissions for the existing and the proposed scenario have been estimated based on the operational data and the latest emission factors available from the National Pollutant Inventory (NPI) and USEPA AP42 documents. To estimate the incremental off-site impact for the proposed operation, the predicted results from the 2008 assessment were scaled based on the ratio of the estimated particulate (TSP and PM₁₀) emissions for the proposed increased annual production rate with that presented in the previous 2008 assessment (Heggies, 2008). Ambient monitoring data collected in recent years (2010 to present) were also used to estimate the conservative background level for each pollutant of interest (TSP, PM₁₀ and dust deposition).



Data collected since the commencement of the new quarry operations in 2005 from dust monitors, a High Volume Air Sampler (HVAS), and a weather monitoring station (all strategically located within the site), were provided to reconcile with previous atmospheric dispersion modelling and also the adopted objective criteria identified in the Quarry Environmental Management Plan (QEMP). The air quality criteria for the quarry operations is identified in condition 16 of the Amended Consent. The long term Impact Assessment Criteria for deposited dust is <4g/m²/month (average exceedance taken over a 12 month period) and for an event <10g/m²/month.

It must be emphasised that there are no major changes in the infrastructure or local topography (ie. stockpiles) required for an increase to 900,000 tpa. As indicated in Table 9 of the air quality assessment report (reproduced below), the comparison in the operating parameters for the extraction rates of 800, 000 tpa and 900, 000 tpa indicate a reduction of 22% (ie. – 22%) in the PM10 emission rate and 23% (ie. – 23%) in the TSP emission rate. These reductions are due to:

- a. An over estimation of the number of blasts per annum in the Heggies 2008 assessment.
- **b.** The 2008 assessment included dust generated during the construction phase of the new quarry (ie. haul roads, bund walls, initial soil/overburden stripping etc.).

Table 9 Comparison of the Operating Parameters and Estimated Emission Rate

Activity	Unit	Scenario 1*	Scenario 2	Scenario 3	Difference ¹	Difference ²
Extraction rate	tpa	800,000	600,000	900,000	50%	13%
Hours of operation	per annum	3,025	3,025	3,025	0%	0%
Disturbed area	ha	2.55	1.91	2.87	50%	13%
Number of blasts	per annum	750	250	250	0%	-67%
Number of Drill holes	per annum	1,570	1,178	1,766	0%	-67%
Hauling	VKT/hr	5.47	4.1	6.2	51%	13%
Grading	km/week	11	2.2	2.2	0%	-80%
Scraper	days/annum	275	10	10	0%	-96%
PM ₁₀ emission rate	kg/annum	25,679	13,958	19,968	43%	-22%
TSP emission rate	kg/annum	44,778	23,925	34,382	44%	-23%

^{*} based on the emission rate presented in the previous assessment (Heggies 2008)

The new quarry site works have now been completed and on-going works will include maintenance grading of the haul road and stripping as required to expose product prior to blasting. Provision for these works has been made in the revised assessment for the quarry production increase proposal.

The incremental and cumulative annual average dust deposition for each of the established receptors is identified in Table 10 of the report. The comparisons between the estimated 800, 000 tpa, the estimated 900, 000 tpa and the actual recorded results of 600, 000 tpa indicates that there will be a small increase in dust deposition for the proposed 900, 000 tpa compared with the current recorded emissions at receptors 1,2 and 3. It is also noted that for 900, 000 tpa the estimated cumulative dust at all receptors is below the

¹Difference between the proposed and current operation

²Difference between the proposed operation and the scenario assessed in the previous assessment (Heggies 2008)



OEH nuisance criteria of 4 g/m²/month (ie. maximum of 3 g/m²/month at receptors 1 and 2, and less for receptors 3-6 inclusive).

The SLR report adopts the following conclusion:-

"Potential dust emissions from the proposed operation were estimated based on the most recent version of NPI and AP42 documents. The emission sources included in the inventory covered bulldozer, scaper and grader operations, excavators, haul trucks, blasting and wind erosion. Since no significant changes in the local meteorology or dispersion pattern are anticipated due to the proposed annual production rate increase, air quality impacts at surrounding residential receptors for the proposed production rate increase were predicted by scaling the model predictions for 800, 000 tpa extraction scenario (Heggies 2008) by the ratio of estimated particulate emissions.

AUSPLUME V6 was used to predict the incremental impact at surrounding areas in the 2008 study. Ambient monitoring data from on-site dust monitors were used to establish the background dust depiction level (g/m²/month) and particulate (PM10) monitoring data from nearest OEH monitoring site at Albion Park South were used to conservatively estimate the background PM10 concentration level (µg/m³).

Based on the assumptions outlined in the report, the predicted incremental and cumulative impact at the surrounding sensitive receptors areas complies with the relevant OEH guidelines. Therefore, based upon the assumptions outlines in this assessment, it is considered to be reasonable to conclude that the proposed increase in the extraction rate from 600,000 tpa to 900,000 tpa will not cause any exceedances of relevant OEH air quality criteria in the surrounding areas."

It is therefore concluded that the increase in the material production rate from 600, 000 tpa to 900, 000 tpa will be appropriate relative to air quality. Accordingly, there are no further measures required to minimize, manage or monitor the air quality within the locality as a result of an increase in the material production rate to 900, 000 tpa.

4.3 Noise & Blasting

In 2002, SLR Consulting (formerly Heggies Pty Ltd) was commissioned to prepare a noise and blasting impact assessment for the extension of quarrying operations at the site (Quarry Extension) and the findings were presented in the Report 30-1079-R1, dated 12 November 2002 (Quarry Extension NIA), as part of the Environmental Impact Assessment (EIA). As part of that assessment, noise modelling was performed based on an extraction rate of 400, 000 tpa. The results of the noise modelling indicated that noise assessment



goals would be exceeded at the surrounding residences, however the Proponent made a number of commitments to mitigate the noise emissions.

In 2006, SLR Consulting was engaged to prepare the Noise Monitoring Programme (NMP) and Blast Management Plan (BMP) for the Albion Park Quarry Extension in accordance with the requirements of Schedule 4, Condition 7 and Schedule 4, Conditions 14 and 15 of the Consent.

In 2008, SLR Consulting was commissioned to undertaken a noise study for an increase in the extraction rate at the Albion Park hard rock quarry, to determine the level of noise impact associated with increasing the extraction rate to 800, 000 tpa. The findings of the assessment are presented in Report 30-2138-R1 dated 30 October 2008 (2008 Modification). The proponent was granted approval to increase the extraction rate to 600, 000 tpa.

Cleary Bros now proposed to increase the extraction rate of Albion Park Quarry from the approved rate of 600,000 tpa to 900,000 tpa.

Accordingly, SLR Consulting has now been engaged to undertake a noise and blasting impact assessment of the environmental emissions likely to be associated with the increased extraction rate at the quarry. The report on the findings of this assessment is attached as *Appendix 6*.

The proposed increase in annual extraction rate is relatively minor (12.5%) compared to that assessed for the 2008 Modification and no major changes in the infrastructure or local topography (such as new stockpiles or bunds) will be required for the proposed annual production rate increase. The local meteorology, topographic shielding and noise emissions are therefore likely to be similar. Given this, additional modelling to quantify the incremental and cumulative impacts at surrounding areas for the proposed operations is not considered to be warranted and a semi-quantitative assessment has been performed instead.

A long history of noise monitoring and site attended noise audits, together with recent meteorological conditions, were utilised in order to determine the existing ambient noise levels and noise contributions created from current site activities. The proposed increased annual production rate and associated results were then measured against the current performance standards and required legislative noise goals, which revealed likely comparable conditions with the current site operations. In this regard, a summary of findings in the report concluded:-

"... The quarry is currently operating with an approved annual extraction rate of 600,000 tpa and the Proponent is seeking approval to increase the extraction rate to 900,000 tpa.



Busy operational days for the existing Albion Park Quarry operations currently equate to an annual production rate of approximately 1,380,000 tpa. The proposed increase in the approved annual extraction rate of 600,000 tpa to 900,000 tpa would primarily be achieved through increased utilisation of current operational lulls.

Accordingly, the noise and blasting emissions from the Modification to all surrounding receivers are expected to be comparable to the existing emissions from the Albion Park Quarry.

Operating Noise Impact Summary

The noise assessment has found that the calculated daytime LAeq(15minute) intrusive noise emission level at all the potentially noise affected residences comply with the Consent noise limits. The noise emissions at all receivers are expected to remain unchanged and the current performance is expected to continue ie typically 4 dBA below Consent criteria at all receivers.

Road Traffic Noise Impact Summary

The existing access road off East-West Link Road would remain the primary access to the quarry site. The typical daily maximum operational workforce traffic and traffic associated with deliveries along public roads would not change due the Modification. The overall traffic noise level contribution, including the Albion Park Quarry operations, would remain well below the corresponding noise limit of 60 dBA LAeq(15hour).

Cumulative Noise Summary

As the on-site mobile fleet numbers are expected to remain unchanged, the estimated daytime amenity noise level will remain below the INP's acceptable amenity criteria of 55 dBA LAeq(11hour) during the daytime period.

Blasting Impact Summary

The blast design parameters and management practices remain generally unchanged. The modification would not increase the blast frequency, of one blast per day, that is currently permitted in the Consent and there is no change in the extent of operation.

Accordingly, blasting impacts associated with the Modification would continue to be maintained within the Consent and EPL Conditions (for the existing operation) of 115 dBA airblast and 5 mm/s ground vibration (with an allowance 5% exceedance in a 12 month period) at the closest most affected residences surrounding the site. "



As noted above, busy operational days (ie. up to 5,000 tonnes per day) for this quarry equates to an annual production rate of approximately 1,380,000 tonnes. Therefore, the production increase will not extend the operating hours of the quarry beyond the permissible hours as defined within the development consent. The proposed increase in material production to 900,000 tpa will be achieved by utilising the existing plant and equipment more consistently during the approved operating hours.

It is noted that the environmental monitoring records (refer to AQEMP) show that the objective levels for noise, vibration and dust have not been exceeded.

The operating noise, road traffic and blasting impacts summarised in the SLR assessment report indicates that expected emissions generated by a proposed quarry material production increase from 600,000 tpa to 900,000 tpa will meet the existing objectives set by the original consent conditions and create no additional impact on the sensitive noise receivers. As such, this proposed increase will be appropriate.

Again as applicable to the preceding air quality assessment, there are no further measures required to minimise, manage or monitor the impacts of noise and blasting within the locality as a result of an increase in the material production rate of 900, 000 tpa.

4.4 Traffic Management

In 2006 approval was granted to the Quarry to produce up to 400, 000 tonnes per annum (tpa) of hard rock from the site. The application for the approval was supported by a traffic impact assessment prepared by Masson Wilson Twiney Pty Ltd (April 2003). The assessment included consideration of the then recently opened East-West Link Road connecting Croome Road with the Princes Highway at the 'Oak Flats Interchange'.

In 2009 approval was granted to the Quarry to increase production levels from 400, 000 tpa to 600, 000 tpa. The application for the increase was supported by a traffic statement prepared by Masson Wilson Twiney (September 2008) which considered the traffic implications associated with a Quarry production level of 800, 000 tpa.

The current modification application proposes that the production level be increased to 900, 000 tpa.

GTA Consultants has been commissioned by Cleary Bros to undertake a traffic impact assessment for the proposed increased production level. In particular, this assessment has considered the implications of the proposed annual increase in production levels with regard to:

the existing and potential future daily traffic generation characteristics of the Quarry;



- the operation of the surrounding road network; and
- functional capacity of the East West Link Road.

The report on the findings of this assessment is attached as *Appendix 7*, which addresses the anticipated transport implications of the proposed material production limit increase including consideration of the following:

- existing traffic conditions surrounding the site
- existing traffic generation
- the traffic generating characteristics of the increased production
- suitability of the proposed access arrangements for the site
- the transport impact of the proposed increased production levels on the surrounding road network.

In summary, the Traffic Impact Assessment identifies the following:-

- the local road network adjacent to the site is dominated by the East-West Link Road which
 was constructed and opened in late 2007 with the purpose of providing a major collector
 road connection between Croome Road and the Princes Highway (thereby relieving the
 traffic demands on the Prince Highway / Tongarra Road intersection to the north).
- The East-West Link is currently constructed as a two lane road with a dedicated marked cycle lane and wide sealed shoulder lane on both sides of the road. It is currently carrying in the order of 10, 000 11, 000 vehicles per day which is consistent with the roads intended function.
- Two roundabout intersections have been constructed along the East-West Link road to facilitate access to the residential / industrial estates to the north and to the quarries to the south. These intersections are operating at a level of Services B (SIDRA analysis) and therefore are operating well and have spare capacity to accommodate as increase in traffic volumes.
- The Albion Park Quarry is accessed from the intersection of the East-West link and Colden Drive. The East-West Link provides a direct link between the Quarry and the existing arterial road network. As such, it provides direct access to the Princes Highway via a grade separated interchange from which some 95% of the Quarry traffic enters / leaves the site.
- Minimum heavy vehicle roads associated with the quarry operation are within the nearby key roads network during the AM and PM peak periods.



- With regard to the potential traffic implications of Quarry operations to the surrounding road network, it is the volume of traffic generated on a daily and more importantly hourly basis that determines the extent of impact and not annual production.
- Traffic generation potential of the Albion Park Quarry is determined by:
 - o production capacity and ability to load trucks with material for export;
 - o haulage fleet characteristics; and
 - market demand.
- Current Quarry activities on a busy day generates 5, 018 tonnes of material within 137 trucks with a peak operating day in October 2012 generating some 196 truck movements.
 This represents the movement of 5, 482 tonnes of quarry production material.
- The peak Quarry day hourly flows at the nearby intersections have been analysed using the SIDRA INTERSECTION software as aforementioned and found to operate at a Level of Services B.
- An increase in the material production rate to 900, 000 tpa as proposed will not change the
 existing peak operating traffic conditions. It is not proposed to increase the Quarry's
 capacity nor the Quarry's capacity to load trucks and essentially the increase in annual
 production levels allows the Quarry to operate within more busy days per year than
 currently occur.
- Application of the current busy days production rate for a 5 ½ day working week and 50 weeks of production per year equates to an annual material production level of 1, 380, 000 tpa to 1, 508, 000 tpa.
- The average daily production level for a 900, 000 tpa production limit would be approximately 3,275 tonnes per day.

The Traffic Impact Assessment provides the following conclusion:-

"In summary, the proposed increase in the annual quarry production will not require any variation to the consent condition relating to Transport (Sch.4 Cl.46) as quarry access will continue via the East West Link Rd. Further, it is proposed that there will be no noticeable change to the peak operating periods of the Cleary Bros Albion Park Quarry with regards to traffic generation.



The analysis presented in this report has concluded that the existing (and thus proposed) Quarry traffic generation can be adequately accommodated by the surrounding road network which is operating satisfactorily with good levels of service and significant spare capacity.

Thus the proposed increase to annual production levels from 600,000 tpa to 900,000 tpa is considered acceptable with regard to road network operation."

Accordingly, the existing and proposed quarry traffic generation can be adequately accommodated by the surrounding road network, which is operating satisfactorily and with good levels of service already (ie. significant spare capacity). As such, the proposed increased annual production rate from 600,000 tpa to 900,000 tpa is considered acceptable with regard to traffic generation and road network operation.

Based on these findings, there are no further measures required to minimise, manage or monitor the impacts of traffic management within the locality should the proposed measures in material production rate be implemented.

The Traffic Impact Statement has considered the impacts upon the surrounding road network as required. However, in a broader context, it should be noted that a primary catalyst for the requested increase in the annual production rate at the Albion Park Quarry is the now reduced availability of alternate products within the Region. In this regard, the closure of the No. 6 Blast Furnace at the BlueScope Port Kembla plant has stopped the production of an alternate product generated from steel blast furnace slag (see NSW Trade & Investment Resources and Energy correspondence at *Appendix 4*).

Accordingly, any increase in the transportation of quarry products will be offset by the reduction in the transportation of slag products which were previously providing in excess of 1,000,000 tpa for the construction industry.

4.5 Water Consumption

A Water Management Plan was prepared for inclusion in the Quarry Environmental Plan (QEMP), which generally comprises:-

- 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).

This Water Management Plan is Appendix G within the QEMP attached as *Appendix 3* to this report



Water required for dust suppression and landscape irrigation for the quarry extension 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 the new quarry is being 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.

Cleary Bros operate a fleet of six CAT 773 dump trucks which have a capacity to transport in excess of 18,000 tonnes of material per week from the quarry face to the processing plant while operating within nine hours per day.

This equates to in excess of 900,000 tonnes per year. Although adequate water storage exists it is unlikely that there will be additional demand with the increase in haulage.

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 guarry extension.

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 the proposed increase 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 indicate that there has been a surplus of available water during these periods.

It is concluded that there is adequate water storage capacity to meet the requirements for dust suppression and irrigation with an increase in annual quarry production to 900,000 tonnes.



4.6 Other

There are no 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 merely a modification of the annual production rate, and it is considered the impacts associated with this increase will be negligible in relation to that which has already been approved by the DPI.

In general, the proposed development should be 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.



5.0 Conclusion

This application seeks DPIs support in relation to a proposed Modification of Development Consent for the Cleary Bros Albion Park Quarry. This modification seeks an increase to the quarry production limit from 600,000 tonnes to 900,000 tonnes per annum.

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

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

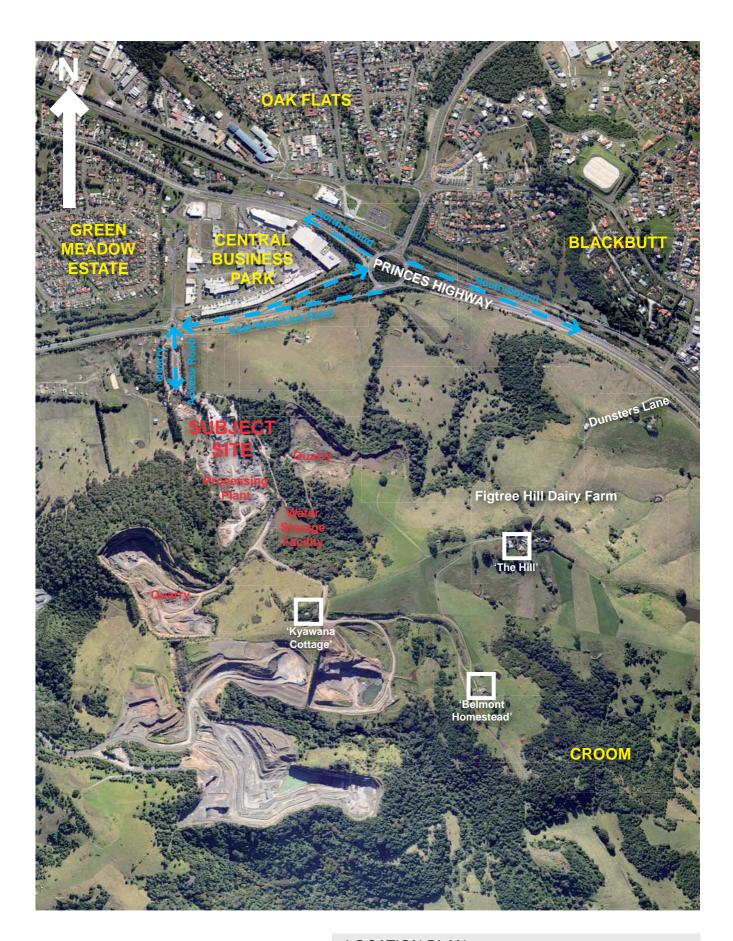
- the modified development is substantially the same development as that for which consent was originally granted, thereby maintaining the acceptable environmental impact assessment associated with the original proposal;
- > the perceived traffic impacts associated with the modification will be negligible;
- the proposed modification will appropriately manage the impacts of air quality;
- 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 is not a prohibiting factor for the proposed modification;
- the proposed modification should be in keeping with current community expectations for the appropriate use of the subject land; and
- the proposed modification should be environmentally sustainable.

It has been shown that all likely impacts for the increase in material production rate from 600, 000 tpa to 900, 000 tpa 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 DPI is respectfully requested to favourably consider this application at the earliest convenience.



FIGURES:





LOCATION PLAN title:

property: Cleary Bros Albion Park Quarry

November 2013 scale : reduced figure : date:



APPENDIX 1:

"Quarry Development Consent"



Land and Environment Court of New South Wales

CITATION:

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):

10639 of 2005

CORAM:

Hussey C; Brown C

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

APPLICANT

REPRESENTATIVES:

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 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.
- 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).
- 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

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.

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

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:

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

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

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

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

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

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

b

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

- 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.
 - 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

Figtree Hill Pty Limited

Applicant

Cleary Bros (Bombo) Pty Limited

First Respondent

Minister for Infrastructure and Planning

Second Respondent

Order

The orders of the Court are:

- 1. The appeal is dismissed.
- 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.

Ordered: 21 February 2006



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:

Cleary Bros (Bombo) Pty Ltd.

To:

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

Development Application:

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

State Significant Development:

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

Integrated Development:

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;

Rivers and Foreshores Improvement Act, 1948.

Designated Development:

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.

Commencement of Consent:

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

Lapse of Consent:

Pursuant to section 95 of the Environmental Planning and Assessment Act 1979, 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.



SCHEDULE 2 DEFINITIONS

AEMR

Applicant BCA Council DA

DEC

Department Design Event

Director-General

DPI Dust EI\$

EMS EP&A Act

EPL

Fig Tree Hill Land

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

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

Scope of Development

The Applicant shall carry out the development in accordance with:

DA No. 466-11-2003;

The EIS titled Proposed Quarry Extension Albion Park, dated October 2003, and prepared by b) Perram & Partners; and

Conditions of this consent. c)

- If there is any inconsistency between the above, the conditions of this consent shall prevail to the 3. extent of the inconsistency.
- The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the 4. Department's assessment of:

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.

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

- 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:

details of the proposed quarrying operations for Stages 5 and 6; results of consultation conducted during preparation of the report; b)

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

justification for the extraction of Stages 5 and 6. e)

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 warrented;
- seek advice from relevant government authorities on the report;
- determine the proposal; and
- make this determination public.

Period of Approval

d)

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



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
 - 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

- 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 eyent.
- 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

 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 19 0NM/metre buffer area. The buffer may be used for landscaping, minor drainage works, noise/visual this alignment of the haul road (including batters), as depicted on the plan in Appendix 3.

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

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

Noise L	mits dB(A) Last removies and the
Receiver Locations Stages 1-2	Stages 3-4 - Stages 5-6
The Hill residence (Dunster premises)	38 - 35 - 35
The Cottage residence (Dunster premises):	Factorial and the second
Approved fural workers dwelling (Dünster 2005) 35	38 35
Greenmeadows Residential Estate.	41
	2000年4月1日 (1000日 1000日 1000 1000 1000 1000 1000

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 nominated in Table 5.12 of the report prepared by Richard Heggle and Associates
Report No. 30-1079R1 littled '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 ilmits 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 veriation.

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).

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Operating Hours

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

Activity	elega karan ka	THE RESERVE OF THE PARTY OF THE	Time
Activity		Days of the Week	
Drilling rock breaking	g loading and haulage o.	Monday - Friday	STORES ENGINEER
material from quarry		violinayi- in loav	WHAT SHEET SHEET
1.6.25/4.60/00/00/25/20/00/00/20/20/20/20/24/20/24/20/00/00/00	kbiling, overburden als als	Saturday	7:00 am - 1:00 pm
156.6 456.126.0 CANADA	tage preparatory works		Tools and the state of the stat
	activities, rehabilitation		
works, general plant	and maintenance.		
Processing, crushing	i and screening and 🖅 🕏		
product transfer to st	ockelles to the control of	医线线 经外支债券 统	

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.

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

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

Noise Compliance Assessment Report

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

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

Alrbiast 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.



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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 3.5m from any residence or other sensitive receiver on privately-owned land.

	Peak particle velocity Allowable exceedance
	Tean Daniele Velocity
	PART OF AMOUNT OF THE COLUMN TO THE PART OF THE PART O
۰	
	5% of the total number of blasts over any 12 month reporting period.
	The state of the s

Table 4: Ground Vibration Limits

Blasting Restrictions

- Blasting operations on the premises may only take place: 12.
 - between 9.00am and 5.00pm Monday to Friday inclusive;
 - are limited to 1 blast each day; and b)
 - at such other times as may be approved by the DEC (EPA). c)

Public Notice

- During the life of the development, the Applicant shall:
 - 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
 - notify landowners within 2 kilometres of the site about this hotline on an annual basis, b) 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

- 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 and to the satisfaction of the Director-General and DEC. This plan must:
 - Include a summary of monitoring results for the previous quarry stage; aì
 - Describe the objectives for noise and blasting for that stage; b)
 - Describe the proposed blasting design for that stage, and demonstrate that the design c) will meet the blast criteria listed in Tables 3 and 4; and
 - Describe the measures that would be implemented to: d)
 - 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,;
 - (lii) 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 Ply Ltd.

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Blast Monitoring

- 15. 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

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;

(lii) 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.

Pollutant Averaging pe	riod Criterion
Total suspended particulate (TSP) matters : Annual	90 µg/m 🕅
Particulate matter < 10 um (PM _B) s Annual	30.pg/m

Table 5: Long Term Impact Assessment Criteria for Perticulate Matter

Pollutant Averaging period C	riterion
Particulate matter < 10 pm (PMr ₀) L 24 hour E	i0 μg/m³/

Table 6: Short Term Impact Assessment Criterion for Particulate Matter

Pollutant Averagi	g Maximum increase in Maximum total deposited dust level deposited dust level.
	2.g/m²/month; 4.g/m³/month

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. ¹⁰ 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. ¹¹The 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 Unit of	Averaging Frequenc	y Sampling. Method	Locations
Dust deposition = 4. g/m2/months . N	lànth achual — Continuou	s AM-15	4 6 1
PMproving the ag/m ² 2	hour annual : Every 6	AM TB	1.1

Table 8: Sampling of Air Pollutents

- 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;
 - air quality impact assessment criteria;
 - 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 Pty 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, everaging period, frequency and sampling method.

Parameter	Units of measure	Averaging period	Frequency	Sampling method
Rainfall	inm/hr	j hr-	Continuous :	AM-4
Temperature @ 2 m	L = K + K	# hr	Cordinuous	-AM-4
Temperature @ 10 m ;	English Kuratus	(15.54 m.)	Confinuous	AM-4
Wind direction @ 10 m	Compass points	The state of	Continuolis	AM-2
Wind speed @ 10 m	m/s 242.33	1 pr	⊋Centinuous >>>	AM-2
Sigma Theta @ 40m		thr	Continuous 🦠	AMi2 Scille
Total Solar Radiation @ 10m.	∓W/m2 + 3 s	the state of	Continuous	≥AM-43
Stung		357 兴州北京	被连接的	AM-1

Table 9: Meteorological Monitoring

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. ¹²Except 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

23. 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:

NSW EPA, 2001, Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

¹² Incorporates DEC GTA

	A STATE OF THE PROPERTY OF THE
	Maximum Limit
	Pollutant Units of
•	THE RESERVE THE CONTROL OF THE PARTY OF THE
	Trock with the market of the control
	THE REAL PROPERTY AND ADDRESS OF THE PROPERTY
	Harris Harris and the second of the second o

·Table 10: Water Discharge Pollution Limits

Storm Water Management System

- 13 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).
- 14Within 5 days of a rainfall event, the Applicant shall ensure that the basins in the storm 25. water management system are treated and emptied to maintain the required storage volume.

Flocculant Management

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

Monitoring and Management

- 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 Water Balance;
 - an Erosion and Sediment Control Plan; b)
 - a Surface Water Monitoring Program; c)
 - a Ground Water Monitoring Program; and d)
 - an Integrated Water Management Strategy, if the water balance shows a potential e) demand for water above that which can be collected from rainfall.
- 16 The Water Balance shall include: 28.
 - consideration of the existing quarry and processing site, existing water storage dam and the proposed quarry and haul road;
 - the source of all water collected or stored on the site, including rainfall, stormwater and b) groundwater;
 - the estimated water use demand in wet, average and drought years.
- 17 The Erosion and Sediment Control Plan shall: 29
 - be consistent with the requirements of the Department of Housing's Managing Urban Stormwater: Soils and Construction manual;
 - 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.
- The Surface Water Monitoring Program shall include: 30.
 - detailed baseline data on surface water flows and quality;
 - surface water impact assessment criteria; b)
 - a program to monitor surface water flows and quality; c)
 - a program to manage water releases from the site; d)
 - a program to monitor bank and bed stability; e)
 - a protocol for the investigation, notification and mitigation of identified exceedances of f) the surface water impact assessment criteria; and
 - a program to monitor the effectiveness of the Eroslon and Sediment Control Plan.



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- 31. The Ground Water Monitoring Program shall include:
 - detailed baseline data on ground water levels and quality, based on statistical analysis; 3)

b) ground water impact assessment criteria;

- a program to monitor regional ground water levels and quality; c)
- a program to monitor ground water level effects on vegetation, and on ground water ď) supply to adjoining properties; and
- a protocol for the investigation, notification and mitigation of identified exceedances of e) the groundwater impact assessment criteria.
- 32. ¹⁸The Integrated Water Management Strategy shall include:
 - exploration of a range of options for a sustainable resource alternative for water supply
 - identification of all possible and available sources of water; ь١
 - c) consistency with Government Water Reform Initiatives and policies;
 - quality of water to meet usage requirements including any possible effects on product; d)

e) costs of supply;

f) health and environmental impacts;

legislative requirements; g)

- assessment of the feasibility, benefits and costs of options; h)
- a process to identify and evaluate preferred options for implementation; and i) ń
 - the identification of a timetable for implementation of the selected options.

Reporting

- Each year, the Applicant shall: 33.
 - review the Water Management Plan;

update each sub-plan; and ь)

report the results of this review in the AEMR, including: c)

d) the results of monitoring;

e) details of the review for each sub-plan;

f) amendments to the sub-plans; and

details of the measures undertaken/proposed to address any identified issues.

FLORA & FAUNA

Vegetation Clearing Protocol

- 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:
 - delineate the areas of remnant vegetation to be cleared; and a)
 - **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

- The Applicant shall conserve and maintain the southern areas of remnant vegetation marked 35. 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

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:

establishment of baseline data for existing vegetation and habitat in the area;

- vegetation management on all areas of the site outside the working area of the quarry; ьì
- conservation, maintenance and enhancement of threatened communities, including Ç) 'Illawarra Subtropical Rainforest' and 'Illawarra Lowlands Grassy Woodlands';
- conservation, maintenance and enhancement of threatened plant species, including d) Cynanchum elegans (White Cynachum), Daphnandra sp.aff micrantha (Nawarra Socketwood), and Zieria granulata (Illawarra Zieria);
- establishment and maintenance of vegetation/habitat for threatened fauna species, e) including the Grey-headed flying fox;

ongoing weed control and maintenance; fì

- a program for how the performance of the measures described in (b) to (f) above g) would be monitored over time:
- a program for monitoring the effect of quarrying, including water management, on f) vegetation communities.

Reporting

The Applicant shall include a progress report on the Implementation of the Vegetation Management Plan in the AEMR.

REHABILITATION

Rehabilitation

The Applicant shall progressively rehabilitate the site to the satisfaction of the Director-General. 39.

Rehabilitation Management Plan

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:

identify the disturbed area at the site; a)

- describe in general the short, medium, and long-term measures that would be b) implemented to rehabilitate the site;
- 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.
- Within 5 years of providing the Rehabilitation Management Plan to the Director-General, and 41. every 5 years thereafter, the Applicant shall review and update the plan to the satisfaction of the Director-General.

Rehabilitation Bond

- 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:
 - $$2.50/m^2$ for the total area of disturbance at the development; and $$3.00/m^2$ for the total area of the revegetation area, .
 - to the satisfaction of the Director-General.

- 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, necessary revise, the sum of the rehabilitation bond to the satisfaction of the Director-General review must consider:

the effects of inflation; .a) 🗸

- any changes to the total area of disturbance; and
- the performance of the revegetation area.

Reporting

b}

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 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 NSW Heritage Office and Sheliharbour 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) 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;
 - 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 refic 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 AEM

VISUAL IMPACT

Visual Amenity

54. The Applicant shall minimise the visual impacts of the development to the satisfaction of the Director-General.



NEW SOUTH WALES

- 55. The visual/noise bunds and screen plantings shall be designed and established in accordance with a Landscape Plan prepared in consultation with Sheliharbour City Council, and to the satisfaction of the Director-General. The Landscape Plan shall be prepared by a sultably 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. ¹⁹All 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 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.

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:
 - 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
 - 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;
 - 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 refevant employees are familiar with the documentation; and

^{19.} 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:
 - 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

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;

e) 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
- 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.
- 4. 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).

6. If the landowner disputes the results of the independent review, either the Applicant or the landowner 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).

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;



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HEW SOUTH WALE

- (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:
 - 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;
 - 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-487-11-2003, 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;
 - 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.

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During the life of the development, the Applicant shall: 11,

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 update these results on a regular basis (at least every 6 months),

to the satisfaction of the Director-General.

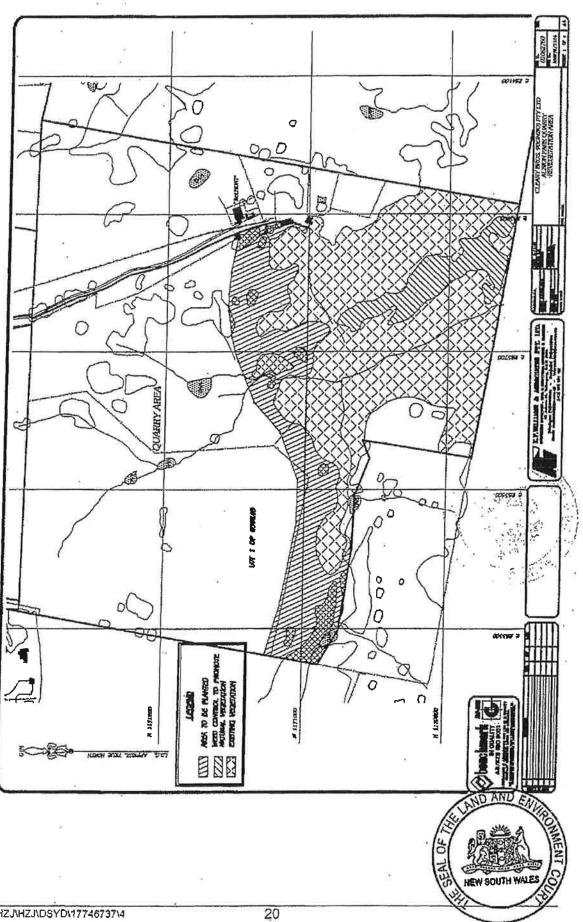
Note: The Applicant's environmental management plans/protocols should specify the reporting provisions for each environmental aspect.

Commissioner of the Court

Commissioner of the Court

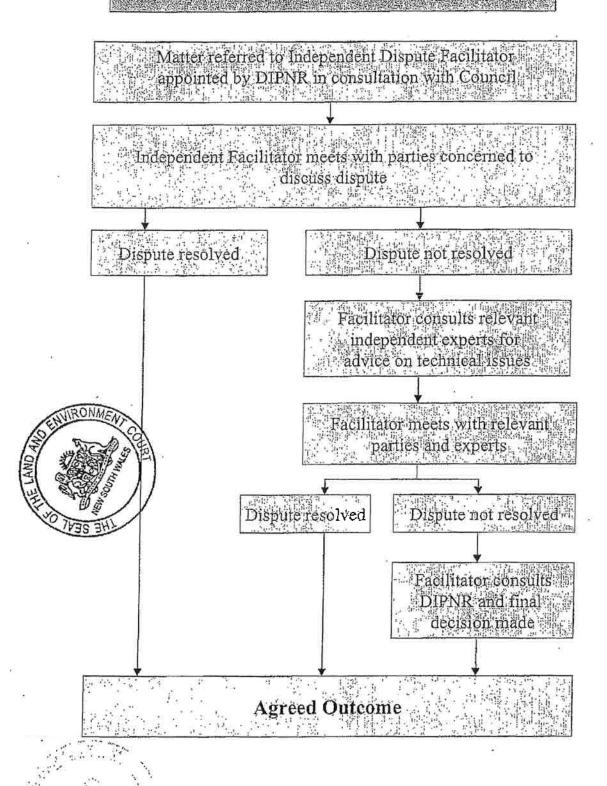


APPENDIX 1 REVEGETATION/REHABILITATION AREA

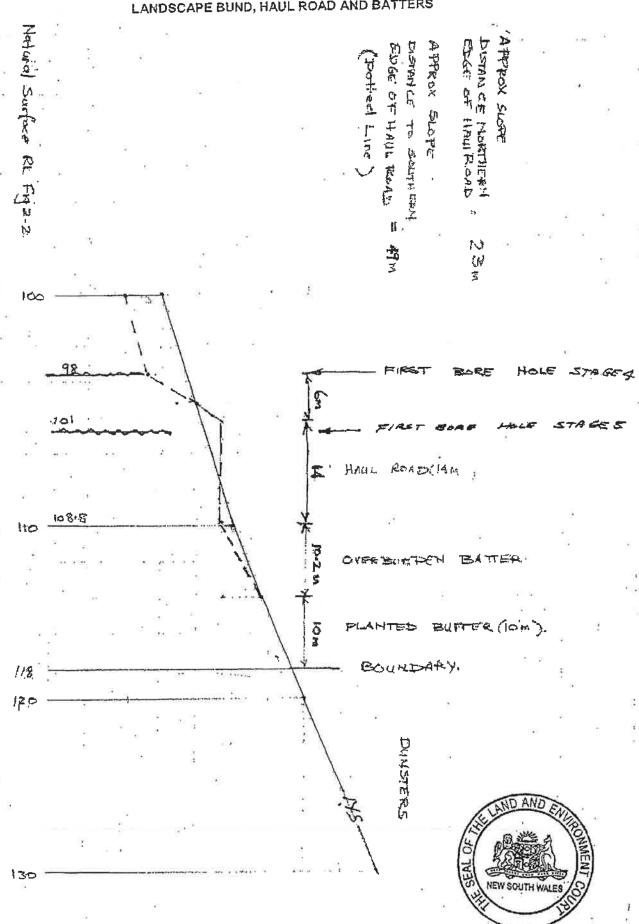


APPENDIX 2 INDEPENDENT DISPUTE RESOLUTION PROCESS

Independent Dispute Resolution Process (Indicative only)



APPENDIX 3 LANDSCAPE BUND, HAUL ROAD AND BATTERS



(51



APPENDIX 2:

"Notice of Modification Approval"



Major Project Assessment Industry & Mining Contact: Kane Winwood

Phone: Fax:

(02) 9228 6298 (02) 9228 6466

kane.winwood@planning.nsw.gov.au

Our ref: \$00/00534

Graeme Granger Technical Manager Cleary Bros PO Box 210 PORT KEMBLA NSW 2505

Dear Mr Granger

Albion Park Quarry (10639 of 2005 MOD 1) Notice of Modification Approval

As advised by email on 2 July 2009, I wish to advise that on 30 June 2009, the Executive Director, Major Projects Assessment, as delegate for the Minister for Planning, approved the application to modify the LEC consent (10639 of 2005) of the Albion Park Quarry.

I have attached a signed copy of the Notice of Modification for your information. A copy of this document, together with the Department's Assessment Report, can be viewed on the Department's website under "Notices of Determination – Other Development Proposals" (www.planning.nsw.gov.au).

If you have any enquires on this matter, please contact me on the above details.

Yours sincerely

Kane Winwood

Senior Planner

Major Development Assessment

28/7/09

Notice of Modification

Section 96AA of the Environmental Planning and Assessment Act 1979

As delegate of the Minister for Planning, I modify the development consent referred to in Schedule

Chris Wilson **Executive Director**

Sydney,

2009

SCHEDULE 1

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

SCHEDULE 2

Delete the definition for "DEC" in the Definitions in Schedule 2, and insert in alphabetical 1. order the following:

DECC

Department of Environment and Climate Change

SEE

Statement of Environmental Effects

- 2. Delete all references to "DEC", "DEC (EPA)" and "DEC (NPWS)" and replace with "DECC".
- In Condition 2 of Schedule 3, delete paragraph (c) and insert the following: 3.
 - Modification Application 10639 of 2005 MOD 1 and the accompanying SEE titled c) "Albion Park Quarry: Application to Modify Development Consent Increased Production Limit", dated November 2008, as amended by the correspondence to the Department Conditions of this consent.
 - d)
- 4. Delete Condition 8 of Schedule 3 and replace with the following:
 - 8. The production of quarry products from the quarry shall not exceed 600,000 tonnes per



APPENDIX 3:

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

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.

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1

INTRODUCTION

1.1 BACKGROUND

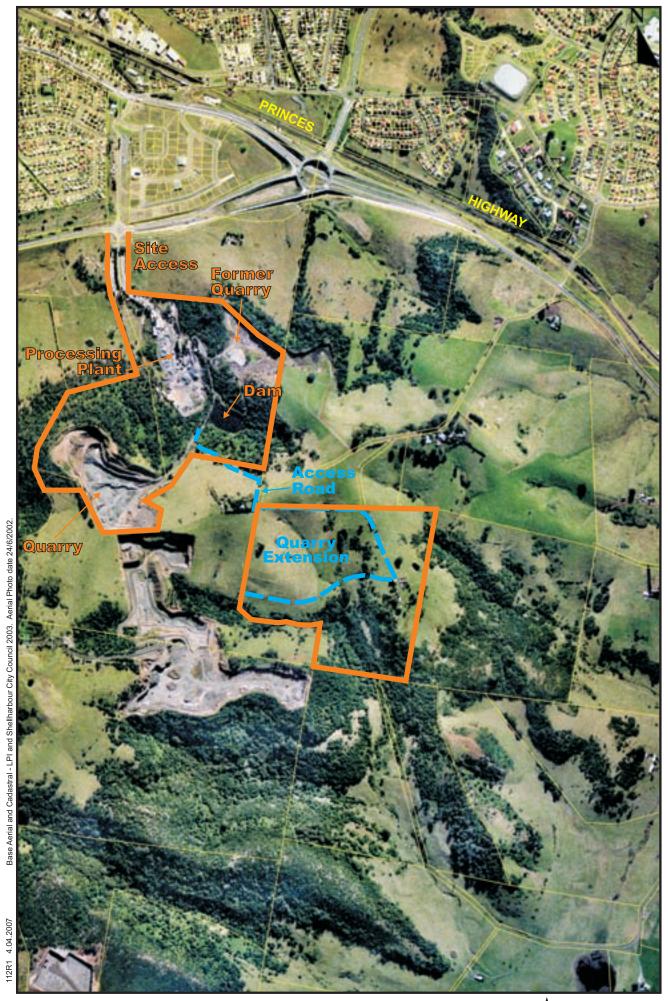
Cleary Bros (Bombo) Pty Ltd has extracted and processed hard rock from quarries in the Albion Park area since the middle of last century. In May 2005 the Minister for Infrastructure and Planning granted development consent for the company to extend quarrying into a new area, about 400 metres south east 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.



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 1.1 CONSENT CONDITIONS REQUIRING APPROVED DOCUMENTATION

Condit	ion No	Documentation Specified	Manner of Inclusion
Quarry (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.

	I	T	
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;
- periodic review and re-issue of the environment protection licence;
- 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.

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

□ Water Act, 1912

2

THE SITE

2.1 PROPERTY DESCRIPTION

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

Property Description	Owner	Activities
Quarry conse	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 o	consent	
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:



Property Plan FIGURE 2.1

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.

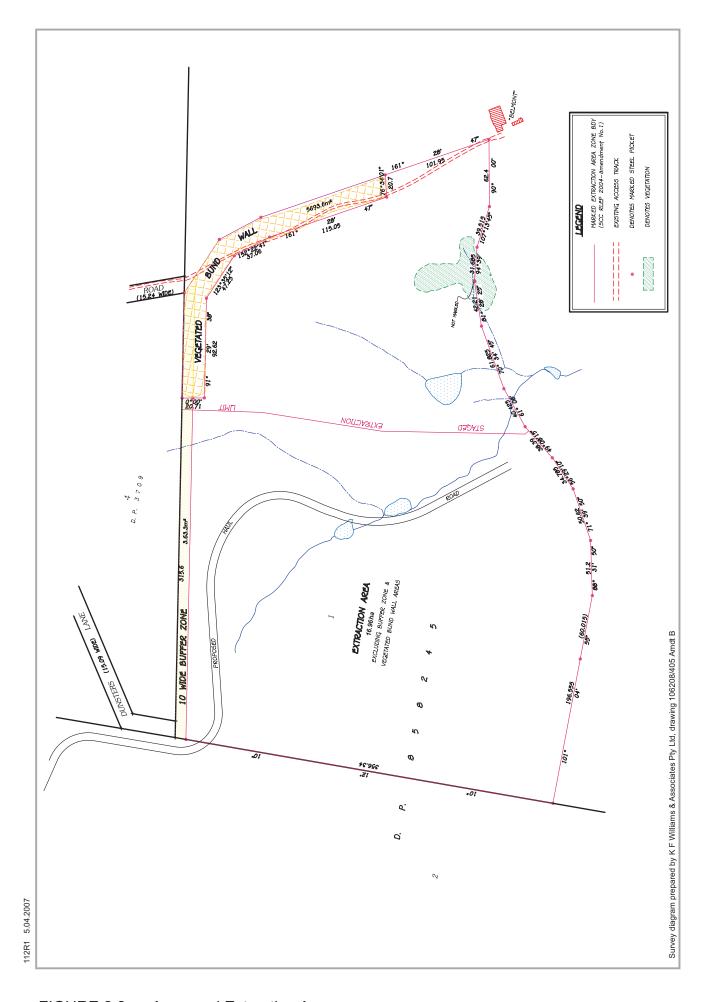
A right of way has been established by agreement over land owned by Rinker Australia Pty Ltd to permit construction of the access road and its use in relation to the quarry extension.

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.

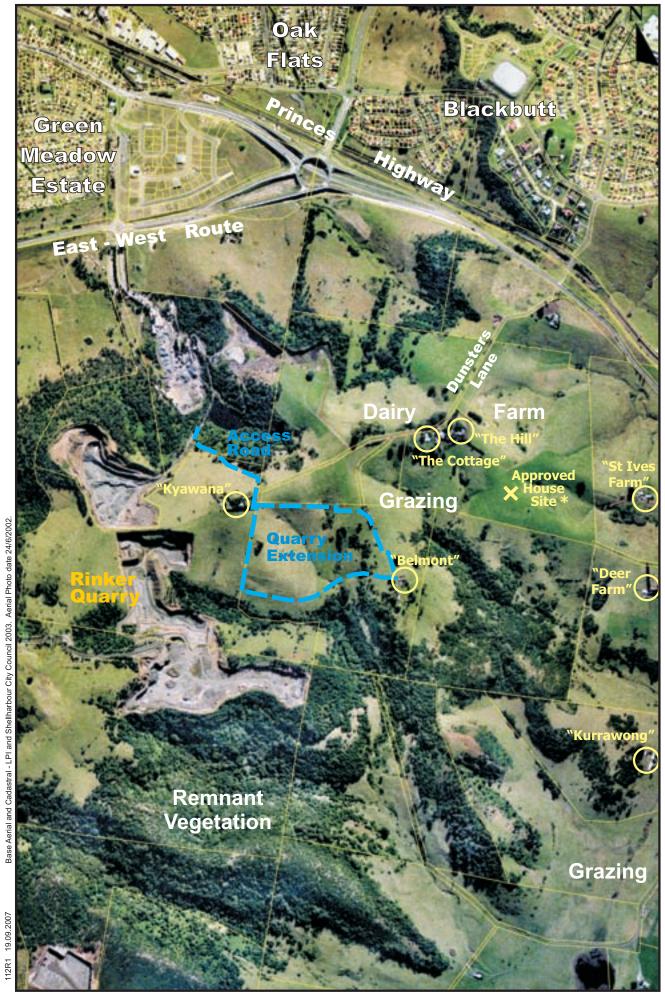
Table 2.1 TEMPERATURE, RAINFALL, HUMIDITY AND WIND SPEED

Item	J	F	M	Α	M	J	J	Α	S	О	N	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, northeasterlies 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.



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 focusing 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.

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

Head Office	0	Board of Directors;
		Chief Executive Officer;
	٥	General Manager Quarries
On site		Quarry Production Manager;
	٥	Operational staff;
	٥	Drivers (as required);

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**.

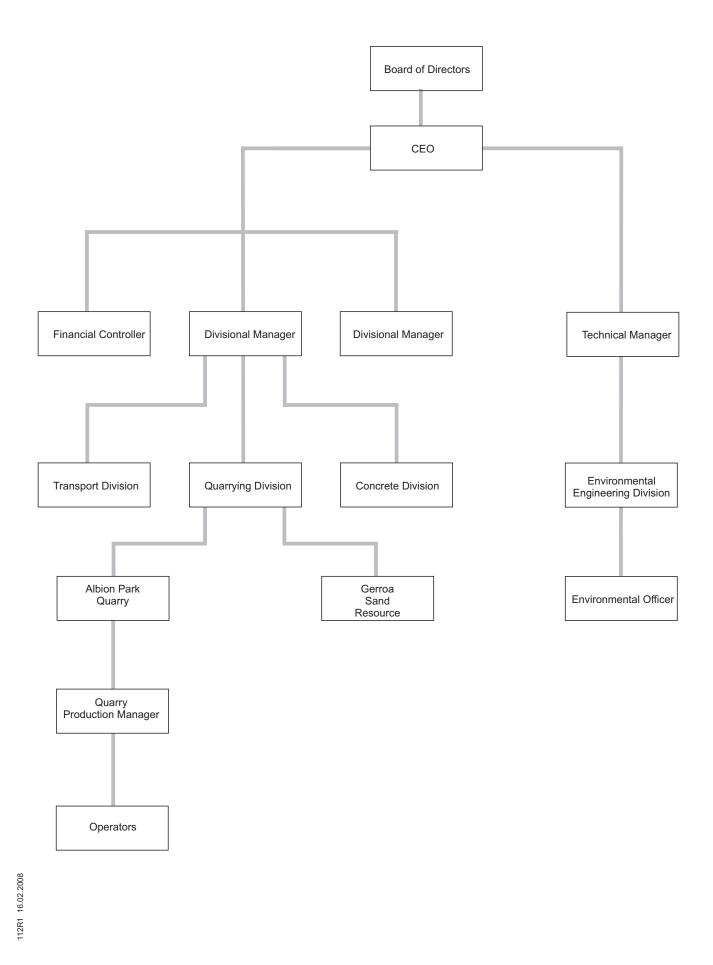


Figure 3.1 Cleary Bros Simplified Organisation Chart

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	

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.

Task	Chief Executive	General Manager	Quarry Production	Operational Staff	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.		

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.

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

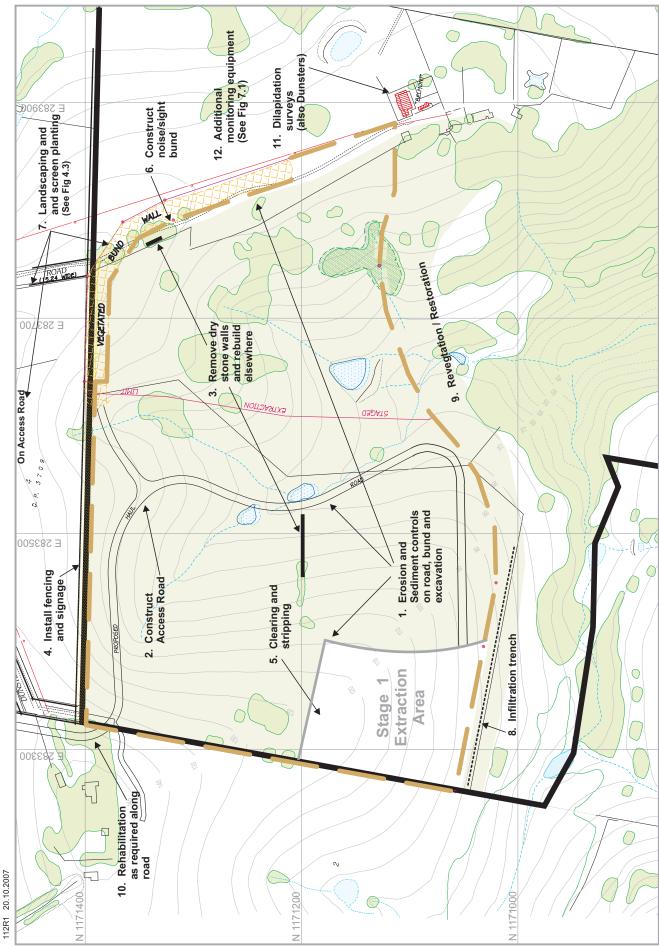
Construction work includes necessary site preparation prior to commencing hard rock extraction from the quarry extension area. Where actions are specifically required by Conditions of consent, the condition is referenced. The general location of construction works is shown on *Figure 4.1*.

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.

FIGURE 4.1 Location of Construction Works

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.

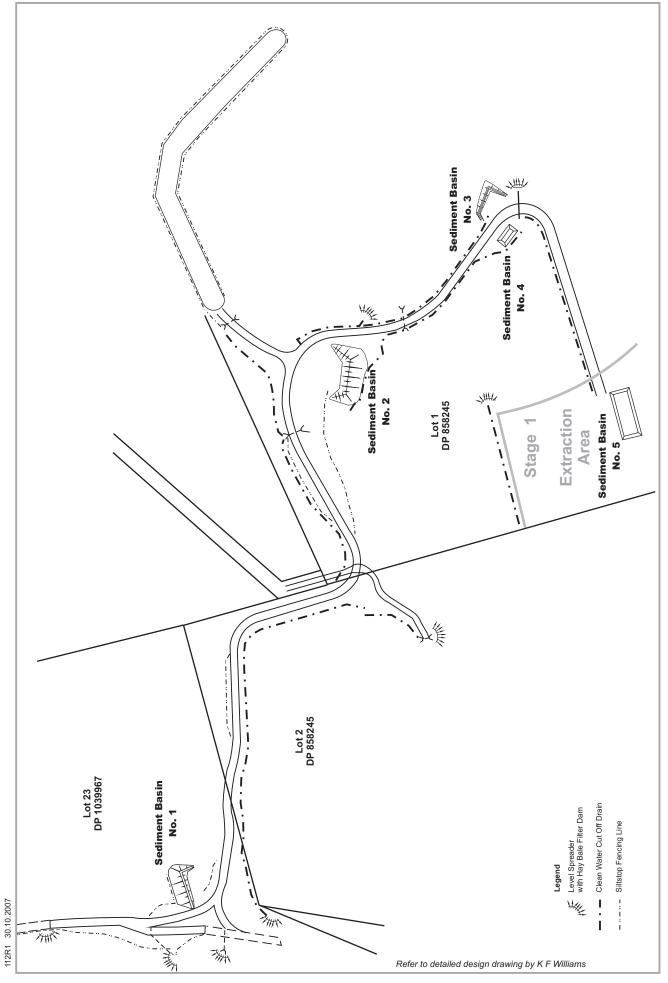


FIGURE 4.2 Erosion and Sediment Controls



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;
- l) 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.

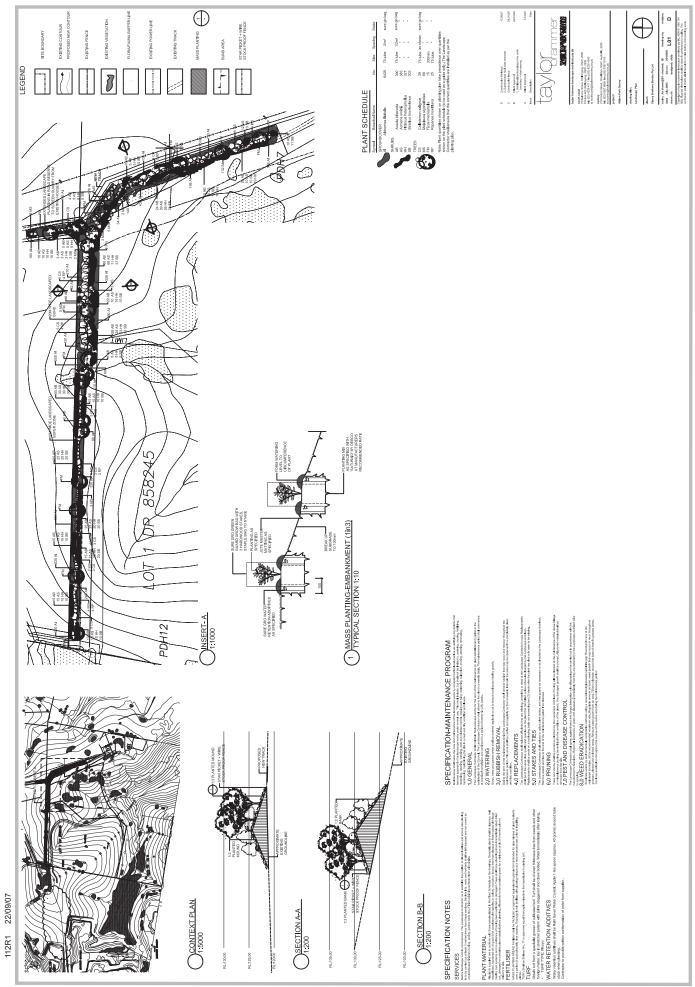


Figure 4.3 Landscape Plan - Quarry

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).

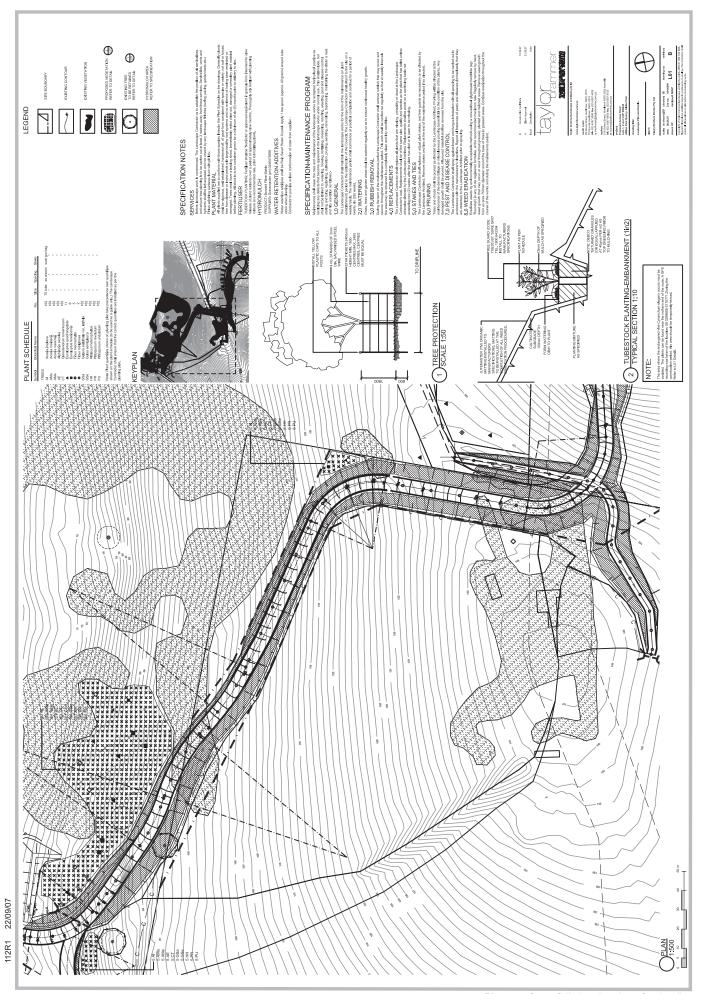


Figure 4.4 Landscape Plan - Access Road

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

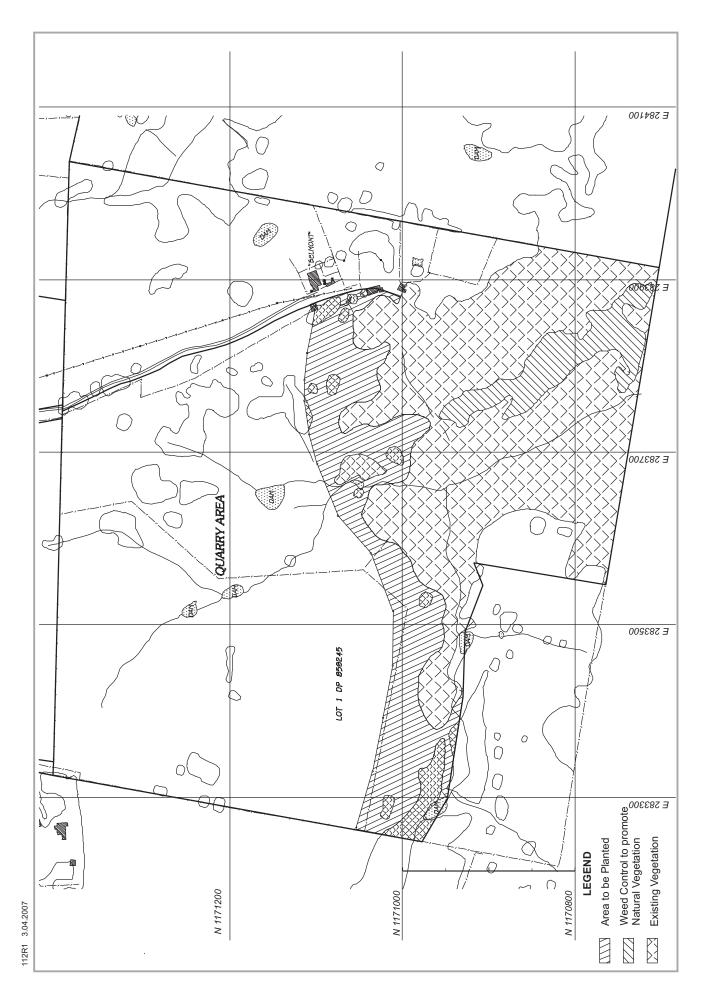


FIGURE 4.5 Revegetation / Rehabilitation Area

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 PM₁₀ 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;

- \Box 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.

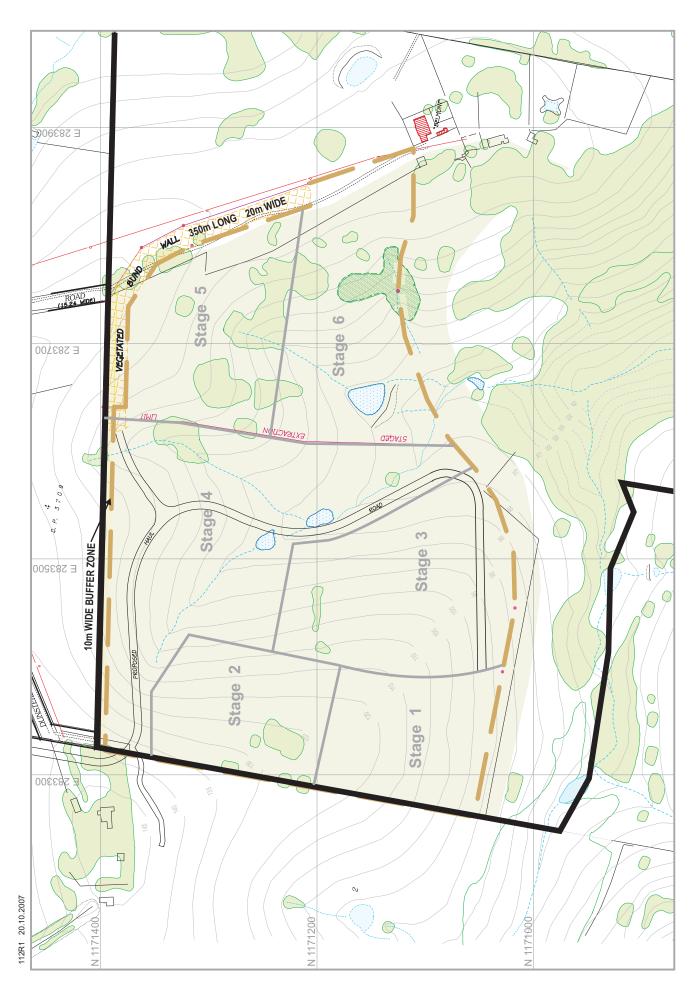


FIGURE 5.1 Staging Plan

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

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

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.

NOISE LIMITS 5.5

Performance Objective 5.5.1

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 5.1 NOISE LIMITS

Receiver Locations	Noise Limits L _{Aeq15minute}		
	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.

Table 5.2 BLASTING LIMITS

Maximum Airblast Overpressure dB(Lin Peak)	Maximum Peak Particle Velocity mm/s	Allowable Exceedence		
1. At any point located at least 3.5 metres from any residence 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 boundary of the Figtree Hill land				
135	200	0%		

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;
 - ☐ 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)) $^2/4,719$
- (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 Period	Criterion	
	Terrou		
Total suspended particulate matter (TSP)	Annual	90 μg/m³	
Particulate matter < 10 μm (PM ₁₀)	Annual	30 μg/m³	
Particulate matter <10 μm (PM ₁₀)	24-hour*	50 μg/m ³	
		Maximum increase	Total
Deposited Dust	Annual	2 g/m ² /month	4 g/m ² /month

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

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/m²/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.
 - 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;
 - □ 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

- (i) 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 - All site access is to be via the roundabout at East-West Link Road

Do not cause any heavy vehicle movements on Dunsters Lane,

except in an emergency

- Ensure that all loaded vehicles leaving the site are covered

• Prevent spillage of quarry material to the public road system.

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.

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 59

Requirement - Minimise waste generation and avoid the site becoming

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 - Store, handle and transport dangerous goods in accordance with

relevant Australian standards.

- Secure the site to ensure public safety.

- Minimise the risk of pollution in the event of a significant threat to the environment.

- Alert relevant agencies and the affected community in the event of significant pollution.

- Ensure that employees are familiar with emergency procedures.

- Integrate emergency management procedures for the quarry with

Cleary Bros emergency management plans

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;
 - 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;
- 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.

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 7.1 WEATHER MONITORING PARAMETERS

Parameter	Units
Temperature at 2 metres	K
Temperature at 10 metres	K
Total Solar Radiation at 10 metres	W/m^2
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.

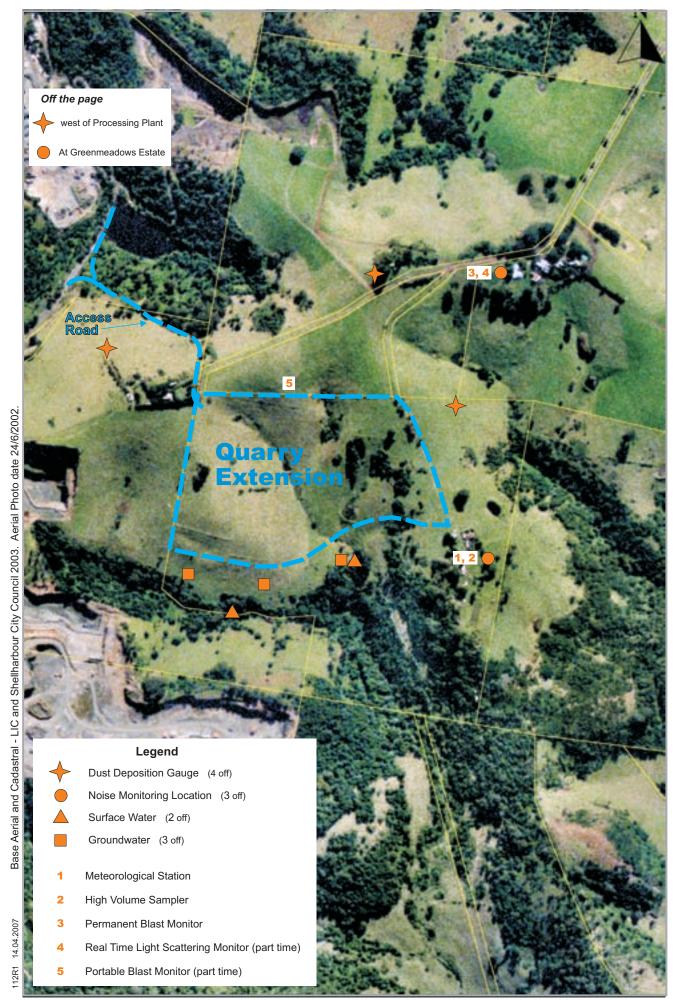


FIGURE 7.1 Location of Monitoring Devices

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 Belmont;
Deposition gauge	West of the administration area of the existing processing plant;
High Volume Sampler	Ridge top, south of Belmont
Real time light scattering monitor (new)	Adjacent to <i>The Cottage</i> (subject to owner permission)

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.

Real time continuous PM_{10} monitoring using the light scattering monitor 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.

The real time light scattering device shall monitor PM_{10} in proximity to receptors with information conveyed to the Quarry Production Manager by SMS remote telemetry. This device is to be calibrated monthly by taking it to the high volume sampler for a period of 24 hours. The results from both monitors will be compared to provide a calibration factor for the continuous sampler.

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.

An additional performance target applies to the continuous real time monitor. The Quarry Production Manager will receive telemetered notification if the continuous monitor records a one-hour average PM_{10} above 125 $\mu g/m^3$. This is to be correlated with observations from the on-site anemometer to determine if the wind direction is consistent with dust generation from the quarry.

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 ₄ , Cl, NO ₃ , NO ₂ , alkalinity, TKN, CO ₃ /HCO ₃ , 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 ₄ , Cl, CO ₃ /HCO ₃ , 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;
- 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
- 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:

- review and provide advice on the environmental performance of the quarry;
- 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:

- 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
- of 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:

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):

10639 of 2005

CORAM:

Hussey C; Brown C

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

APPLICANT

REPRESENTATIVES:

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 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.
- 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).
- 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

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

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:

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)

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

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

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

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

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

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

6

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

- 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.
 - 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.
 - The exhibits are returned with the exception of Exhibits C,1, 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

Figtree Hill Pty Limited

Applicant

Cleary Bros (Bombo) Pty Limited

First Respondent

Minister for Infrastructure and Planning

Second Respondent

Order

The orders of the Court are:

- 1. The appeal is dismissed.
- 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.

Ordered: 21 February 2006





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:

Cleary Bros (Bombo) Pty Ltd.

To:

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

Development Application:

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

State Significant Development:

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 1000

Integrated Development:

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.

Designated Development:

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.

Commencement of Consent:

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

Lapse of Consent:

Pursuant to section 95 of the Environmental Planning and Assessment Act 1979, 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.



SCHEDULE 2 DEFINITIONS

AEMR Annual Environmental Management Report

Applicant Cleary Bros (Bombo) Pty Ltd **Building Code of Australia BCA** Council Shellharbour City Council Development Application DA

DEC Department of Environment and Conservation

Department of Planning Department **Design Event**

90 percentile, 5 day rain event Director-General of the Department Planning, or delegate Director-General

DPI Department of Primary Industries

Any solid material that may become suspended in air or deposited Dust

EIS **Environmental Impact Statement Environmental Management Strategy** EMS

EP&A Act Environmental Planning and Assessment Act 1979

Environment Protection Licence issued under the Protection of the EPL

Environment Operations Act, 1997

Lots 4 and 5 in deposited plan 3709 in their present or succeeding titles] Fig Tree Hill Land

GTA General Terms of Approval

Heavy vehicle Any vehicle with a gross vehicle mass of 5 tonnes or more

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

Minister Minister for Planning, or delegate

POEO Act Protection of the Environment Operations Act 1997

Privately owned land Land not owned by the Applicant or its related companies or where a

private agreement does not exist between the Applicant and the land

Regulation Environmental Planning and Assessment Regulation 2000

RTA The Roads and Traffic Authority Land to which the DA applies Site

Stage The quarry development stages as described in the EIS





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.
- 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 Director-General arising from the Department's essessment 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.

Note: Amendment of any environmental management plan, strategy or monitoring program required under this consent shell be prepared and approved in accordance with the consultation and approved 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.
- 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;
- 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 quarry products from the quarry shall not exceed 400,000 tonnes per annum.
- 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.



Protection of Public Infrastructure

- 10. The Applicant shalf:
 - Repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and
 - 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

 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

- 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.
- 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

- 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
 - 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 19 ONME metre buffer area. The buffer may be used for landscaping, minor drainage works, noise/visus within alignment of the hauf road (including batters), as depicted on the plan in Appendix 3.

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

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

			Noise L	mits dB(A) Lac	a (Smoother State)
Receiver Locat	ions	n La Green	itages 1-2	Stages 34	¿Stages 5-6
The fall resider	tca (Dunster prem	ises)		288 m	84, 85
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Approved rural v	vorkers dwelling (Jurister de	185. 1		35.
premises)	Residential Estat				
			41 41	**************************************	33,41

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 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).

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Operating Hours

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

Activity		Days of the Wes	iks Time . Time
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	ng loading and haulage o v.to processing plant	Monday - Frida	. 530 pm - 530 pm
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President and the control of the con	activities, rehabilitation		
works//general plan	TO STATE OF THE PARTY OF THE PA		的。因为一个人的一个人的
product transfer to s	g and screening and to knies		

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;
 - workshop activities and other maintenance work inaudible at the nearest affected receiver.

Noise Monitoring Program

c)

- 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;
 - a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria
 in this consent; and
 - 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 Heggies 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:
 - e) 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

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

Airblast Overpressure Criteria

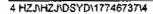
10. ⁶The Applicant shall ensure that the airblast overpressure level from blasting at the development does not exceed the criteria in Table 3 at any point that is located at least 3.5m from any residence or other sensitive receiver on privately owned (and.

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² Incorporates DEC GTA



NEW SOUTH WALES



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37. 315	5% of the total number of blasts over any 22 m	onth reporting period - "
12 120		

Table 3: Airbiast Overpressure Limits

Ground Vibration Criteria

11. ⁶The 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.

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reak particle velocity	Allowable exceedanc	English State of the Control of the
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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
 - 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

- 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 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:
 - 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. 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
 - 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;
 - (lii) 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	Averag	ing period Criterion
Total suspended par	pulate (TSP) metters : A	nnual 90 µg/m
Particulate matter 4	um (PMio)	nnual "45" - 30 pg/m²

Table 5: Long Term Impact Assessment Criteria for Particulate Matter

Pollutant 1	
Particulate matter < 10 µm (PMio)	

Table 6: Short Term Impact Assessment Criterion for Perticulate Matter

Poliutant Averaging Maximum increase in Max period deposited dust level deposit	led dust level
Deposited dust Annual 2, 2 g/m²/month, 4 g/	

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. 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. ¹¹The 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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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;
 - 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.

Parameter Units of Averaging measure period	Frequency Sampling method
Rainfalls (in	Contigueus : AM-4
Temperature @ 2 m	Conunious AMA
Temperature @ 10 m KC 3 45 45 34 hr 12 5	Continuous
Wint direction @ 10 m Compass points The Land	Continuous AM-2
Wind speed @ 10 m // m/s // 1/16 // see	Community AM-2
Signe Theta © 40m	Continuous C. AM-2
Total Sciar Radiation @ 10m W/m2. Unit 16 16 16 16 16 16 16 16 16 16 16 16 16	Continuous A.S. EAM.4.5
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Table 9: Meteorological Monitoring

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. ¹²Except 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

23. 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:

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

¹² incorporates DEC GTA

Pollutant Units of Measure	Maximum 2	Umit
TSS (VE 7: Wing/LL	504	
Property of the second	6546	

Table 10: Water Discharge Pollution Limits

Storm Water Management System

- 24. ¹³The 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. ¹⁴Within 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

 15The 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;
 - an Erosion and Sediment Control Plan;
 - c) a Surface Water Monitoring Program;
 - d) a Ground Water Monitoring Program; and
 - an Integrated Water Management Strategy, if the water balance shows a potential demand for water above that which can be collected from rainfall.
- 28. 16 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;
 - 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. 17The Eroslon and Sediment Control Plan shall:
 - 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;
 - 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.
- 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.



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¹⁵ Incorporates DEC GTA

¹⁶ Incorporates DEC GTA

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- 31. The Ground Water Monitoring Program shall include:
 - 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. ¹⁸The 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
 - 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
 - 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) define 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 Ptanted' 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;
- 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;
- 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:
 - identify the disturbed area at the site;
 - describe in general the short, medium, and long-term measures that would be implemented to rehabilitate the site;
 - 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/m² for the total area of disturbance at the development; and
 - \$3.00/m² 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 necessary revise, the sum of the rehabilitation bond to the satisfaction of the Director-General review must consider:
 - a) / the effects of inflation;
 - b) any changes to the total area of disturbance; and
 - 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

- The Applicant shall ensure that all loaded vehicles entering or leaving the site are covered.
- 50. The Applicant shall ensure all loaded vehicles teaving 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 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) a program for baseline ditapidation 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;
 - 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

The Applicant shall minimise the visual impacts of the development to the satisfaction of the Director-General.

Appeal No 10839 of 2005

- 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

 The Applicant shall minimise the amount of waste generated by the development to the satisfaction of the Director-General.

Waste Classification

59. ¹⁹All 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 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

 The Applicant shall secure the development to ensure public safety to the satisfaction of the Director-General.

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:
 - 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;
 - 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:
 - 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 collusions.
 - f) ensure that all relevant employees are familiar with the documentation; and

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^{19.} Incorporates DEC GTA

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 when developing this documentation, identify any opportunities to integrate with Cleary Bros Emergency plans.

BUSHFIRE MANAGEMENT

- 64. The Applicant shall:
 - ensure that the development is suitably equipped to respond to any fires on-site;
 - 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

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

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.
- 4. 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
 - 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 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).

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

- 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;
 - (f) 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;



- (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 8 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;
 - 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;
 - ensure that a copy of the relevant documents is made publicly available at the Applicant's regional office; and
 - put a copy of the relevant document/s on the Applicant's website (once established) to the satisfaction of the Director-General.

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- 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
- update these results on a regular basis (at least every 6 months), to the satisfaction of the Director-General.

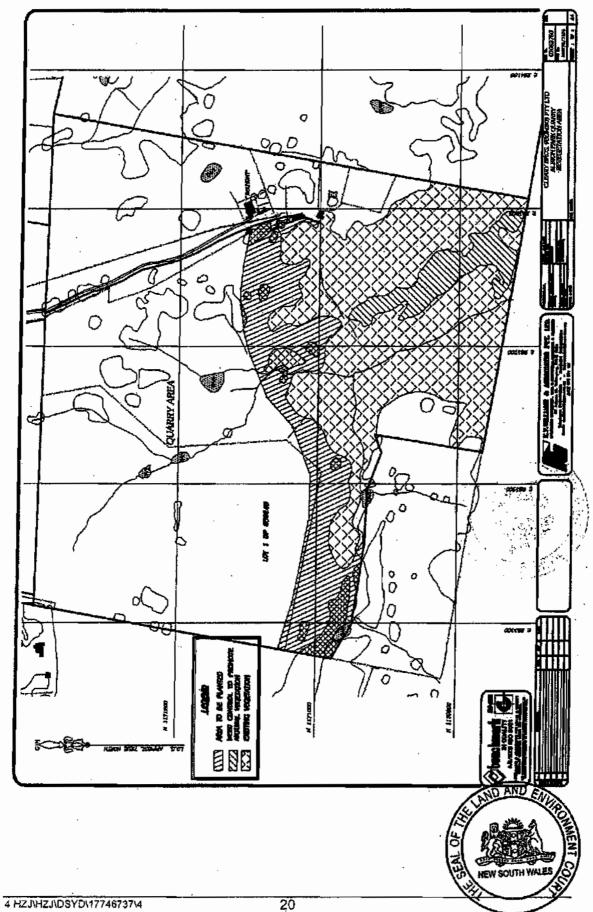
Note: The Applicant's environmental management plans/protocols should specify the reporting provisions for each environmental aspect.

R R Hussey Commissioner of the Court

Commissioner of the Court

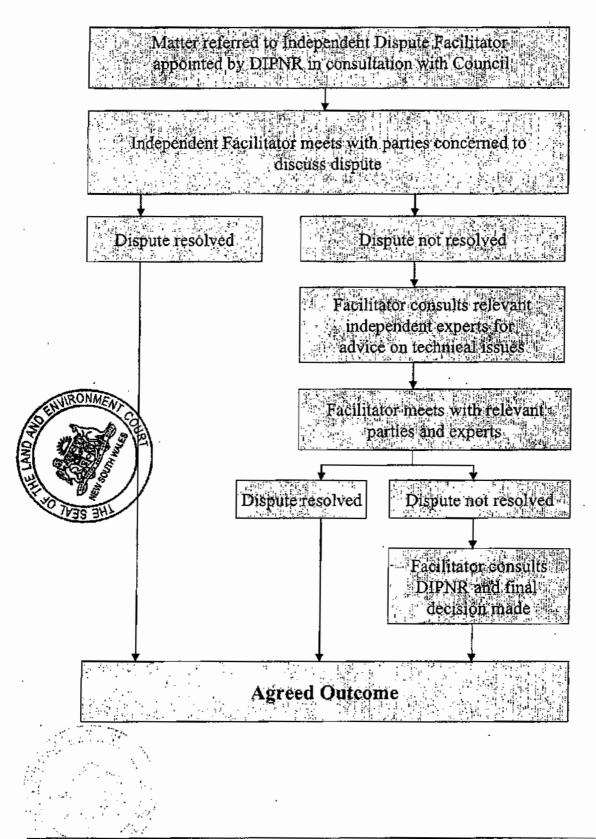


APPENDIX 1 REVEGETATION/REHABILITATION AREA

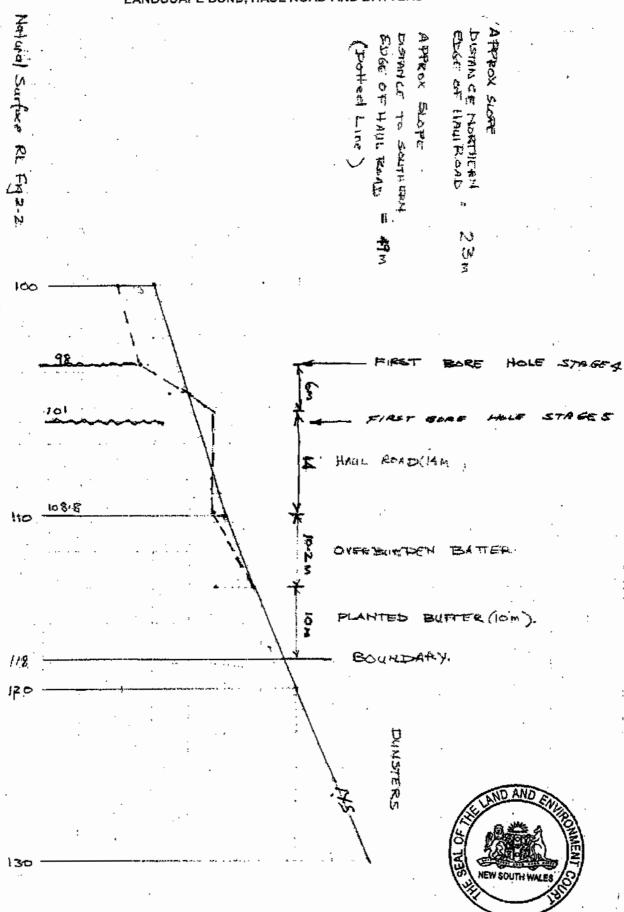


APPENDIX 2 INDEPENDENT DISPUTE RESOLUTION PROCESS

Independent Dispute Resolution Process (Indicative only):



APPENDIX 3 LANDSCAPE BUND, HAUL ROAD AND BATTERS



Appendix B

ACCESS ROAD DEVELOPMENT CONSENT



1 1 MAY 2007

FULL GOOD

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 NGW 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

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LOT: 23 DP: 1039967 PRINCES HIGHWAY, CROOM

BUILDING CODE DE 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)
 - appoint a principal certifying authority (S81A).

ADMINISTRATION CENTRE; Lamerton House Lamerton Cresnent Shellharbour City

COUNCIL MEETING CHAMBER: Cor Shellharbour & Lake Entrance Roads, Warilla

Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

LEGISLATION

 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

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

 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

- The applicant must carry out the development generally in accordance with:
 - DA No. 614/2006 and accompanying documentation
 - b. Conditions of this consent.
- 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.

Development Application No. 614/2006 Lots 1 & 2, DP 658245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

- The applicant must comply with any reasonable requirement/s of Shellharbour City Council arising from assessment of:
 - any reports, plans or correspondence that are submitted in accordance with this a. consent, and

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the implementation of any actions or measures contained in these reports, plans or correspondence.

Period of Approval

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

Operation of Plant & Equipment

- The applicant must ensure that all plant and equipment at the site, or used in connection with the development are:
 - maintained in a proper and efficient condition, and a,
 - operated in a proper and efficient manner.

ENVIRONMENTAL PERFORMANCE

Identification of Boundaries

- Prior to the commencement of works, the applicant must:
 - engage a registered surveyor to mark out the boundaries of the haul road corridor
 - submit a survey plan of these boundaries to Shellharbour City Council, and b.
 - ensure that these boundaries are clearly marked at all times in a permanent C. manner that allows operating staff and inspecting officers to clearly identify those limits.

Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters 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

- The following activities may be carried out at the premises outside the hours specified in Table 1:
 - 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
 - workshop activities and other maintenance work inaudible a the nearest affected receiver.

AIR QUALITY

Air Quality Criteria

19. 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 2, 3 & 4 at any sensitive receiver or residence on privately owned land.

Pollutanit	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 pg/m³
Particulate matter < 10pm (PM ₁₀)	Annual	30 pg/m ³

Table 2: Long Term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10pm	24 hour	50 pg/m ³
(PM ₁₀)	·	

Table 3: Short Term Impact Assessment Criterion for Particulate Matter

-5-

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/m²/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.
- 21. 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
 - 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.

Reporting

- Each year, the applicant must:
 - a. review the Erosion & Sediment Control Plan

Development Application No. £14/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

- b. update the plan, and
- c. 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
 - details of the measures undertaken/proposed to address any identified issues.

FLORA & FAUNA

Vegetation Clearing Protocol

- 26. Prior to the commercement 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;
 - 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.

Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lans & 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.

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- 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 qualified 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

- 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:
 - identify the discurbed area at the site
 - 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 vears to rehabilitate the site, and
 - describe how the performance of these measures would be monitored over time. d.

Reporting

The applicant must include a progress report on the Rehabilitation Management Plan in the AEMR.

TRAFFIC & TRANSPORT

Site Access

- All access to the guarry extension site (following construction of the haul road) is to be via the roundabout at East/West Link Road.
- 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. 814/2006 Lots 1 & 2, DP 858245, 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.

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

- To minimise any possible adverse environmental impacts of the proposed development.
- 2. To ensure that the amenity and character of the surrounding area is protected.
- 3. To ensure that the design and siting of the development complies with the provisions of Environmental Planning Instruments and Council's Codes and Policies.
- 4. To ensure that the development does not conflict with the public interest.

SUPPLEMENTARY ADVICE

- 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.

Development Application No. 614/2006 Lots 1 & 2, DP 858245, Dunsters Lane & Lot 23, DP 1039967, Princes Highway, Croom

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 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 98 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 132866.

6. Erection of Signs

A maximum penalty of 10 penalty units (\$1,100) applies for fallure to erect and maintain sign(s) detailing principal contractor and principal certifying 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
- ii. prior to covering any stormwater drainage connections
- 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 (Bombo) 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

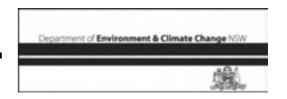
Manager Development Services

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:	11lul-2010

Licensee
CLEARY BROS (BOMBO) PTY LTD
PO BOX 210
PORT KEMBLA NSW 2505

Licence Type	
Premises	

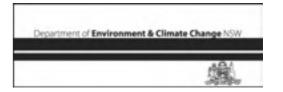
<u>Premises</u>
CLEARY BROS (BOMBO) PTY LTD
LOT 3 PRINCES HIGHWAY
ALBION PARK RAIL NSW 2527

Scheduled Activity	
Concrete Works	
Extractive Industries	
Mines	

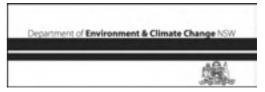
Fee Based Activity	<u>Scale</u>
Concrete Batching (30)	> 13000 - 25000 m3 produced
Hard-Rock Gravel Quarrying (36)	> 100000 - 500000 T obtained
Mining (Other than Coal) (64)	> 100000 - 500000 T obtained

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





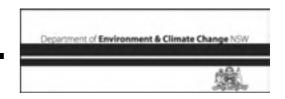
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Licence - 299



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.

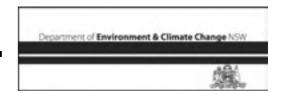
Fees and annual return to be sent to the EPA

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.

Licence - 299



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.

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.

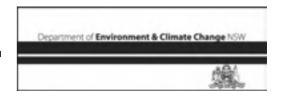
1 Administrative conditions

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.

Environment Protection Authority - NSW
Archived: 12-Dec-2007

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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.

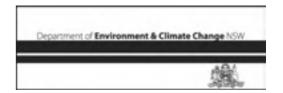
A2 Premises to which this licence applies

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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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:

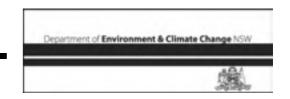
- (a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- (b) the licence information form provided by the licensee to the EPA to assist the EPA 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.

Licence - 299



Air

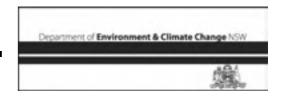
EPA Identi-	Type of Monitoring Point	Type of Discharge Point	Description of Location
1	Dust deposition monitoring		APD 1 - approximately 200 metres west of the crushing and screening plant and labelled as APD1 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
2	Dust deposition 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-	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

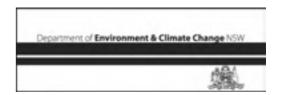
- L3.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.
- L3.2 Where a pH 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

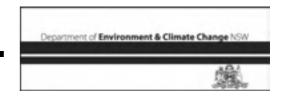
- L6.1 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not:
 - (a) Exceed 5mm/sec for more than five per cent of the total number of blasts carried out on the premises within the 12 months annual reporting period.
- L6.2 The overpressure level 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

Licence - 299



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.

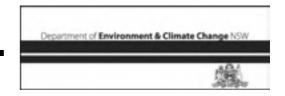
O4.2 A minimum of 2500 square metres must be retained for use as the wastewater utilisation area.

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
- (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

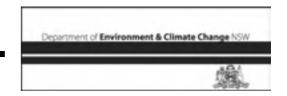
POINT 4

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.

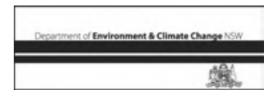
M4 Recording of pollution complaints

- 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

Licence - 299



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.

- 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

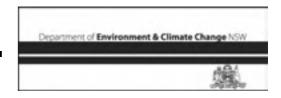
- M7.1 Each production blast must be monitored and recorded at the permanent station established near the Dunster residence.
- M7.2 To determine compliance with Conditions L6.1 and L6.2:
 - (a) Airblast overpressure and ground vibration levels must be measured for all production blasts carried out in 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.

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

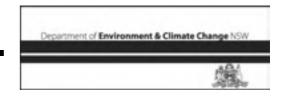
R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

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.

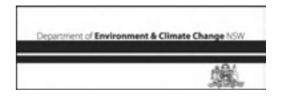
R3 Written report

- 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

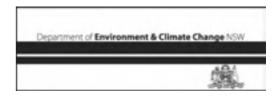
General Dictionary

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

AM 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

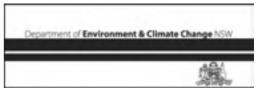
industrial waste Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

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 Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998 protocol 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 Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit relation to a specified in the licence for that pollutant over a specified period of time. In this licence, the specified period concentration limit of time is the Reporting Period unless otherwise stated in this licence. of a sample] plant Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles. pollution of waters Has the same meaning as in the Protection of the Environment Operations Act 1997 [or water pollution] Means the premises described in condition A2.1 premises 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. Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act reprocessing of 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 TM 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

TSP Means total suspended particles

TSS Means total suspended solids

Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or Type 1 substance

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 Notes

- Licence varied by notice 1003792, issued on 17-Jul-2002, which came into effect on 11-Aug-2002.
- Licence varied by notice 1038336, issued on 30-Jun-2004, which came into effect on 05-Jul-2004.
- 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

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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. <u>Vegetation Management Plan</u>

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.

PART 2. 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.
- Obtaining plant stock. 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

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.

a. Weeds

Remove the following weeds, if present:

African Box Thorn

Lantana

Prickly Pear

b. Plantings

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.

a. Weeds

Remove the following weeds as soon as possible, if present:

African Box Thorn

Lantana

Prickly Pear

b. Plantings

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.

Plant Size

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.

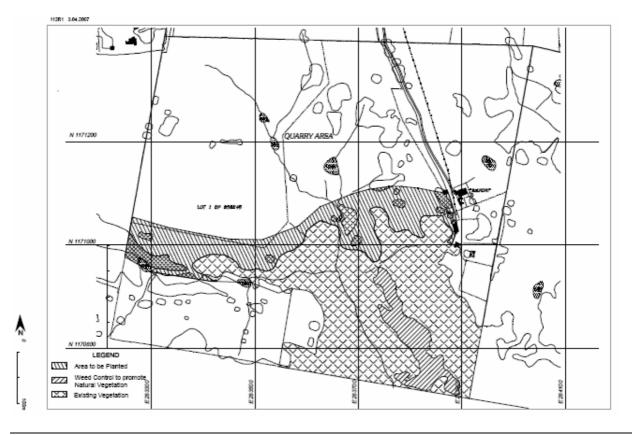
- 6.13 <u>Use of mulched debris</u>. All trees and shrubs cleared from the construction area to be mulched on site, the mulch to be utilised on site in landscaping or forest restoration works. Mulch containing weed propagation material (e.g. seeds) must be heap composted to ensure this material is rendered 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.



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					
Cynanchum elegans	White Cynanchum	Vine			
Daphnandra sp. 'C' (Illawarra)	Illawarra Socketwood	Tree			
Zieria granulata	Illawarra Zieria	Shrub			
Regionally Significant Plant Species					
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. augustifolia	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, although it appears that this area is heavily grazed, so it is possible that emergent seedlings are regularly eaten. 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

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.

Fencing

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 Species	in the	Quarry Area

Species	Habit	Status/Notes
Noxious Weeds African Box-thorn Lycium ferocissimum	Shrub	Noxious (W2). Rare on the site.
Blackberry <i>Rubus fruticosus</i>	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 <i>Ligustrum lucidum</i>	Small tree	Occasional in treed areas.
Madeira Vine Anredera cordifolia	Vine	Occasional to common amongst Lantana.
Mist Flower Ageratina riparia	Shrub	Common in moist areas.

Moth Vine Vine Common amongst Lantana.

Araujia sericiflora

Noogoora Burr Large herb Mainly on disturbed areas.

Xanthium occidentale

Small-leaved Privet Shrub, small tree Occasional in treed areas.

Ligustrum sinense

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
c - common
o - occasional
u - uncommon

5. shrubland/regrowth # - plant species of conservation

6. sedgeland/rushland (dams) importance.

* - Introduced plants.

FAMILY	GENUS SPECIES	*	1	2	3	4	5	6
FILICOPSIDA								
Adiantaceae	Adiantum aethiopicum		×	u				
	Adiantum formosum		X	u				
	Adiantum hispidulum		X	u	u			
	Cheilanthes distans		×					
	Cheilanthes sieberi		×		u	u	u	
Aspidiaceae	Asplenium australasicum		×	u				
	Asplenium flabellifolium		×	0	u			
	Lastreopsis acuminata		×	٦				
	Lastreopsis microsora		×	٦				
Azollaceae	Azolla filiculoides						0	
Blechnaceae	Blechnum cartilagineum		×	u				
	Doodia aspera		×		u		u	
Davalliaceae	Arthropteris tenella		×	0				
Dennstaedtiaceae	Histiopteris incisa			0				
	Hypolepis muelleri			a				
	Hypolepis glandulifera			u				
	Pteridium esculentum			0				
Dicksoniaceae	Calochlaena dubia		X			u		
Polypodiaceae	Microsorium scandens		X		u			
	Platycerium bifurcatum		X	u	u			
	subsp. bifurcatum							
	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		х			u		
Amygdalaceae	Prunus persica	*					u	
Anacardiaceae	Euroschinus falcata		X	u				
Apiaceae	Centella asiatica				0		0	
	Hydrocotyle peduncularis		×					
	Hydrocotyle tripartita				u			
	Platysace ericoides		×					
Apocynaceae	Parsonsia straminea		X	С	0			
Araliaceae	Polyscias elegans		×	0				
Asclepiadaceae	Araujia sericiflora	*		0	0		0	
	Cynanchum elegans	#	×	u			u	
	Gomphocarpus fruticosus	*	×			u		
	Marsdenia flavescens		×	С				
	Marsdenia rostrata		×	0				
	Melodinus australis		×	u				
	Tylophora barbata		×		0		u	
Asteraceae	Ageratina adenophora	*	X	0				0
	Ageratina riparia	*	X	0	0			
	Bidens pilosa	*	X			0		
	Brachycome angustifolia var		X					
	angustifolia							
	Cassinia trinervia		X		u		u	
	Cirsium vulgare	*	X			0		
	Conyza albida	*	X		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	*	X			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-	*	×					u
	aqauticum							
Cactaceae	Opuntia stricta	*	×			0		
Campanulaceae	Wahlenbergia gracilis		×		0	0	u	
Caprifoliaceae	Lonicera japonica	*					u	

	Sambucus australasius		×	u			u	
Caryophyllaceae	Stellaria flaccida		×	0	u		u	
Celastraceae	Elaeodendron australe		×	С	u		u	
Celus II aceae	Celastrus australis		×	u			u	
Chenopodiaceae	Einadia hastata		×	u		u		
Chenopoulaceae	Einadia nutans		×			u		
Clusiaceae	Hypericum gramineum		^			0		
Convolvulaceae	Convolvulus erubescens		×		и	U		
Convolvulaceae			-					
	Dichondra repens	*	×		u	0	u	
Cradulana	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		X	u	0		0	
	Claoxylon australe		X	u				
	Croton verreauxii		X	0			n	
	Glochidion ferdinandi		X	0				
	Omalanthus populifolius		X	С	0		u	
	Omalanthus stillingifolius	#	X					
	Phyllanthus gasstroemii		X		u			
	Ricinus communis	*	X			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		×		u		и	
	Kennedia rubicunda		×			u	u	
	Trifolium repens	*	-``	1		_	<u> </u>	

	Trifolium subterranean	*	X			С		
Fabaceae: Mimosoideae	Acacia binervata				0		0	
	Acacia implexa		X		0		u	
	Acacia maidenii		X		u			
	Acacia mearnsii		X		0		С	
	Acacia melanoxylon				u			
	Pararchidendron pruinosum		X	u				
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		X	С			0	
	Litsea reticulata		X	0				
Lobeliaceae	Pratia purpurascens				0			
Loranthaceae	Amyema congener		X	u			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		X	u			u	
Menispermaceae	Legnephora moorei		X	u			u	
	Sarcopetalum harveyanum		X	0			u	
	Stephania japonica var.		×	u			u	
	discolor							
Monimiaceae	Daphnandra sp. aff.	#	×	u				
	micrantha (species 'C')							
	Doryphora sassafras		×	u				
	Wilkiea huegeliana		×	u				
Moraceae	Ficus coronata		×	0			u	
	Ficus macrophylla		×	0		0		
	Ficus obliqua		×	u				
	Ficus rubignosa		X	u				

	Ficus superba var. henneana		×			0		
	Maclura cochinchinensis		X	u c		0	0	
	Malaisia scandens		X	0			u	
	Strebulus brunonianus		^ ×	С	0		0	
Myrsinaceae	Rapanea howittiana		^ ×	и	0		0	
Myrsmaceae	Rapanea variabilis		X	u				
Myntacasa	Acmena smithii							
Myrtaceae			X	С			u	
	Angophora floribunda		X		u			
	Austromyrtus acmenoides	#	X	u				
	Eucalyptus amplifolia		X					
	Eucalyptus bosistoana		X		0			
	Eucalyptus quadrangulata		X		0			
	Eucalyptus tereticornis		X		С			
	Melaleuca armillaris		X		u		С	
	Melaleuca styphelioides		X		u			
	Syzygium australe		X	0				
Oleaceae	Ligustrum lucidum	*					u	
	Ligustrum sinense	*	X			u	u	
	Notolaea longifolia		X		u			
	Notolaea venosa		X	0			u	
	Olea europaea subsp.	*	X			u	u	
	africana							
Onagraceae	Ludwigia peploides subsp.	*	X					u
	montevidensis							
Passifloraceae	Passiflora herbertiana		X	u	u		u	
Phytolaccaceae	Phytolacca octandra	*	X			u		
Piperaceae	Piper novae-hollandiae		×	u				
Pittosporaceae	Billardiera scandens				u			
	Bursaria spinosa		X				0	
	Citriobatus pauciflorus		X	С			0	
	Pittosporum revolutum		X	0			u	
	Pittosporum undulatum		X	0	0		0	
Plantaginaceae	Plantago lanceolata	*	х			0		
	Plantago major	*	X					0
Polygonaceae	Acetosella vulgaris	*	X				u	
	Muehlenbergia gracillima		×	и				
	Persicaria decipens		×					u
	Persicaria hydropiper		×					u
	Rumex crispus	*	×					u
Portulacaceae	Portulaca octandra	*	^			0		u
Proteaceae	Stenocarpus salignus		X	u	u			
Ranunculaceae	Clematis aristata		^	u				
Rununculaceae					u		,.	
Dhamnassas	Clematis glycinoides		X	u	_		u	
Rhamnaceae	Alphitonia excelsa	<u> </u>	X	С	0	<u> </u>	0	<u> </u>

	Emmenosperma alphitonoides		×	u				
	Pomaderris aspera		X				u	
Rosaceae	Rubus fruticosus sp.	*	X			0	u	
	aggregate							
	Rubus hillii		×		u			
	Rubus parviflorus		X		0			
	Rubus rosifolius			u				
Rubiaceae	Canthium coprosmoides		X	u				
	Coprosma quadrifida (?)		X					
	Morinda jasminoides		X	u				
	Psychotria loniceroides		X	u				
Rutaceae	Acronychia oblongifolia		X	f				
	Citrus limonia	*	X			u		
	Geijera latifolia		X	0			u	
	Melicope micrococca		X	0			u	
	Sarcomelicope simplicifolia		×	u				
	Zieria granulata	#	×				0	
Santalaceae	Exocarpos cupressiformis		X		u		u	
Sapindaceae	Alectryon subcinerus		X	0			u	
	Cardiospermum grandiflorum	*	X	0	0		0	
	Diploglottis australis		X	0				
	Dodonaea viscosa subsp.	#	X				0	
	angustifolia							
	Guioa semiglauca		X	0			u	
Sapotaceae	Pouteria australe		X	0			r	
Scrophulariaceae	Verbascum thapsus	*	X			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			J		
	Solanum pseudocapsicum	*	X			J		
	Solanum stelligerum		×			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		×	0	u		u	
	Lantana camara	*	×	С	С		С	
	Verbena bonariensis	*	×			0		

Violaceae	Hymenanthera dentata		×	О			и	
	Viola hederacea		×		и		и	
Vitaceae	Cayratia clematidea		x	u				
	Cissus antarctica		x	u				
	Cissus hypoglauca		X	0			u	
MONOCOTYLEDONS	77. 3							
Alismataceae	Alizma plantago-aquatica							u
Araceae	Gymnostachys anceps		X	u				
Arecaceae	Livistonia australis		X	0				
Commelinaceae	Aneilema acuminatum		X	0				
	Commelina cyanea		X	0				
	Pollia crispata		X	u				
Cyperaceae	Bolboschoenus caldwelli		X					u
••	Carex appressa		X			u		
	Carex longebrachiata		X		u	u	u	
	Cyperus eragrostis	*						u
	Cyperus imbecillis				u			
	Cyperus polystachyos		X					u
	Eleocharis sphacelata		X					u
	Isolepis prolifera	*					С	
Iridaceae	Romulea longifolia	*	X			0		
Juncaceae	Juncus usitatus		X					0
Lemnaceae	Spirodela oligorrhiza		X					0
Philesiaceae	Eustrephus latifolius		X	0	0			
	Geitonoplesium cymosum		X	0	0			
Poaceae	Andropogon virginicus	*	X			0		
	Aristida ramosa		X		0	0		
	Aristida vagans				0			
	Axonopus affinis	*	×			0		
	Bothriochloa macra		×		u			
	Chloris gayana	*	×			0		
	Chloris truncata		X		u			
	Cynodon dactylon		X		0	u	u	
	Danthonia tenuior				0			
	Echinopogon caespitosus		X		0	0		
	Microlaena stipoides		X		u			
	Oplismenus aemulus			C	С			
	Oplismenus imbecillis		X	С	С		u	
	Paspalum dilatatum	*	×			С	u	
	Paspalum distichum		×					u
	Pennisetum clandestinum	*	×		0	С		0
	Poa labillardieri		×		0	0		
	Sporobolus indicus var.	*	×			u		
	capensis							

	Stenotraphrum secundatum	*	X			u		
	Stipa ramosissima		X		0		J	
	Themeda australis		×		0		0	
Orchidaceae	Dendrobium speciosum		×					
	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 Wallabia bicolor
Fox* Vulpes vulpes

Rabbit* Oryctolagus cuniculus

Domestic Cattle*

Bos taurus

Birds

Australian Magpie Gymnorhina tibicen Australian Raven Corvus coronoides Australian Wood Duck Chenonetta jubata Geopelia humeralis Bar-shouldered Dove Black-shouldered Kite Elanus axillaris Brown Gerygone Gerygone mouki Brown Thornbill Acanthiza pusilla Chestnut Teal Anas castanea

Clamorous Reed-Warbler

Common Mynah*

Common Starling*

Crimson Rosella

Eastern Rosella

Acrocephalus stentoreus

Acridotheres tristis

Sturnus vulgaris

Platycercus elegans

Platycercus eximius

Eastern Spinebill Acanthorhynchus tenuirostris

Eastern Whipbird Psophodes olivaceus
European Goldfinch* Carduelis carduelis

Fan-tailed Cuckoo Cacomantis flabelliformis Green Catbird Ailuroedus crassirostris Grey Butcherbird Cracticus torquatus Grey Fantail Rhipidura fuliginosa Grey Shrike-thrush Collurincincla harmonica Passer domesticus House Sparrow* Latham's Snipe Gallinago hardwickii Laughing Kookaburra Dacelo novaeguineae Lewin's Honeyeater Meliphaga lewinii

Little Eagle Hieraaetus morphnoides
Magpie-lark Grallina cyanoleuca
Masked Lapwing Vanellus miles

Mistletoebird Dicaeum hirundinaceum

Nankeen Kestrel

Noisy Friarbird

Pacific Black Duck

Pied Currawong

Purple Swamphen

Red-browed Finch

Red-whiskered Bulbul*

Falco cenchroides

Philemon corniculatus

Anas superciliosa

Strepera graculina

Porphyrio porphyrio

Neochmia temporalis

Pycnonotus jocosus

Richard's Pipit Anthus novaeseelandiae Satin Bowerbird Ptilonorhynchus violaceus

Silvereye Zosterops lateralis
Spotted Turtle-Dove* Streptopelia chinensis
Superb Fairy-wren Malurus cyaneus

Fortunat Diagon / anhalaimus antara

Topknot Pigeon Lopholaimus antarcticus

Tree Martin

Welcome Swallow

White-browed Scrubwren

White-faced Heron

Willie Wagtail

Hirundo nigricans

Hirundo neoxena

Sericornis frontalis

Egretta novaehollandiae

Rhipidura leucophrys

Yellow Thornbill Acanthiza nana

Yellow-rumped Thornbill Acanthiza chrysorrhoa

Frogs

Brown-striped Frog Limnodynastes peronii
Common Eastern Froglet Crinia signifera

Reptiles

Grass Skink

Lampropholis guichenoti

Long-necked Tortoise

Red-bellied Black Snake

Chelodina longicollis

Pseudechis porphyriacus

* - Introduced species.

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

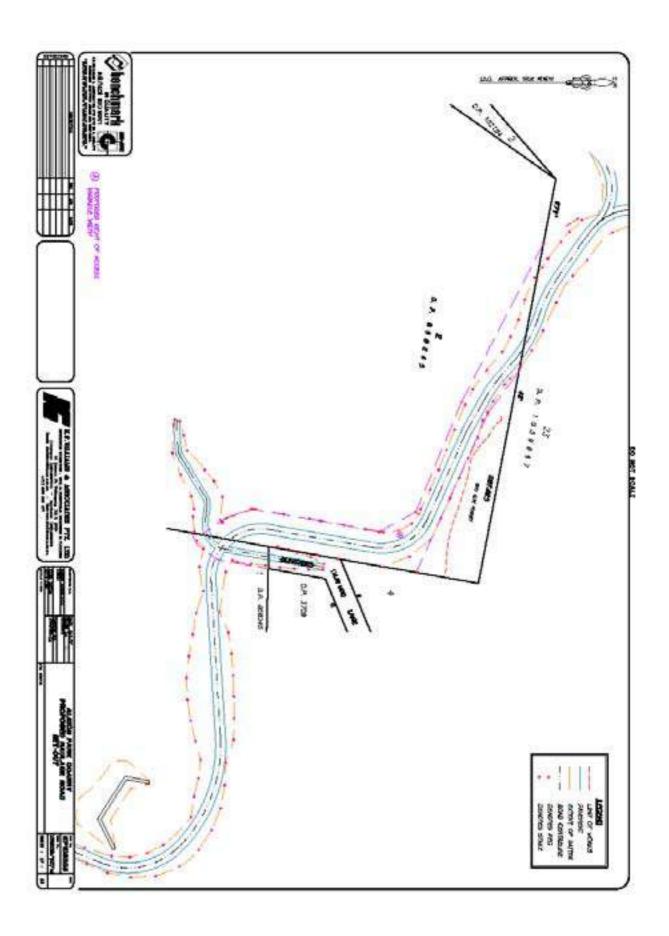
It is not anticipated that rehabilitation of the haul road will be required during the next five years, as the quarry is a 30-year project.

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

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:

Table 1 QUARRY EXTENSION WATER DEMAND

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
Fire fighting	Collected rainfall runoff	nil

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

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.

Table 2 QUARRY EXTENSION WATER SUPPLY

Stage	Additional Catchment (hectares)	Cumulative Catchment (hectares)	Average Annual Runoff (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

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

CLEARY BROS (BOMBO) PTY LTD

QUARRY DIVISION

ALBION PARK QUARRY WORK INSTRUCTIONS

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Issue: 2 Rev: 2	CLEARY BROS (BOMBO) PTY LTD - QUARRY DIVISION Albion Park Quarry Work Instruction	No: WIAPQ10 Rage: 1
Date: 24/10/06	Emergency Procedures	Appriland

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

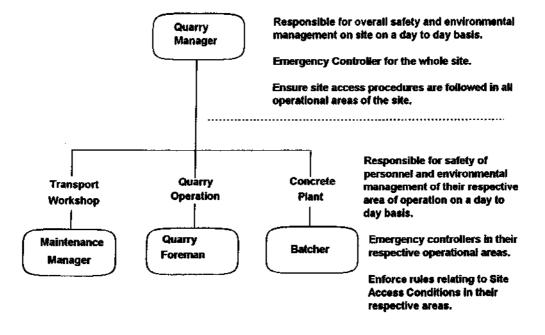
Incident: - An unplanned event which causes or has the potential to cause injury, damage or environmental failure.

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



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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.

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Date: 21/11/05	Emergency Procedures	Appr:

 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.

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- 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.

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Date: 17/12/03	Emergency Procedures	Appr: blow

- 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.

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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

[ssue: 2 Rev: 1	CLEARY BROS (BOMBO) PTY LTD - QUARRY DIVISION Albion Park Quarry Work Instruction	No: WIAPQ10 Page: 7
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4.2 Procedure for dealing with fire impinging on flammable materials or other cylinders.



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

-	_	•	\mathbf{T}	
r	IJ		лч	И.

Emergency 000 "Police" Warilla 42952699
Albion Park 42561044

FIRE BRIGADE

Emergency 000 Shellhabour-Kiama Bush Fire 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

Emergency Inquiries 132090

EMERGENCY CONTROLLERS

 Operations Manager
 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 a		Internal Quality Auditor Cleary Bros (Bombo) Pty PO Box 210 Port Kembla		
NAME:				
ADDRESS – No & Street: Suburb: Postcode:		PHONE	- Home: Work:	
	Details:			
YOUR SUGGESTION IS I How do you suggest that we who are in a similar position	e resolve the issu	e to your satisfaction and/o	or ensure that you and other cu	stomers
			ur customer. People such as yo y of maintaining customer serv	
SIGNATURES				
Customer:		Cleary Bros Representat	ive:	
OFFICE USE				
		er:NCI	R/CAR Number:	
Perceived Effectiveness	of Response:			

Cleary Bros Concrete & Quarrying Customer Complaint & Feedback Register

Plant/Quarry: _

Feedback Made	nplaint	Complaint NCR/CAR	Date	Name of	Brief Description of Complaint or Feedback	Handled by	Closed	No Customer
	ber ber	o Z	Complaint or Feedback	Person			5	Feedback Forms Since Last Man
			Made					Neview



APPENDIX 4:

"NSW Trade & Investment Resources & Energy Correspondence"



Out12/23762 FILE 12/1754#2

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



APPENDIX 5:

"Air Quality Impact Assessment"



Albion Park Quarry
Proposed Expanded Operation
Air Quality Impact Assessment

Report Number 610.12049-R1D2

11 December 2012

MMJ Wollongong 6-8 Regent Street Wollongong, NSW 2500

Version:Revision 0

Albion Park Quarry Proposed Expanded Operation 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.

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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 Consulting.

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DOCUMENT CONTROL

Reference	Status	Status Date Prepared		Checked	Authorised	
610.12049-R1	Revision 0	11 December 2012	F Rahaman	K Lawrence	K Lawrence	

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APPENDICES

Appendix A Meteorological Data File Appendix B **Emission Calculations**

1 INTRODUCTION

MMJ Wollongong (MMJ) commissioned SLR Consulting Australia Pty Ltd (SLR Consulting) to conduct an air quality impact assessment for a proposed annual production rate increase at the Albion Park hard rock quarry, operated by Cleary Bros (Bombo) Pty Ltd (The Proponent). The quarry is currently operating with an annual extraction rate of 600,000 tonnes per annum (tpa) and the proponent is seeking approval to extract up to 900,000 tpa.

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 Albion Park hard rock quarry, 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 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 has again been commissioned to conduct additional atmospheric dispersion modelling for an increase in the annual extraction rate at the Albion Park hard rock quarry, which is the focus of this report. The objective of the assessment is to assess the potential air quality impacts associated with increasing the extraction rate to 900,000 tpa.

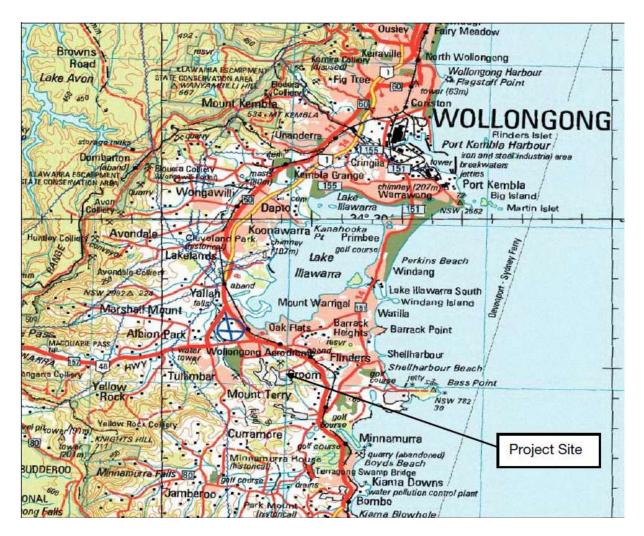
The proposed increase in annual extraction rate is relatively minor (12.5%) compared to that assessed in the previous assessment (Heggies, 2008) and no major changes in the infrastructure or local topography (such as new stockpiles or bunds) would be required for the proposed annual production rate incraese. The local meteorology and dispersion patterns of relevant pollutants are therefore likely to be similar. Given this, additional modelling to quantify the incremental and cumulative impacts at surrounding areas for the proposed operations is not considered to be warranted and a semi-quantitative assessment has been performed instead.

Particulate emissions for the existing and the proposed scenario have been estimated based on operational data and the latest emission factors available from the National Pollutant Inventory (NPI) and USEPA AP42 documents. To estimate the incremental off-site impact for the proposed operation, the predicted results from the 2008 assessment were scaled based on the ratio of the estimated particulate (TSP and PM_{10} ,) emissions for the proposed increased annual production rate with that presented in the previous 2008 assessment (Heggies, 2008). Ambient monitoring data collected in recent years (2010 to present) were also used to estimate the conservative background level for each pollutant of interest (TSP, PM_{10} and dust deposition).

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 1** illustrates the regional setting of the Project Site.

Figure 1 Regional Setting of the Project Site



2.1 Sensitive Receptors

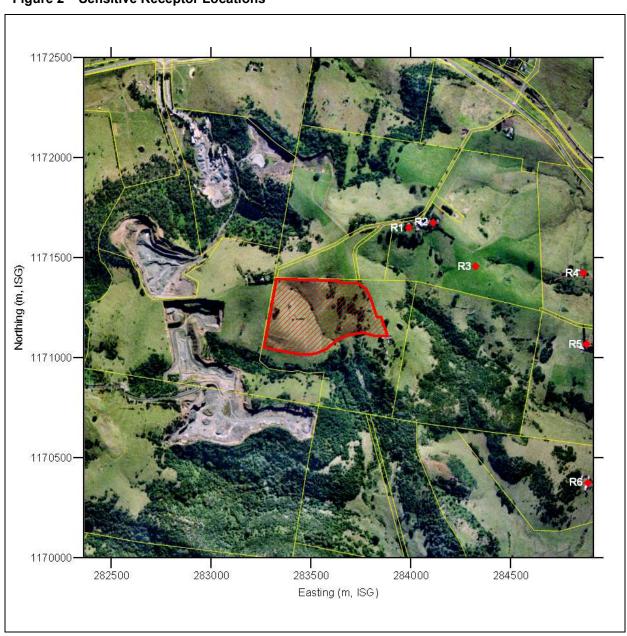
A number of non-project related residential dwellings are situated in the area surrounding the Project Site. The nearest dwellings were identified as sensitive receptor locations to be taken into account during the assessment of potential air quality impacts due to the expanded operations.

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 2** illustrates the location of the surrounding receptors in relation to the Project Site.

Table 1 Surrounding Sensitive Receptor Locations

Receptor	Receptor Name	Location (m, ISG)	Distance (m) / Direction	Elevation	
ID		Easting	Northing	from Site Boundary	(m, AHD)	
R1	The Cottage	368,240	6394,059	330 / NE	140	
R2	The Hill	368,210	6393,741	440 / NE	140	
R3	Approved Property	368,892	6393,790	520 / ENE	110	
R4	St Ives Farm	369,606	6393,776	1020 / E	60	
R5	Deer Farm	369,421	6393,895	970 / E	70	
R6	Kurrawong	369,306	6394,140	1180 / SE	50	

Figure 2 Sensitive Receptor Locations

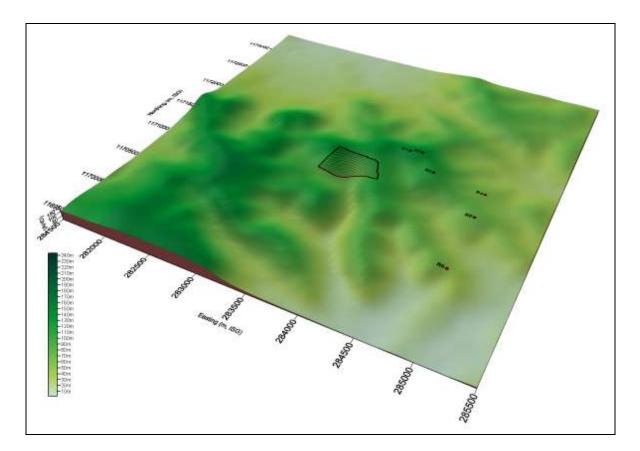


SOURCE: Albion Park Quarry EIS (2008)

2.2 Surrounding Topography

A three dimensional representation of the topographical features in the region surrounding the Project Site is presented in **Figure 3**.

Figure 3 Local Topography Surrounding the Project Site



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 and 800,000 tpa (Reports 10-1676R1, 10-1676R2 and 10-7319R1 respectively).

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 (NO_2) , sulphur dioxide (SO_2) , carbon monoxide (CO) 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. These pollutants have therefore not been considered further in this assessment.

3.2 Health-Based Criteria Applicable to Particulate Matter

The term "particulate matter" refers to a category of airborne particles typically less than 50 microns (μ m) in diameter and ranging down to 0.1 μ m in size. Particles less than 10 μ m are referred to in this report as PM₁₀.

Emissions of PM_{10} are considered important pollutants in terms of impact due to their ability to penetrate into the respiratory system. Potential adverse health impacts associated with exposure to PM_{10} include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children. The NSW Office of Environment and Heritage (OEH) PM_{10} impact assessment criteria, as expressed in the NSW Approved Methods for the Modelling and assessment of Air Pollutants in NSW, 2005 (hereafter referred to as the "Approved Methods"), are presented in **Table 2**.

Table 2 OEH 24-Hour and Annual Average Assessment Criteria for PM₁₀

Averaging Period	Maximum Concentration
24-hour	50 μg/m³
Annual	30 µg/m³

Source: Approved Methods, OEH 2005

The 24-hour PM_{10} reporting standard of 50 $\mu g/m^3$ is numerically identical to the equivalent National Environment Protection Measure Ambient Air Quality (Air NEPM) reporting standard except that the NEPM reporting standard allows for five exceedances per year.

3.3 Nuisance Impacts of Fugitive Emissions

The criteria for PM_{10} 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 $g/m^2/month$.

Table 3 presents the OEH 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 OEH Goals for Allowable Dust Deposition

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m ² /month	4 g/m ² /month

Source: Approved Methods, 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 OEH air quality criteria, are summarised in **Table 4**.

Table 4 Adopted Project Air Quality Goals

Pollutant	Averaging Time	Goal
PM ₁₀	24 hours Annual	50 μg/m³ 30 μg/m³
Dust Deposition (Project only)	Annual	2 g/m ² /month
Dust Deposition (Cumulative)	Annual	4 g/m ² /month

4 EXISTING AIR QUALITY

4.1 Air Quality Monitoring Locations

Recent air quality monitoring data for PM_{10} and dust deposition have been provided by the Proponent for use in this assessment to provide an indication of the existing air quality environment. The locations of the Proponent-operated monitoring sites, from which data was sourced for use in this report, are presented in **Figure 4**.

4.2 Background Dust Deposition

Dust deposition monitoring has been conducted at three locations in the area surrounding the Project Site for a number of years. Monthly dust deposition data for the period between January 2010 and December 2011 are presented in **Table 5**. The location of the dust monitors are illustrated in **Figure 4**.

Table 5 Annual Average Dust Deposition Monitoring Data – 2010 and 2011

ID	Average Total Insoluble Solids (g/m²/	
	2010	2011
Dust Monitor 1	2.8	2.7
Dust Monitor 2	2.7	2.5
Dust Monitor 3	1.8	1.6
Dust Monitor 4	1.8	1.7
Average	2.3	2.1
Maximum	2.8	2.7

Based on the data presented in **Table 5**, a conservatively high estimation of the ambient dust deposition rate at the Project Site for assessment purposes may be assumed to be of the order of 2.8 g/m²/month expressed as an annual average. This value corresponds to the maximum of all the annual average deposition rates recorded at the four monitoring locations, which was recorded to the north of the site at Dust Monitor 1 during the 2010 monitoring period.

4.3 Suspended Particulate Matter

 PM_{10} monitoring is conducted immediately east of the Project Site at the *Belmont* property, indicated on **Figure 4** 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 and 2011 are presented in **Table 6** and **Figure 5**.

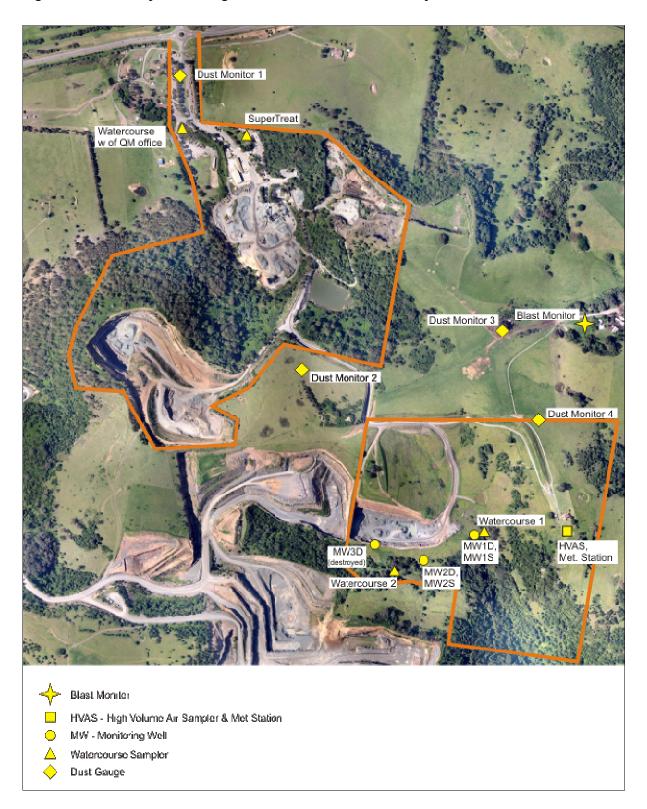
Table 6 24-Hour Average PM₁₀ Concentrations – January 2010 to December 2011

	24-hour Average PM ₁₀ (μg/m³)		Sampling	Number of	Monitoring	
-	Average	Minimum	Maximum	Method	Samples	Location
2010	9.9	2.3	32.2	HVAS	61	Project site
2011*	10.6	0.6	43.0	HVAS	60	Project site

Note *:An extremely high 24-hour average PM₁₀concentration of 207 μg/m³ was recorded on 28th November 2011.

Occurrence of such high concentration 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 4 Air Quality Monitoring Locations – Albion Park Quarry



30
Jan-10 Apr-10 Jul-10 Oct-10 Feb-11 May-11 Aug-11 Dec-11
Date

Figure 5 24-Hour Average PM₁₀ Concentrations Recorded at the Project Site

It is noted that continuous PM_{10} monitoring data from the OEH-operated Albion Park South monitoring station (located approximately 3 km west of the Project Site), were used as daily varying background data in the previous assessment (Heggies, 2008). A brief summary of this background dataset, which was based on 24-hour average concentrations recorded during the 2006 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 PM_{10} concentrations recorded at the project site in recent years are significantly lower than the concentrations measured in 2006 by the OEH monitor located at Albion Park South. Therefore use of 2006 OEH monitoring data as background data would be expected to provide a conservative estimate of current ambient background PM_{10} levels in the Project area. As this assessment is based on scaling the impacts predicted in the 2008 modelling study based on the quarry extraction rate, it is therefore based on the use of the Albion Park South background data set from 2006. This means that the impacts predicted in this study for the proposed operations should provide a conservative worst-case estimate of the actual concentrations that would be expected to occur.

Table 7 24-Hour Average PM₁₀ Concentration (2006) – Albion Park South

	24-hour Average PM ₁₀ (μg/m ³)			Sampling		Monitoring
	Average	Minimum	Maximum	Method	Samples	Location
2006	17.2	4.3	60.1	TEOM	365	OEH- Albion Park

4.4 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 8**.

Table 8 Ambient Air Quality Environment for Assessment Purposes

Air Quality Parameter	Averaging Period	Assumed Background Ambient Level	Data Source
DM	24-Hour	Hourly varying	OEH (2006)
PM ₁₀	Annual	17.2 μg/m ³	
Dust Deposition	Annual	2.8 g/m ² /month	The Proponent

5 ASSESSMENT OF POTENTIAL IMPACTS

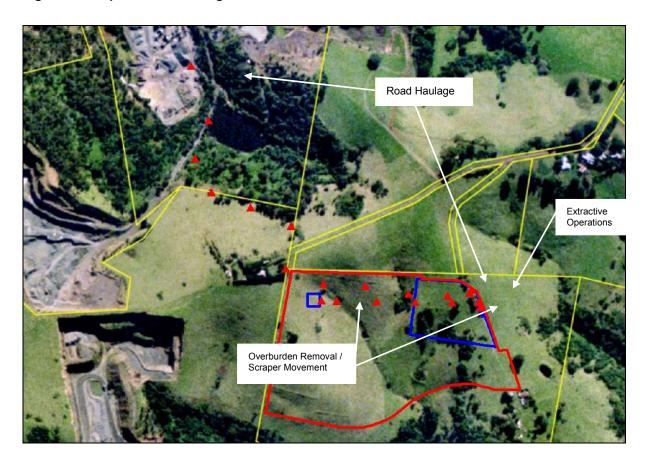
5.1 Dispersion Modelling Methodology

The atmospheric dispersion modelling study performed in the 2008 impact assessment utilised the Ausplume Gaussian Plume Dispersion Model software (Version 6.0) developed by the EPA Victoria. Ausplume is the approved dispersion model for use in the majority of applications in NSW. Default options specified in the Technical User's Manual were used, as per the Approved Methods. Ausplume was configured with a 4 km x 4 km modelling domain, centred on the Project Site. The gridded receptor spacing was defined at 50 m, providing adequately fine computational resolution to calculate near field impacts. A site-representative meteorological file was compiled for use in the modelling as described in **Appendix A**.

In order to account for the potential influence on pollution dispersion and varying receptor elevations across the modelling domain, a terrain file incorporating the local topographical features was included in the modelling process (see **Figure 3**).

Figure 6 illustrates the location of the sources simulated in the 2008 dispersion modelling study. The selected source locations were chosen in order to provide estimates of maximum potential impacts at the closest surrounding receptors.

Figure 6 Dispersion Modelling Source Locations



5.2 Emission Estimation Methodology

Two emission inventories have been compiled for this assessment:

- Current operation 600,000 tpa based on the latest emission factors and equations available in the literature; and
- Proposed operation 900,000 tpa.

The emission inventories take into consideration the movement of mobile plant and equipment during operation at the current and proposed 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 current and proposed operations have been estimated based on the emission factors presented in the *Emission Estimation Technique Manual for Mining* (hereafter, "EETMM"), *Version 3.1* (Environment Australia, 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.

It is noted that emission factors and equations from EETMM Version 2.3 (Environment Australia, 2001) were used to estimate potential emissions for 800,000 tpa extraction rate scenario in the previous assessment (Heggies 2008). Since then, the EETMM has been updated with revised emission factors or equations for several mining activities. For example, the equation used in the 2008 study for estimating particulate emissions from blasting overestimates the emission by a significant margin and therefore a new equation (as presented below) was recommended in the current version of EETMM (Version 3.1).

Potential particulate emissions from both the current and proposed operations were estimated based on the latest EETMM and AP42 documents in order to provide comparable and scalable emission inventories for the two scenarios. Details of the emission factor/equations used in estimating the potential emissions are provided below.

Bulldozer

$$EF = k \times \frac{s^{1.2}}{M^{1.3}} \, \text{kg/h}$$

where k=2.6 for TSP and 0.34 for PM_{10} , s=silt content and M=moisture content. Source: EETMM and AP42

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 PM₁₀, U = mean wind speed and M = moisture content.

Source: EETMM and AP42

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} , s = silt content and W = vehicle gross mass

Note: VKT = Vehicle Kilometres Travelled.

Source: EETMM

Grader Operation

$$EF = 0.0034 \times S^{2.5} \text{kg/VKT}$$

$$EF = 0.00336 \times S^{2.0} \text{ kg/VKT}$$

where S = average vehicle speed

Note: VKT = Vehicle Kilometres Travelled

Source: AP42

Blasting

$$EF = 0.00022 \times A^{1.5} \text{ kg/blast}$$

where A = Blast area (m^2), PM_{10} is 52% of TSP.

Source: EETMM

Stockpile Wind Erosion

EF = 0.4 kg/ha/hr for TSP

EF = 0.2 kg/ha/hr for TSP

Source: EETMM

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 and 1.5 for PM₁₀, s = silt content and W = vehicle gross mass

Note: VKT = Vehicle Kilometres Travelled.

Source: USEPA AP-42

5.3 Estimated Emissions

Table 9 presents a comparison of the assumed operating parameters and total estimated potential TSP and PM_{10} emission rates for the following scenarios:

 Scenario 1 – Proposed scenario used in previous assessment (Heggies 2008) (i.e. as used in the 2008 modelling study, uncorrected for the updated emission factors and equations in the latest EETMM);

- Scenario 2 Current operation (including emission factors and equations in the latest EETMM);
 and
- Scenario 3 Proposed operation assessed in this report.

Detailed calculations for estimating the emissions for Scenario 2 and Scenario 3 are presented in **Appendix B**. It is shown in **Table 9** that the potential TSP and PM_{10} emissions were significantly overestimated in the previous assessment (Scenario 1). The main reasons for the reductions in the estimated emissions for Scenarios 2 and 3 compared to Scenario 1 were changes in the following operating parameters assumed in the previous assessment (Scenario 1), which have been updated based on information provided by the site on current activity levels.

- Number of blasts and drill holes per annum;
- Annual distance travelled by the grader;
- Scraper operating hours per annum

In the previous assessment, total number of blasts per annum was based on the assumption of three blasts per day. SLR has been advised that currently up to one blast per day is performed, and blasting is not required every single day. Therefore, to estimate the potential annual TSP and PM_{10} emission rate from blasting operations for Scenario 3, it was conservatively assumed that one blasting event would occur every single day. The required number of drill holes for Scenario 3 was then revised accordingly, based on a scaling factor derived from the ratio of number of blasts per annum for Scenarios 1 and 3.

The scraper operating hours used for Scenario 1 were estimated based on the scraper activity level during construction phase of the project. SLR has been advised that currently the scraper operates infrequently (estimated at up to 10 days per annum) and this would not change with the increased extraction rate. An activity rate of 10 days per annum was therefore used for both Scenario 2 and Scenario 3.

Similarly, the grader operating hours used for Scenario 1 were estimated based on the usage of the grader during the construction phase of the project. Information provided for current operations indicates that the haul roads are usually graded once a week and no change in grader operation would be required for the proposed scenario.

 Table 9
 Comparison of the Operating Parameters and Estimated Emission Rate

Activity	Unit	Scenario 1*	Scenario 2	Scenario 3	Difference ¹	Difference ²
Extraction rate	tpa	800,000	600,000	900,000	50%	13%
Hours of operation	per annum	3,025	3,025	3,025	0%	0%
Disturbed area	ha	2.55	1.91	2.87	50%	13%
Number of blasts	per annum	750	250	250	0%	-67%
Number of Drill holes	per annum	1,570	1,178	1,766	0%	-67%
Hauling	VKT/hr	5.47	4.1	6.2	51%	13%
Grading	km/week	11	2.2	2.2	0%	-80%
Scraper	days/annum	275	10	10	0%	-96%
PM ₁₀ emission rate	kg/annum	25,679	13,958	19,968	43%	-22%
TSP emission rate	kg/annum	44,778	23,925	34,382	44%	-23%

^{*} based on the emission rate presented in the previous assessment (Heggies 2008)

¹Difference between the proposed and current operation

²Difference between the proposed operation and the scenario assessed in the previous assessment (Heggies 2008)

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It is noted that haulage operations are estimated to be a relatively minor source of particulate emissions from the site. The quarry access road is sealed and a water truck is utilised to reduce dust during dry periods.

5.4 Predicted Impacts

As discussed in **Section 1**, the proponent is proposing to increase the annual extraction rate by 300,000 tpa from 600,000 tpa to 900,000 tpa with no major changes in the infrastructure or local topography. This represents a 13% increase above the 800,000 tpa extraction rate assessed in the previous modelling study.

It is noted that the proposed annual increase will not change the existing peak daily export levels and associated traffic generation (i.e. it is not proposed to increase the quarry's production capacity nor the quarry's capacity to load trucks). Rather the increase in annual production levels would enable the quarry to operate with more busy days per year than currently occurs (GTA Consultants, 2012).

It is unlikely that there will be any significant changes in local meteorology and dispersion patterns of particulates since the modelling was performed in 2008. Given this, additional modelling to quantify the incremental and cumulative impacts at surrounding areas for the proposed operations is not considered to be warranted and a semi-quantitative assessment has been performed instead. To estimate the incremental off-site impact for the proposed operation, the predicted results from the 2008 assessment have been scaled based on the ratio of the estimated particulate (TSP and PM₁₀,) emissions for the proposed increased annual production rate with that presented in the 2008 assessment.

5.4.1 Dust Deposition

Annual average dust deposition rates (in g/m²/month) at the surrounding sensitive receptors due to the proposed quarry operations were estimated based on the TSP emission rates presented in **Table 9** and incremental dust deposition rate predicted for Scenario 1 in the 2008 modelling study. It can be observed from **Table 9** that the estimated TSP emission for the proposed operation (Scenario 3) is 23% lower than that assessed in the previous assessment (Scenario 1) due to the updates in the emission factors and activity data assumed.

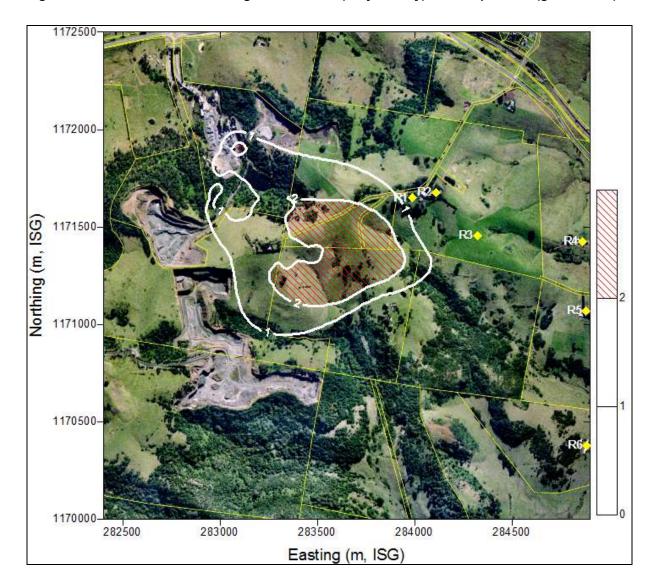
Estimated annual average incremental and cumulative dust deposition levels at each receptor for the proposed operation are summarised in **Table 10** and presented as contour plots in **Figure 7** (incremental) and **Figure 8** (cumulative). Assuming that the meteorological data used in the 2008 modelling study is representative of current conditions, it can be observed from **Table 10**, **Figure 7** and **Figure 8** that the proposed operation is unlikely to exceed the OEH nuisance criteria for incremental or cumulative dust deposition levels at any of the identified surrounding sensitive receptor locations.

Table 10 Incremental and Cumulative Annual Average Dust Deposition at Nearest Residences

Residence	Background *	Incremental	Cumulative					
	(g/m²/month)	Scenario 1 (modelled)	Scenario 2 (current)	Scenario 3 (proposed)	Estimated Increase (Sc3 - Sc2)	Scenario 3 (proposed) (g/m²/month)		
R1	2.8	1.0	0.5	0.8	0.2	3.0		
R2	2.8	0.7	0.4	0.5	0.2	3.0		
R3	2.8	0.5	0.3	0.4	0.1	2.9		
R4	2.8	0.2	0.1	0.2	0.0	2.8		
R5	2.8	0.2	0.1	0.2	0.0	2.8		
R6	2.8	0.1	0.1	0.1	0.0	2.8		
Criterion		2.0	2.0	2.0		4.0		

Note: *The background value is based on data from the site monitoring program and therefore includes the impact from current operations. Hence only the incremental impact associated with the increased extraction rate has been added to the background to give the cumulative impact.

Figure 7 Predicted Annual Average Incremental (Project only) Dust Deposition (g/m²/month)



1172500-1171500-1170500-1170500-282500 283000 283500 284000 284500 Easting (m, ISG)

Figure 8 Predicted Annual Average Cumulative Dust Deposition (g/m²/month)

5.4.2 Suspended Particulate Matter (PM₁₀)

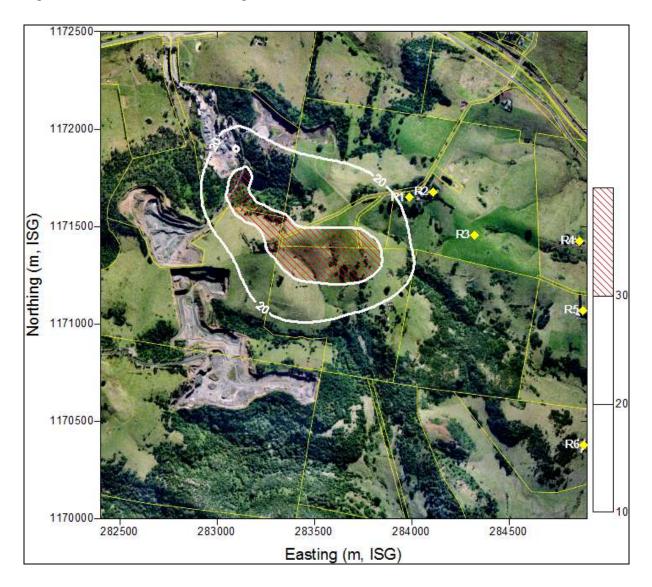
As stated earlier in **Section 5.2**, emission factors for several mining activities were updated in recent years. Potential PM_{10} emissions from the proposed operation (Scenario 3) have been estimated based on the current NPI and AP42 documents. It can be observed from **Table 9** that the estimated potential PM_{10} emission rates for the proposed operation is 22% lower than that assessed in the previous assessment (Scenario 1) due to the updates in the emission factors and activity data assumed.

Predicted incremental 24-hour average PM_{10} concentrations and annual average incremental and cumulative PM_{10} concentrations are presented in **Table 11** and **Figure 9** for the proposed operations.

Table 11 Predicted PM₁₀ Concentrations at Surrounding Residences

Residence	Incremental 24-Hour Average	Annual Average PM ₁₀ Concentrations (μg/m³)								
Residence	PM ₁₀ Concentrations (µg/m³)	Background	Incremental Impact	Cumulative Impact						
R1	26.6	17.2	2.2	19.4						
R2	18.2	17.2	1.4	18.6						
R3	11.1	17.2	0.9	18.1						
R4	5.8	17.2	0.4	17.6						
R5	7.4	17.2	0.4	17.6						
R6	4.0	17.2	0.2	17.4						
Criteria	50			30						

Figure 9 Predicted Annual Average Cumulative PM₁₀ Concentration



It can be observed from **Table 11** and **Figure 9** that the proposed increase in the quarry extraction rate is unlikely to result in exceedances of the OEH criterion for cumulative annual average PM_{10} concentrations at any of the surrounding sensitive residences. The highest incremental 24-hour average PM_{10} concentration was predicted at Residence 1 (R1).

Based on the results presented in **Table 11**, 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 per '*The Approved Method*' for this receptor (R1) and is presented in **Table 12**. The data presented in **Table 12** shows that up to two exceedences (PM_{10} concentration >50 µg/m³) were recorded in the background monitoring data (i.e. excluding the contribution from the Project) and that the incremental (project only) contribution from the proposed operation on these days are negligible. It can also be observed from **Table 12** that the incremental contribution from the proposed quarry operation is relatively low, dropping from a maximum of 26.6 µg/m³ for the worst-case day to 13.2 µg/m³ on the second worst day. Given that the background data used in the 2008 modelling study is expected to over-estimate current background levels in the Project area (see **Section 4.3**) it is therefore concluded that the proposed increase in the quarry extraction rate is unlikely to cause any additional exceedences of 24-hour average PM_{10} concentrations at the surrounding sensitive receptors.

Table 12 Summary of Contemporaneous Impact and Background at Receptor R1

	redicted 24-Hou ons – High Back			Maximum Predicted 24-Hour Average PM ₁₀ Concentrations – High Impact Days (μg/m³)							
Date	Background	Increment	Total	Date	Background	Increment	Total				
01-12-2006	60.1	0.0	60.1	22-11-2006	10.3	26.6	36.9				
21-11-2006	51.1	0.0	51.1	27-10-2006	17.2	13.2	30.5				
08-10-2006	44.1	0.2	44.3	20-09-2006	4.9	13.1	18.0				
20-11-2006	39.9	0.6	40.5	30-09-2006	14.2	11.9	26.1				
12-11-2006	39.5	0.0	39.5	04-02-2006	8.3	11.3	19.6				
28-11-2006	37.9	0.1	38.0	11-04-2006	16.1	11.2	27.2				
24-09-2006	37.8	0.6	38.4	29-09-2006	13.4	10.1	23.5				
21-01-2006	37.7	0.0	37.7	12-01-2006	7.6	9.6	17.2				
20-10-2006	37.5	0.0	37.5	07-02-2006	13.9	9.5	23.3				
22-01-2006	37.2	0.1	37.3	10-11-2006	10.3	9.2	19.5				

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6 CONCLUSION

SLR Consulting has been commissioned by MMJ Wollongong on behalf of Cleary Bros (Bombo) Pty Ltd to conduct an air quality impact assessment for proposed expanded operations at their Albion Park Quarry.

Potential dust emissions from the proposed operation were estimated based on the most recent version of NPI and AP42 documents. The emission sources included in the inventory covered bulldozer, scraper and grader operations, excavators, haul trucks, blasting and wind erosion. Since no significant changes in the local meteorology or dispersion pattern are anticipated due to the proposed annual production rate increase, air quality impacts at surrounding residential receptors for the proposed production rate increase were predicted by scaling the model predictions for 800,000 tpa extraction scenario (Heggies 2008) by the ratio of estimated particulate emissions.

AUSPLUME V6 was used to predict the incremental impact at surrounding areas in the 2008 study. Ambient monitoring data from on-site dust monitors were used to establish the background dust deposition level (g/m²/month) and particulate (PM $_{10}$) monitoring data from nearest OEH monitoring site at Albion Park South were used to conservatively estimate the background PM $_{10}$ concentration level (µg/m³).

Based on the assumptions outlined in the report, the predicted incremental and cumulative impact at the surrounding sensitive receptors areas complies with the relevant OEH guidelines. Therefore, based upon the assumptions outlined in this assessment, it is considered to be reasonable to conclude that the proposed increase in the extraction rate from 600,000 tpa to 900,000 tpa will not cause any exceedences of relevant OEH air quality criteria in the surrounding areas.

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7 REFERENCES

Cleary Bros (2008), Dust Deposition, PM_{10} and Meteorological Monitoring Data from established monitoring equipment at Project Site.

Environment Australia National Pollution Inventory (2012), *Emission Estimation Technique Manual for Mining*, Version 3.1.

GTA Consultants, Cleary Bros Quarry Albion Park Rail: Proposed Increase to Annual Production Levels – Traffic Impact Assessment, Draft Report, 20 November 2012.

Heggies (2008), Albion Park Quarry – Proposed Expanded Operations – Air Quality Impact Assessment, October 2008.

National Environmental Protection Council (1998) National Environmental Protection Measure for Ambient Air Quality.

Office of Environment and Heritage (2005), Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.

Office of Environment and Heritage (2006), PM₁₀ and Meteorological data from the DECC's Albion Park South monitoring site for 2006.

US EPA (1985 and updates) Compilation of Air Pollutant Emission Factors AP-42.

This Appendix provides background information on the meteorological data used in the 2008 modelling study which has formed the basis of this assessment.

Local Meteorological Data

To adequately characterise the dispersion meteorology of the Project Site, monitoring data from the on-site meteorological station and the OEH's Albion Park South air quality monitoring station were sourced. The location details of these two monitoring stations are summarised in **Table A1**. The data from these monitoring stations were used to characterise the local meteorology and provide the input datasets for the meteorological modelling undertaken for the 2008 modelling study.

Table A1 Meteorological Monitoring Station Details

Station Name	Location	(m, ISG)	Distance (km) / Direction	
	Easting	Northing	From Project Site	(m, AHD)
Onsite Meteorological station at Belmont	283920	1171123	At eastern site boundary	120 m
Albion Park South (OEH)	279858	1171964	3.5 km / WNW	20 m

Meteorological Modelling Methodology

Data obtained by the on-site meteorological monitoring station was sourced to compile the majority of parameters required to conduct atmospheric dispersion modelling. For indirect parameters not recorded onsite, The Air Pollution Model (TAPM) meteorological model (Version 3) was used to create a complete meteorological dataset for the Project Site.

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, with no local data inputs required.

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.

Additionally, the TAPM model may assimilate actual local wind observations so that they can optionally be included in a model solution. The wind speed and direction observations are used to realign the predicted solution towards the observation values. This function of accounting for actual meteorological observations within the region of interest is referred to as "data assimilation".

Thus, direct measurements for 2006 of hourly average wind speed and wind direction at the Proponent's onsite meteorological station and the OEH's Albion Park South station were input into the TAPM simulations to provide realignment to local and regional conditions.

Meteorological Data used in Modelling Study

Wind Regime

A summary of the wind pattern recorded at the Project Site in 2006 calendar year is presented in **Figure A1**. On an annual basis, the wind rose displays occurrences of winds from all quadrants.

Figure A1 Wind Rose for Project Site - 2006

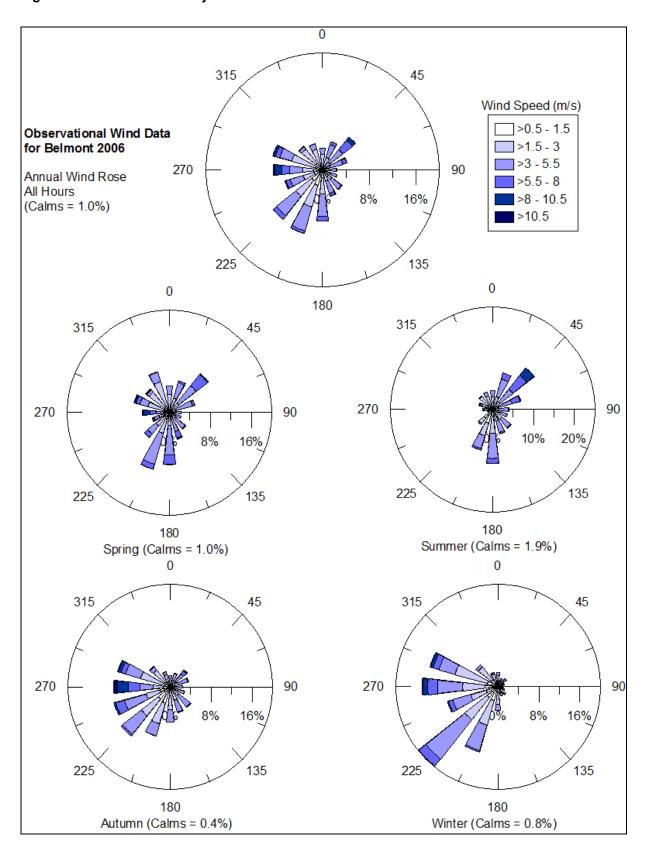


Figure A1 indicates that winds experienced at the Project Site were predominately light to fresh (between 1.5 m/s and 10.5 m/s) from the west-southwest to west-northwest (approximately 23% combined) and light to moderate (between 1.5 m/s and 8 m/s) from the south to southwest (approximately 30% combined). Calm wind conditions (wind speed less than 0.5 m/s) were recorded approximately 1.0% of the time throughout 2006.

The seasonal wind roses indicate that:

- In spring, light to fresh winds are experienced from all directions, particularly from the northeast, south and south-southwest.
- In summer, light to fresh winds are experienced predominantly from the northeast and south.
- In autumn, light to fresh winds are experienced predominantly from the south-southwest to westnorthwest.
- In winter, light to fresh winds are experienced from the south-southwest to west-northwest.

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 categorise the degree of atmospheric stability (see **Table A2**). These classes indicate the characteristics of the prevailing meteorological conditions and are used as input into various air dispersion models.

Table A2 Description of Atmospheric Stability Classes

Atmospheric Stability Class	Category Description
A	Very unstable low wind, clear skies, hot daytime conditions
В	Unstable clear skies, daytime conditions
С	Moderately unstable Moderate wind, slightly overcast daytime conditions
D	Neutral high winds or cloudy days and nights
E	Stable moderate wind, slightly overcast night-time conditions
F	Very stable low winds, clear skies, cold night-time conditions

The frequency of each stability class predicted by the meteorological modelling during 2006 is presented in **Figure A2**. The results indicated high frequencies of Stability Class D. Stability Class D is indicative of neutral conditions, conducive to a moderate level of pollutant dispersion due to mechanical mixing. An extremely low frequency of Stability Class A conditions has been predicted. These conditions relate to well-mixed atmospheres where there is rapid dispersion. The low frequency of Stability Class A conditions predicted will result in a conservative over-estimate of impacts by the modelling for this location.

Figure A2 Annual Stability Class Distributions for the Project Site, 2006

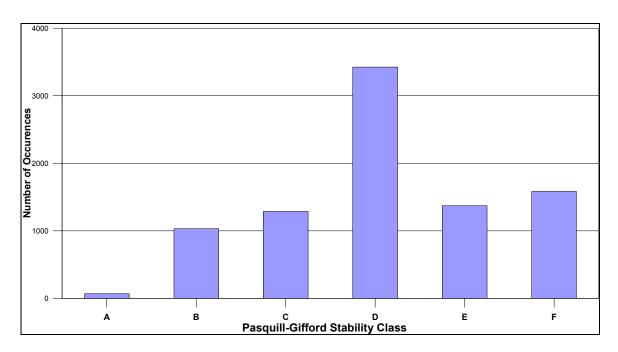


Table B1 Detailed Emission Estimation Calculation for the Current Scenario

	Control Factors			Intensity		Emission Factor			Variables									
ACTIVITY		TSP	PM ₁₀	Value	Units	TSP	PM ₁₀	Units	Var 1	Units	Var 2	Units	Var 3	Units	Var 4	Unit	Var 4	Unit
Bulldozer	2	5,094	2,246	1,031	hours/year	9.9	2.3	kg/h	10	%SC	3	%MC						
Excavator - Rock	2	334	300	600,000	tonnes/year	0.0011	0.0005	kg/t	1.661	WS Factor	3	%MC						
Excavator - OB	2	9	8	32,797	tonnes/year	0.0005	0.0003	kg/t	1.661	WS Factor	5	%MC						
Air - Track Drill	2	154	153	523	holes/year	0.59	0.3068	kg/hole										
Scrapers	2	1,143	157	53	190	VKT	6.008	0.8261	15	%SC	60	Ave GMV						
Grader	1,2	15	9	100	km	1.08	0.34	kg/VKT	10	km/h								
Blasting	2	122	121	250	blasts/year	0.98	0.51	kg/blast	270	m²								
Wheel Dust (Empty)	1,2	4,925	2,526	12,410	VKT	3.175	0.857	kg/VKT	55	tonnes/load	46	tonnes	4.1	VKT/hr	3,025	hr	6.4	%SC
Wheel Dust (Full)	1,2	7,016	3,599	12,410	VKT	4.523	1.221	kg/VKT	55	tonnes/load	101	tonnes	4.1	VKT/hr	3,025	hr	6.4	%SC
Open Pit Wind Erosion	2	1,577	1,498	0.900	ha	0.40	0.20	kg/ha/hour	8,760	hours								
Trucks dumping Rock	2	334	300	600,000	tonnes/year	0.0011	0.0005	kg/t	1.661	WS Factor	3	%MC						
Scraper dumping overburden	2	9	8	32,797	tonnes/year	0.0005	0.0003	kg/t	1.661	WS Factor	5	%MC						
Overburden Wind Erosion	2	3,193	3,033	1.823	ha	0.40	0.20	kg/ha/hour	8,760	hours								
Total		23,925	13,958															

SC = Silt Content (%)
MC = Moisture Content (%)
WS Factor = average of (wind speed/2.2)^{1.3} in m/s

Control Factors:
1 – Water Spray on Haul Road – 75%
2 – Pit Retention – 50% for TSP and 0.5% for PM₁₀

Table B2 Detailed Emission Estimation Calculation for the Proposed Scenario

	Control Factors			Intensity		Emission Factor			Variables									
ACTIVITY		TSP	PM ₁₀	Value	Units	TSP	PM ₁₀	Units	Var 1	Units	Var 2	Units	Var 3	Units	Var 4	Unit	Var 5	Unit
Bulldozer	2	7,641	3,369	1,547	hours/year	9.9	2.3	kg/h	10	%SC	3	%MC						
Excavator - Rock	2	502	451	900,000	tonnes/year	0.0011	0.0005	kg/t	1.661	WS Factor	3	%MC						
Excavator - OB	2	13	12	49,196	tonnes/year	0.0005	0.0003	kg/t	1.661	WS Factor	5	%MC						
Air - Track Drill	2	154	153	523	holes/year	0.59	0.3068	kg/hole										
Scrapers	2	1,143	157	53	190	VKT	6.008	0.8261	15	%SC	60	Ave GMV						
Grader	1,2	15	9	110	km	1.08	0.34	kg/VKT	10	km/h								
Blasting	2	122	121	250	blasts/year	0.98	0.51	kg/blast	270	m²								
Wheel Dust (Empty)	1,2	7,387	3,789	18,615	VKT	3.175	0.857	kg/VKT	55	tonnes/load	46	tonnes	6.15	VKT/hr	3,025	hr	6.4	%SC
Wheel Dust (Full)	1,2	10,524	5,398	18,615	VKT	4.523	1.221	kg/VKT	55	tonnes/load	101	tonnes	6.15	VKT/hr	3,025	hr	6.4	%SC
Open Pit Wind Erosion	2	1,577	1,498	0.900	ha	0.40	0.20	kg/ha/hour	8,760	hours								
Trucks dumping Rock	2	502	451	900,000	tonnes/year	0.0011	0.0005	kg/t	1.661	WS Factor	3	%MC						
Scraper dumping overburden	2	13	12	49,196	tonnes/year	0.0005	0.0003	kg/t	1.661	WS Factor	5	%MC						
Overburden Wind Erosion	2	4,790	4,550	2.734	ha	0.40	0.20	kg/ha/hour	8,760	hours								
Total		34,382	19,968															

SC = Silt Content (%)
MC = Moisture Content (%)
WS Factor = average of (wind speed/2.2)^{1.3} in m/s

Control Factors:
1 – Water Spray on Haul Road – 75%
2 – Pit Retention – 50% for TSP and 0.5% for PM₁₀



APPENDIX 6:

"Noise & Blasting Impact Assessment"

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Albion Park Quarry Proposed Expanded Operation Noise and Blasting Impact Assessment

Report Number 610.12049-R2

30 November 2012

Cleary Bros (Bombo) Pty Ltd c/- MMJ Wollongong PO Box 1167 WOLLONGONG NSW 2500

Version: Draft 2

Albion Park Quarry

Proposed Expanded Operation

Noise and Blasting Impact Assessment

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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 Consulting.

SLR Consulting 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
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APPENDICES

Appendix A Development Consent (DA-466-11-2003) dated 21 February 2006

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1 INTRODUCTION

MMJ Wollongong (MMJ) commissioned SLR Consulting Australia Pty Ltd (SLR Consulting) to conduct a noise and vibration impact assessment for the proposed annual production rate increase at the Albion Park Quarry, operated by Cleary Bros (Bombo) Pty Ltd (Cleary Bros, the Proponent). The quarry is currently operating with an approved annual extraction rate of 600,000 tonnes per annum (tpa) and the Proponent is seeking approval to increase the extraction rate to 900,000 tpa.

In 2002, SLR Consulting (formerly Heggies Pty Ltd) was commissioned to prepare a noise and blasting impact assessment for the extension of quarrying operations at the site (Quarry Extension) and the findings presented in Report 30-1079-R1, dated 12 November 2002 (Quarry Extension NIA), as part of the Environmental Impact Assessment (EIS). As part of that assessment, noise modelling was performed based on an extraction rate of 400,000 tpa. The results of the noise modelling indicated that noise assessment goals would be exceeded at the surrounding residences, however the Proponent made a number of commitments to mitigate the noise emissions.

The Minister for Infrastructure and Planning granted Development Consent in 2004 under Section 80 of the *Environmental Planning and Assessment Act 1979*. Two Development Consents were issued to Cleary Bros (Bombo) Pty Ltd:

- DA No 467-11-2003 Hard rock quarry haul road, including Lot 2 DP 858245, Dunsters Lane, Croom.
- DA No 466-11-2003 Extension of hard rock quarry, including Lot 1 DP 858245 and Lot 23 DP 1039967, Dunsters Lane, Croom.

Further to these approvals 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 by the Commissioner of the Court on 21 February 2006. The current Consent is attached in **Appendix A**.

In 2006, SLR Consulting was engaged to prepare the Noise Monitoring Programme (NMP) and Blast Management Plan (BMP) for the Albion Park Quarry Extension in accordance with the requirements of Schedule 4, Condition 7 and Schedule 4, Conditions 14 and 15 of the Consent.

In 2008, SLR Consulting was commissioned to undertake a noise study for increase in the extraction rate at the Albion Park hard rock quarry, to determine the level of noise impact associated with increasing the extraction rate to 800,000 tpa. The findings of the assessment are presented in Report 30-2138-R1 dated 30 October 2008 (2008 Modification). The Proponent was granted approval to increase the extraction rate to 600,000 tpa.

Cleary Bros now proposes to increase the extraction rate of Albion Park Quarry from the approved rate of 600,000 tpa to 900,000 tpa (Expanded Quarry Operations, the Modification) ie 50% increase in current approved production rate.

Accordingly, SLR Consulting has now been engaged to undertake a noise and blasting impact assessment of the environmental emissions likely to be associated with the increased extraction rate at the quarry (Expanded Quarry Operations).

The proposed increase associated with the Expanded Quarry Operations as an annual extraction rate is relatively minor (12.5%) compared to that assessed for the 2008 Modification and no major changes in the infrastructure or local topography (such as new stockpiles or bunds) would be required for the proposed annual production rate increase. The local meteorology, topographic shielding and noise emissions are therefore likely to be similar. Given this, additional modelling to quantify the incremental and cumulative impacts at surrounding areas for the proposed operations is not considered to be warranted and a semi-quantitative assessment has been performed instead.

To estimate the incremental off-site impact for the proposed Expanded Quarry Operations, the predicted results from the 2008 assessment were scaled based on the ratio of the estimated noise emissions for the proposed increased annual production rate with that presented in the 2008 Modification assessment. Ambient monitoring data collected in recent years (2008 to present) were also used to review compliance of existing operations with nominated emission criteria.

2 PROJECT SETTING

The Albion Park Quarry (the Project Site) is situated at Albion Park Rail, approximately 20 km south-southwest of the central business district of Wollongong on the New South Wales south coast. **Figure 1** 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 noise impacts due to the expanded operations.

A list of the assessable noise sensitive receivers is provided in **Table 1** and **Figure 2** illustrates the location of the surrounding receptors in relation to the Project Site.

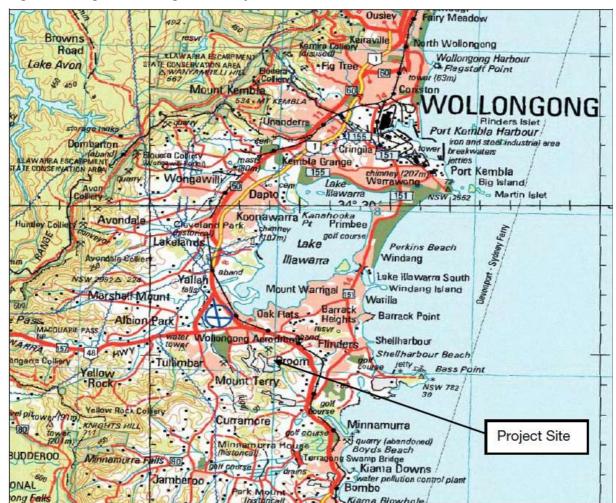
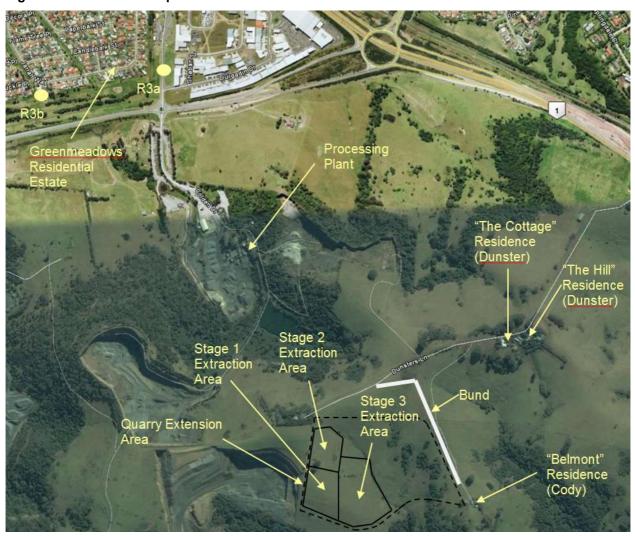


Figure 1 Regional Setting of the Project Site

Table 1 Surrounding Sensitive Receptor Locations

Receiver Location	Location Type	
"The Hill" residence	Vacated residence	
"The Cottage" residence	Residential Assessment Location	
"Belmont" ("Cody") residence	Project related (Reference Location)	
Greenmeadows Residential Estate	Residential Assessment Location	

Figure 2 Sensitive Receptor Locations



3 EXISTING ALBION PARK QUARRY OPERATIONS

3.1 Overview of the existing Albion Park Quarry Operations

Albion Park Quarry is located at Albion Park Rail, to the west of Princes Highway and to the east of Terry Street. A site map showing the location of the noise sensitive premises in relation to Albion Park Quarry (Processing Plant and Quarry Extension Area, currently operating in Stage 1 and Stage 3 Extraction Areas) is presented in **Figure 2**.

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Cleary Bros (Bombo) Pty Ltd Albion Park Quarry Proposed Expanded Operation Noise and Blasting Impact Assessment

It should be noted that "The Cottage" Residence corresponds to the most sensitive privately owned residence located nearest to the Quarry Extension Area. The "Belmont" Residence ("Cody") is the closest residence to the Quarry Extension Area and this residence is owned by Cleary Bros and is currently occupied by a Cleary Bros employee. The Greenmeadows Residential Estate is potentially affected by noise from the Processing Plant which did not changed due to the Quarry Extension.

The noise bund required by the Consent to attenuate noise transmission from the Quarry Extension Area activities has been constructed and is approximately 5 m high.

3.2 **Existing Albion Park Quarry Approvals**

With respect to noise and blasting emissions, Cleary Bros has consent to operate the Albion Park Quarry Extension in accordance with the following approval requirements:

- Development Consent DA-466-11-2003 issued by the Land and Environment Court Proceedings No. 10639 of 2005 dated 21 February 2006 and administrated by the Department of Planning and Infrastructure (attached as **Appendix A**).
- Environment Protection Licence (EPL) No 299 issued by the Environment Protection Authority, issued date 18 November 1999 and licence review date 11 July 2015.

In addition, NSW Work Cover Dangerous Goods Licences describe noise specifications for individual equipment, for health and safety purposes.

3.3 **Noise and Blasting Mitigation and Management Measures**

The Noise Monitoring Programme and Blast Management Plan (NMP and BMP) was prepared in accordance with the Consent condition requirements. The NMP and BMP describe the current noise and blasting monitoring and management activities at the Albion Park Quarry.

3.3.1 **Noise Monitoring Programme**

The NMP includes a number of noise (and blasting) mitigation measures including the use of Best Achievable Technology together with Best Environmental Management Practices.

In general terms, Best Achievable Technology includes 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 includes the following procedures:

- Siting high noise (or vibration) generating plant and equipment at remote locations.
- Scheduling high noise (or vibration) generating operations to occur during late morning and afternoon only.
- Monitoring, reporting and community liaison programmes.

3.3.2 Blast Management Plan

The Quarry Extension NIA included a detailed review of the historic blast designs and corresponding blast emission (ground vibration and airblast) monitoring data and the findings formed the basis of the Blast Management Plan.

The following limiting blast design parameters with regard to the vibration, airblast and flyrock are currently implemented at the quarry.

General Blast Management

The following blast design parameters are implemented for all blasts:

- Direction of detonator initiation is away from near residence
- All blast faces to face generally south
- Use of 1.5 m solid decking per blasthole
- Two or more columns of explosives of equal length per blasthole
- Two detonators per blasthole
- Explosive columns initiated from the bottom
- Use of 76 mm diameter blastholes
- Stemming depth 2.2 m (minimum)
- Subdrill of 1.2 m for both production and overburden blasts
- Bench height between 7 m and 12 m
- Front row burden 2.2 m (minimum)
- Spacing 2.2 m (minimum)

Predicted Blast Emission Levels

Blast emission data from every blast is used (via the blast emissions site laws) to refine subsequent blast designs in order to control blast emission levels, particularly for later blasting when operating closer to residences.

Managing Airblast

Blast design procedures are currently implemented with the primary objective of maintaining the levels of airblast at the closest residences below 115 dB Linear, in accordance with the Consent. 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 deck charging of the front row of blastholes in each blast and initiating the blast in the direction away from the closest receiver location, emissions from blasting in the Quarry Extension Area, using an MIC in accordance with the blasting site law established for the quarry, have resulted in compliance with the general Consent condition of 115 dB Linear airblast.

As an additional measure, to prevent occupational health and safety impacts on rural workers, airblast levels is also contained to below 135 dB Linear at the property boundary of the Albion Park Quarry.

Managing Vibration

Blast design procedures are currently 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. 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.

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By incorporating deck charging of the front row of blastholes in each blast and initiating the blast in the direction away from the closest receiver location, emissions from blasting in the Quarry Extension Area, using an MIC in accordance with the blasting site law established for the quarry, have resulted 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 are 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.

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 and high airblast).

For all blasts at the Albion Park Quarry, the front row blastholes are "Boretraked" in order to identify any areas of less than optimum burden in order that, if required, inert material (rather than explosives) is be placed at this location in the blasthole. Consequently, in relation to flyrock ejection, the latter situation has not occurred since operations commenced in the Quarry Extension Area.

In terms of collar ejection, the stemming length of 2.2 m is considered optimum for the blasthole lengths and has been selected in order to totally contain the explosives and separate them from the collar of the blasthole.

Also, only aggregate is used as the stemming material (<u>not</u> drill dust) again in order to contain the explosives within the blasthole.

External Blast Design Review

Prediction of ground vibration and airblast are 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 are updated on a regular basis to reflect the blast results obtained.

Meteorological Considerations

Meteorological data is evaluated prior to blasting, and 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 is considered and blast plans and/or timing altered if necessary. Meteorological conditions that are considered include:

- Prevailing winds including their direction and velocity
- Temperature inversions
- Time of day
- Seasonal effects on weather patterns
- Cloud cover

Blasting is 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 blasting impacts
- Where there is heavy low level cloud
- Where a temperature inversion is present

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 Readymix) are contacted by telephone on the morning of blasting indicating an expected time of firing.

Wherever possible, the blasts are conducted at the same (nominated) time of day.

If, when notifying Readymix, it is found that a blast is planned for the same day, measures are taken to ensure the blasts are adequately separated in time.

3.4 Noise Compliance Summary

Annual noise compliance monitoring is conducted at the Albion Park Quarry in accordance with the NMP. Operator-attended noise monitoring is used to assess for compliance against the Consent noise limits.

Operator-Attended Noise Monitoring

Operator-attended noise monitoring undertaken by SLR Consulting since 2008 has demonstrated ongoing compliance with the noise criteria. A summary of the findings of the operator-attended noise compliance monitoring undertaken since 2008 is provided in **Table 2**.

Table 2 Summary of Operated-Attended Noise Compliance Monitoring

Year	Noise Compliance Statement	Measured LAeq Noise Emission		
		"The Cottage" residence	Greenmeadows residential estate	
2008	Compliant	<321	<381	
2009	Compliant The noise emission from CB Stage 1 Operation were above the applicable daytime intrusive LAeq(15minute) 35 dBA criterion by up to 9 dBA at "The Cottage" residence due to wind effect.	441.2	40	
2010	Compliant	<34	32	
2011	Compliant	<32	<40	

Note 1: Invalid weather conditions ie wind speed >0.5 m/s.

Note 3: The measurements were conducted during westerly winds which are likely to have increased the noise emissions from the CB Quarry.

Predicted Noise emissions

The analysis of the logger results together with the modelling results enables the contribution of the Albion Park Quarry to be calculated for different wind conditions. The no wind scenario, corresponding to the Consent weather condition, since 2008 is provided in **Table 3**.

Table 3 Calculated Noise Contribution of the Albion Park Quarry for No Wind (Calm)

Year	Noise Compliance Statement	Calculated LAeq Noise Emission under Calm Conditions		
		"The Cottage" residence	Greenmeadows residential estate	
2008	Compliant	NA ¹	NA ¹	
2009	Compliant	33	37	
2010	Compliant	34	37	
2011	Compliant	34	36	

Note 1: No calculated noise emission is available for 2008.

Performance Against Quarry Extension NIA

Quarry Extension NIA predicted noise emissions of 38 dBA and 41 dBA at "The Cottage" residence Greenmeadows residential estate, respectively. The actual performance of the quarry has typically been 4 dBA below the Quarry Extension NIA predicted noise emissions.

3.5 Noise Complaints Summary

Cleary Bros maintains a complaints register in accordance with their Environmental Management Strategy for the quarry, prepared in accordance with Schedule 5, Condition 1 of the Consent. Noise complaints generally relate to on site activities being undertaken out of hours or blast induced vibration emissions. A summary of the noise and blasting complaints for the period February 2006 to October 2012 is provided in **Table 4**.

Complaints regarding noise received were responded to in accordance with the quarry's Complaint Response Protocol (detailed in the NMP).

Table 4 Register of Noise and Blasting Related Complaints

Year	Number of Complaints	Complaint Type
2006	Nil	-
2007	Nil	-
2008	2 x Blast Emissions	Ground borne vibration level
2009	Nil	-
2010	1 x Noise Emissions	Out of hours works
	1 x Blast Emissions	Ground borne vibration level
2011	3 x Blast Emissions	Ground borne vibration level
	1 x Noise Emissions	Out of hours works
2012	Nil	-

The following comments can be made with regard to the noise and blasting complaints:

- Blasting complaints relate to the ground borne vibration being discernible however, in all instances further investigation found the quarry to be below the respective blast vibration limits.
- The two incidents of noise complaints relate to activities being undertaken out of approved hours.

Reportable Incidents

No environmental incidents were reported relating to noise and blasting emissions at the Albion Park Quarry during the period February 2006 to October 2012. Complaints regarding noise and blasting were responded to in accordance with the quarry's Complaint Response Protocol.

4 PROPOSED MODIFICATION TO ALBION PARK QUARRY OPERATIONS

4.1 Existing and Proposed Hours of Operation

The existing and proposed operating hours are summarised in **Table 5**, together with the operating hours proposed in Albion Park Quarry Extension EIS.

Table 5 Existing Quarry and Proposed Quarry Modification Hours of Operation

On-Site Operation	Quarry EIS	Current Quarry (Approved) ¹	Quarry Modification
Drilling	7.00 am to 5.30 pm (Monday to Friday) 7.00 am to 1.00 pm (Saturday)	Unchanged	Unchanged
Blasting	7.00 am to 5.30 pm (Monday to Friday) 7.00 am to 1.00 pm (Saturday)	Unchanged	Unchanged
Loading and Haulage of blasted rock, topsoil and overburden stripping, bund wall construction, routine maintenance	7.00 am to 5.30 pm (Monday to Friday) 7.00 am to 1.00 pm (Saturday)	Unchanged	Unchanged
Crushing, screening and stockpiling operations	7.00 am to 5.30 pm (Monday to Friday) 7.00 am to 1.00 pm (Saturday)	Unchanged	Unchanged
Other activities ¹	7.00 am to 5.30 pm (Monday to Friday)	24 hour a day 7 day a week ²	Unchanged

Note 1: "Other activities" include those activities associated with the extraction operation but exclude other site activities which are the subject to their own approvals and/or licences e.g. workshop activities.

- a) The delivery of materials as requested by Policy 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.

4.2 Description of the Modification

The increase in production rate will be achieved through increased plant efficiency, product mix and truck upgrades and increased offsite truck movements. Further, mobile fleet numbers operating onsite and volume per blast are expected to remain unchanged, however blasting frequency would increase by up to 50%.

The equipment used in current quarry operations and proposed quarry Modification operations are summarised in **Table 6**, together with the equipment proposed in Quarry Extension EIS.

Table 6 Existing and Proposed Modification Operation

On-Site Operation	Quarry EIS	Current Quarry (Approved) ¹	Quarry Modification	
Processing Plant	Primary Crusher Secondary Crushers and screens Pug mill	Unchanged	Unchanged	
Extraction Area	CAT 773 dump truck CAT 627 scraper ¹ CAT 980C loader CAT 992 loader Rock drill Water Cart CAT D8L dozer ¹ 235C hammer excavator ¹ CAT 245 face shovel	CAT 773B dump truck CAT 627 scraper ¹ CAT 980C loader CAT 992 loader Rock drill Water Cart CAT D8L dozer ¹ CAT 330L Excavator + hammer ¹ CAT 375 Excavator CAT 345 Excavator Generator Pump	Unchanged	
Off-site Road Transport	Maximum 130 vehicles per hour	Unchanged ²	Unchanged ^{2,3}	

Note 1: Intermittent use only.

Note 2: The truck movements are comparable to EA due to the use of larger capacity trucks.

Note 3: Refer to **Section 8.2** for summary of findings from the Traffic Impact Assessment.

Note 2: According to the Consent, the following activities may be carried out at the premises outside the hours specified in **Table 5**.

5 NOISE CRITERIA AND NOISE AFFACTED RECEIVERS

The potentially most noise affected residences are identified in **Table 1**.

The noise limits nominated in Consent (refer to **Appendix A**) are as follows:

"4 NOISE LIMITS

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

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	

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.
- 2. 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 identified in Table 1 apply under meteorological conditions of:
 - Wind speed up to 0.5m/s at 10 metres above ground level; or
 - Temperature gradient (environmental lapse rate) conditions of less than or equal to 0∘C/100m (lapse)."

6 EXISTING METEOROLOGICAL AND NOISE ENVIRONMENT

6.1 Meteorological Environment

Section 5.3 of the INP (EPA, 2000) provides the following regarding wind effects:

Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season.

An assessment of prevailing wind conditions was derived from the meteorological data recorded from the Bureau of Meteorology for the period of January 2008 to September 2011 from the weather station at the Albion Park Airport. The seasonal wind speeds and directions over the 45 month period (to the end of September 2011) were analysed in accordance with a methodology consistent with the requirements of the INP.

Based on this analysis, the prevailing winds less than (or equal to) 3 m/s with a frequency of occurrence greater than (or equal to) 30% and considered to be relevant to the Albion Park Quarry in accordance with the INP, are presented in **Table 7**.

Table 7 Prevailing Wind Conditions in Accordance with the INP

Season	Winds ±45 degrees ≤ 3 m/s with Frequency of Occurrence ≥ 30%				
	Daytime	Evening	Night-Time		
Annual	Nil	Nil	NNW (32%)		
Summer	Nil	Nil	N (34%), NNW (34%)		
Autumn	Nil	Nil	Nil		
Winter	Nil	Nil	Nil		
Spring	Nil	N (33%), NNW (35%)	N (36%), NW (33%), NNW (42%)		

Section 5.2 of the INP (EPA, 2000) provides the following regarding temperature inversions:

Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment.

An assessment of atmospheric stability conditions has also been prepared from the meteorological data recorded from the Bureau of Meteorology for the period of January 2008 to September 2011 from a weather station at the Albion Park Airport. The frequency of occurrence of atmospheric stability classes are presented in **Table 8**, together with estimated Environmental Lapse Rates (ELR).

Table 8 Atmospheric Stability Frequency of Occurrence – Winter Evening and Night-Time

Stability Class	Frequen	Frequency of Occurrence					Qualitative
	Annual	Summer	Autumn	Winter	Spring	ELR °C/100 m	Description
A	0.0%	0.0%	0.0%	0.0%	0.0%	<-1.9	Lapse
В	0.0%	0.0%	0.0%	0.0%	0.0%	-1.9 to -1.7	Lapse
С	0.0%	0.0%	0.0%	0.0%	0.0%	-1.7 to -1.5	Lapse
D	38.4%	34.9%	36.4%	46.7%	34.4%	-1.5 to -0.5	Neutral
E	16.9%	17.2%	15.9%	17.5%	17.3%	-0.5 to 1.5	Weak inversion
F	22.3%	20.9%	24.8%	20.7%	22.7%	1.5 to 4	Moderate inversion
G	22.4%	27.0%	22.9%	15.1%	25.6%	>4.0	Strong inversion
F+G	44.7%	47.9%	47.7%	35.8%	48.3%	>1.5	Moderate to Strong Inversion

^oC = degrees Celsius.

In accordance with the INP, the frequency of occurrence of moderate to strong (ie >1.5°C/100 m inclusive) temperature inversions is greater than 30% during winter in the combined evening and night-time period, and therefore is included for assessment. Consequently, consistent with the INP, temperature inversions are assessable during night-time operations.

The findings of the weather analysis are consistent with those presented in the Quarry Extension NIA. Accordingly, the assessable weather conditions remain unchanged ie noise limits apply under calm (no wind) conditions only.

7 NOISE PREDICTION METHODOLOGY

7.1 Noise Prediction Procedure

The Albion Park Quarry noise model was prepared using RTA Software's Environmental Noise Model (ENM for Windows, Version 3.06), a commercial software system developed in conjunction with the NSW EPA. The acoustical algorithms utilised by this software have been endorsed by the ANZEC and all State Environmental Authorities throughout Australia as representing one of the most appropriate predictive methodologies currently available.

The Albion Park Quarry noise model was initially developed for the Quarry Extension NIA and has subsequently been modified and updated as part of the annual noise monitoring undertaken in accordance with the NMP.

The two unattended monitoring locations have been incorporated into the Albion Park Quarry noise model and are used as reference points (reference locations). A comparison between the predicted noise levels at the two reference locations and the residences is undertaken annually and is used to determine the correlation between the noise monitored at the reference locations and the contribution of Albion Park Quarry at the receivers.

Although it has been shown that there are no site specific wind conditions for the Albion Park Quarry Extension operations, the quarry noise at the receivers is calculated for 5 m/s winds in order to give an indication of the quarry noise levels at the receivers as part of the annual reporting.

The analysis of the logger results together with the modelling results enables the contribution of the Albion Park Quarry to be calculated for different wind conditions.

7.2 Sound Power Levels

The potential for machinery to emit noise is quantified as the sound power level (SWL) expressed in A-weighted decibels (dBA) re 1 pW. At the receptor, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 μ Pa. The INP's energy equivalent (Leq) assessment parameters has introduced greater mathematical rigour to the prediction of received noise levels as it enables the use of Leq SWL as noise model inputs. In general terms, any variation in quarry site Leq SWL will produce a similar variation in the Leq(15minute) sound pressure level at the receiver.

Comparative equipment fleets are presented in **Table 9** together with the overall quarry site L_{eq} SWLs from the Albion Park Quarry as predicted in the EIS, the current as built Quarry Extension, and the proposed Quarry Modification.

Table 9 Albion Park Quarry EIS, Current as built, and Proposed Modification Equipment Fleets

On-Site Operation	Equipment	CB Quarry EIS			Current CB Quarry Operation (Approved) ^{1,3}		CB Quarry Modification ³	
		No of Items	SWL	No of Items	SWL per item	No of Items	SWL per item	
Processing Plant	Primary Crusher	1	112	1	112	1	112	
	Secondary Crushers and screens	1	116	1	116	1	116	
	Pug mill	1	115	1	115	1	115	
Extraction Area	CAT 773 dump truck	4	120	4	120	4	120	

On-Site Operation	Equipment	CB Qua	rry EIS	Current CB Quarry Operation (Approved) ^{1,3}		CB Quarry Modification ³	
		No of Items	SWL	No of Items	SWL per item	No of Items	SWL per item
	CAT 627 scraper ¹	1	111	1	111	1	111
	CAT 980C loader	1	114	1	108	1	108
	CAT 992 loader	1	118	1	115	1	115
	Rock drill	2	121	2	121	2	121
	Water cart	1	109	1	104	1	104
	CAT D8L dozer ¹	1	116	1	118	1	118
	235C hammer excavator ^{1, 2}	1	112	-	-	-	-
	CAT 245 face shovel ²	1	117	-	-	-	-
	CAT 330L hammer excavator ^{1, 2}	-	-	1	112	1	112
	CAT 375 excavator ²	-	-	1	111	1	111
	CAT 345 excavator ²	-	-	2	113	2	113
Total		16	127 dBA	18	126 dBA	18	126 dBA

Note 1: Intermittent use only.

Note 2: 235C hammer excavator and CAT 245 face shovel have been replaced with CAT330L hammer excavator, CAT 375 excavator and CAT 345 excavator.

Note 3: SWL based on latest measured on-site plant noise levels.

As shown above, the overall maximum sound power levels of the Quarry Modification (126 dBA) is the same as the existing site sound power. However, the introduction of low noise standard fleet items since the commencement of the Quarry Extension operations has resulted in a marginal (1 dBA) site sound power reduction by comparison with the EIS operations.

7.3 Operational Noise Assessment

The predicted Albion Park Quarry Modification LAeq(15minute) intrusive noise emissions at the nearest receivers are presented in **Table 10**, based on a scaling of the change in total site SWL to the noise emission levels predicted in the Quarry Extension NIA.

Table 10 Calculated Noise Contribution of the Albion Park Quarry for No Wind (Calm)

Residences	Noise Contribution of the Albion Park Quarry at residences under no wind – in dBA				
	EIS	Current Operations	Modification		
"Belmont" residence (Cody) ¹	52	45	45		
"The Hill" Residence (Dunster)	38	34	34		
"The Cottage" Residence	38	34	34		
Greenmeadows Residential Estate	41	36	36		

Note 1: Residence owned by Cleary Bros.

7.4 **Summary of Operational Noise Results**

In summary, the predicted noise levels show that:

The proposed Expanded Quarry Operations are likely to comply with the current Consent noise limits. The levels at all dentified receivers are expected to remain the same as the current operations ie typically 4 dBA below Consent criteria.

OFF-SITE ROAD TRANSPORT NOISE 8

8.1 **Traffic Noise Criteria**

The NSW Road Noise Policy (EPA, 2011) provides non mandatory procedures for setting acceptable LAeq noise levels on arterial, collector and local roads and guidelines for assessing noise impacts from off-site road traffic.

The traffic noise assessments in this report are based on vehicles using the East-West Link Road.

The NSW Road Noise Policy (EPA, March 2011) is the relevant policy for the assessment of road noise in NSW. The NSW Road Noise Policy adopts a classification scheme for assessing noise impacts on an existing road network from additional traffic generated by the proposed Expanded Quarry Operations as presented in **Table 11**.

Table 11 Road Traffic Noise Assessment Criteria for Residential Land Uses (dBA re 20 µPa)

Road	Type of Project and Land Use	Total Traffic Noise Criteria ^{1,3}	Relative Increase Criteria ^{2,3}
East-West Link Road	Existing residences affected by	Daytime 60 LAeq(15hour)	Existing LAeq(15hour) ⁴ plus 12 dBA
	additional traffic on existing freeways/arterial/subarterial road generated by land use development.	Night-time 55 LAeq(9hour)	Existing LAeq(9hour) plus 12 dBA

- Note 2: Relative increase noise level generated by the Modification for comparison with the Criteria.
- Note 3: Daytime 0700 hrs to 2200 hrs, Night-time 2200 hrs to 0700 hrs.
- Note 4: LAeq = equivalent continuous noise level.

In relation to situations where exceedances of the road traffic noise assessment criteria are predicted, the NSW Road Noise Policy relevantly provides:

Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.

In assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

In practice, noise level increases of less than 2 dBA are generally achieved when the Project-related percentage increase to the existing light and heavy traffic is no greater than 60%.

The NSW Road Noise Policy describes a number of process steps for applying the criteria. In general accordance with these steps, this assessment has:

- Identified a study area, which has been defined as the portion of East-West Link Road between Colden Drive and Wollybutt Drive, Albion Park.
- All receivers (ie residences and other sensitive land uses) in the vicinity of the study area have been identified.
- Calculated noise levels associated with existing traffic and Project-related traffic and compared the predicted increase against the Relative Increase Criteria (Section 8.2).
- Compared predicted noise levels against the Total Traffic Noise Criteria (Section 8.2).

8.2 Traffic Noise Impact Assessment

All vehicles entering or leaving the quarry site now use the East-West Link Road. The quarry traffic will pass some 145 m from the closest dwelling. A traffic survey conducted in March 2000 suggested that the peak hourly traffic flow would be up to 130 vehicles per hour with approximately 60% being heavy vehicle movements (ie 78 trucks per hour) was considered in the Quarry Extension NIA.

GTA Consultants Pty Ltd has undertaken a Traffic Impact Assessment (TIA) for the proposed Expanded Quarry Operations. The TIA found that "there will be no noticeable change to the peak operating periods of the Cleary Bros Albion Park Quarry with regards to traffic generation." And, "the increase in annual production levels allows the Quarry to operate with more busy days per year than currently occurs."

Based on a typical busy day, the current Albion Park Quarry operates trucks at a rate of approximately 5,000 tonnes/day, which is equivalent to 1,380,000 tpa. This corresponds to under 200 truck loads (or 400 truck pass-by movements) which corresponds to an average of 40 truck pass-by movements per hour ie about half that considered in the Quarry Extension NIA.

Notwithstanding the above, a prediction of traffic noise levels at the closest Greenmeadows Estate residence generated from Albion Park Quarry traffic is given in **Table 12** and from all traffic is given in **Table 13**

Traffic noise predictions are based on the methodology endorsed by the United States (US) Environmental Protection Agency Report 550/9-74-004 dated March 1974, but including modifications based on equations in Appendix A-13 and certain amendments recommended in the United Kingdom (UK) Calculation of Road Traffic Noise (CORTN). The prediction methodology is generally conservative and takes into account vehicle volume, speed, type, passby duration and facade reflection and assumes no intervening barriers or topography with all receivers having a full angle of view to the road.

Table 12 Predicted Quarry Traffic Noise Contribution – Daytime¹

Receiver Location	Predicted Traff LAeq(15hour)	ic Noise Level	Traffic Noise L _{Aeq} (external) Design Goals
	Existing	Modification	
Greenmeadows Estate residence	42 dBA ²	42 dBA	60 dBA

Note 1: Daytime period (7.00am – 10.00pm).

Note 2: Based on the existing busy day truck movements of approximately 400 product truck movements per day.

Table 13 Predicted Traffic Noise - All Traffic - Daytime¹

Receiver Location	Predicted Traffic Noise Level LAeq(15hour)		Traffic Noise LAeq (external) Design Goals
	Existing	Modification	
Greenmeadows Estate residence	51 dBA ²	51 dBA	60 dBA

Note 1: Daytime period (7.00am - 10.00pm).

Note 2: Based on the existing busy day movements of approximately 11,000 vehicle movements per day and assuming 15% heavy vehicles.

The predicted contribution to the noise at the closest residence at Greenmeadows Estate for a typical high traffic flow day from both the Albion Park Quarry alone and from all traffic accessing the road is well below the daytime traffic noise goal. Consequently, continuation of the Albion Park Quarry traffic flow will not cause the noise from the total traffic flow on the East-West Link Road to exceed the daytime traffic noise goals.

9 CUMULATIVE NOISE IMPACT

9.1 Cumulative Amenity Noise Criteria

Potential cumulative noise impacts from existing and successive resource developments are embraced by the INP procedures by ensuring that the appropriate noise emission criteria (and Consent limits) are established with a view to maintaining acceptable noise *amenity* levels for residences.

In order to assess potential cumulative noise impacts it is important to appreciate and distinguish between the INP's first and second environmental noise control objectives as follows:

Intrusive Noise Criteria LAeq(15minute)

The INP's first objective, that the intrusive noise emission from any single source does not exceed the background level by more than 5 dBA, relates to each individual development and the intrusive noise limit is generally specified in the Development Consent and/or Licences and Approvals.

There is not an established procedure (or regulatory requirement) to determine the cumulative intrusive LAeq(15minute) noise criterion in relation to the simultaneous operation of the existing CSR and Cleary Bros quarrying operations.

Cumulative Noise Amenity Criteria LAeq(period)

The INP's second objective is that the LAeq(period) amenity level does not exceed the specified "acceptable" level appropriate for the particular locality and land use and is aimed at restricting the potential cumulative increase in noise *amenity* levels (otherwise known as "background creep").

Based on the INP, the acceptable LAeq(period) noise *amenity* level in relation to the simultaneous operation of the CSR and Cleary Bros quarries are daytime 55 dBA LAeq(11hour), evening 45 dBA LAeq(4hour) and night-time 40 dBA LAeq(9hour).

9.2 Cumulative Noise Impact Assessment

An indicative cumulative noise impact assessment has been based upon an evaluation of the predicted worst case noise emission levels produced by the existing and future operations of the CSR and Cleary Bros quarrying operations.

Based on the Quarry Extension NIA and the "Annual Noise Monitoring Assessments" from 2008 to 2011, the maximum estimated daytime LAeq(11hour) amenity noise level is 43 dBA at Greenmeadow Residential Estate, which are well below the INP's acceptable amenity criteria of 55 dBA LAeq(11hour) during the daytime period.

As the on-site mobile fleet numbers are expected to remain unchanged, the estimated daytime LAeq(11hour) amenity noise level will remain unchanged. Therefore, the INP's acceptable amenity criterion of 55 dBA LAeq(11hour) during the daytime period is still achievable.

10 BLASTING

10.1 Ground Vibration and Airblast Limits

Blast emission limits have been imposed on Albion Park Quarry via the EPL and the Consent. The Licence extract is presented below.

"L3 Blasting

- L3.1 The airblast overpressure level from blasting operations in or on the premises must not exceed:
 - a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period;

and

b) 120 dB (Lin Peak) at any time.

At any point that is located at least 3.5m from any residence or other sensitive receiver on privately-owned land.

- L3.2 The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:
 - a) 5mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and
 - b) 10 mm/s at any time.

At any point that is located at least 3.5m from any residence or other sensitive receiver on privately-owned land.

L3.3 Blasting must be limited to one blast each day.

Where compelling safety reasons exist, the Authority may permit additional blasts to occur where prior written (or facsimile) notification of any additional blasts are made to the Authority.

L3.4 Blasting operations at the premises may only take place between 9:00am – 5:00pm Monday to Friday.

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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."

10.2 Blast Emissions Performance

An extensive study into the impact of blasting at the Albion Park Quarry was conducted by SLR Consulting and the findings presented in the Quarry Extension NIA. The NIA and subsequent BMP identified extensive blast design requirements in order to comply with the blast emission limits (refer to **Section 3.3.2**).

At the existing Cleary Bros Albion Park Quarry the limiting parameter for blast design is airblast, rather than ground vibration.

All blasting undertaken to date within the Quarry Extension Area has complied with the emission limits presented in **Section 10.1**. For the period 2008 to 2012 the maximum monitored blast emissions levels were 112.3 dBL and 2.72 mm/s

10.3 Blast Impact Assessment

Cleary Bros intend to continue with the current blasting practices at the Albion Park Quarry for the proposed Modification ie shot orientation and limiting MIC. As a worst case scenario the number of blast would increase by 50% ie there would be more blasts per year. However, Cleary Bros blast on average less than once per week, accordingly, the proposed increase in blasting frequency would still be well within the Consent and EPL blasting frequency limit of 1 blast per day.

By incorporating deck charges of the front row of blastholes in each blast and 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 of up to 36 kg, would result in compliance with the Consent and EPL limits of 115 dBA airblast and 5 mm/s ground vibration.

Accordingly, the blast emission impacts from the Modification are expected to remain comparable to the current operations and compliant with the Consent and EPL limits.

11 SUMMARY OF FINDINGS

MMJ Wollongong (MMJ) has engaged SLR Consulting Australia Pty Ltd (SLR Consulting), on behalf of Cleary Bros (Bombo) Pty Ltd (Cleary Bros, the Proponent) to conduct a noise and blasting impact assessment for the proposed annual production rate increase at the Albion Park Quarry. The quarry is currently operating with an approved annual extraction rate of 600,000 tpa and the Proponent is seeking approval to increase the extraction rate to 900,000 tpa.

Busy operational days for the existing Albion Park Quarry operations currently equate to an annual production rate of approximately 1,380,000 tpa. The proposed increase in the approved annual extraction rate of 600,000 tpa to 900,000 tpa would primarily be achieved through increased utilisation of current operational lulls.

Accordingly, the noise and blasting emissions from the Modification to all surrounding receivers are expected to be comparable to the existing emissions from the Albion Park Quarry.

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Operating Noise Impact Summary

The noise assessment has found that the calculated daytime LAeq(15minute) intrusive noise emission level at all the potentially noise affected residences comply with the Consent noise limits. The noise emissions at all receivers are expected to remain unchanged and the current performance is expected to continue ie typically 4 dBA below Consent criteria at all receivers.

Road Traffic Noise Impact Summary

The existing access road off East-West Link Road would remain the primary access to the quarry site. The typical daily maximum operational workforce traffic and traffic associated with deliveries along public roads would not change due the Modification. The overall traffic noise level contribution, including the Albion Park Quarry operations, would remain well below the corresponding noise limit of 60 dBA LAeq(15hour).

Cumulative Noise Summary

As the on-site mobile fleet numbers are expected to remain unchanged, the estimated daytime amenity noise level will remain below the INP's acceptable amenity criteria of 55 dBA LAeq(11hour) during the daytime period.

Blasting Impact Summary

The blast design parameters and management practices remain generally unchanged. The modification would not increase the blast frequency, of one blast per day, that is currently permitted in the Consent and there is no change in the extent of operation.

Accordingly, blasting impacts associated with the Modification would continue to be maintained within the Consent and EPL Conditions (for the existing operation) of 115 dBA airblast and 5 mm/s ground vibration (with an allowance 5% exceedance in a 12 month period) at the closest most affected residences surrounding the site.

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Development Consent (DA-466-11-2003) dated 21 February 2006



APPENDIX 7:

"Traffic Impact Assessment"



Cleary Bros Quarry Albion Park Rail

Proposed Increase to Annual Production Levels

Traffic Impact Assessment

draft

transportation planning, design and delivery



Cleary Bros Quarry Albion Park Rail

Proposed Increase to Annual Production Levels

Traffic Impact Assessment

Issue: A-Dr2 27/11/12

Client: Cleary Bros Pty Ltd Reference: 13S1169000 GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By
A-Dr	20/11/12	Draft	Brigette Humphrey- Robinson	Jason Rudd	Jason Rudd
A-Dr2	27/11/12	Final Draft	Brigette Humphrey- Robinson	Jason Rudd	Jason Rudd







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1. Introduction

1.1 Background

It is understood that a modification application is to be lodged with the Department of Planning and Infrastructure (DoPI) to increase the annual production for the Cleary Bros hard rock quarry (Quarry) located in Albion Park Rail.

In 2005 approval was granted to the Quarry to produce up to 400,000 tonnes per annum (tpa) of hard rock from the site. The application for the approval was supported by a traffic impact assessment prepared by Masson Wilson Twiney Pty Ltd (April, 2003). The assessment included consideration of the then recently opened East – West Link Road connecting Croome Road with the Princes Highway at the 'Oaks Flat Interchange'.

In 2009 approval was granted to the Quarry to increase production levels from 400,000 tpa to 600,000 tpa. The application for the increase was supported by a traffic statement prepared by Masson Wilson Twiney (September 2008) which considered the traffic implications associated with a Quarry production level of 800,000 tpa.

The current modification application proposes that the production level be increased to 900,000 tpa.

GTA Consultants has been commissioned by Cleary Bros to undertake a traffic impact assessment for the proposed increased production level. In particular, this assessment has considered the implications of the proposed annual increase in production levels with regard to:

- the existing and potential future daily traffic generation characteristics of the Quarry
- the operation of the surrounding road network
- functional capacity of the East West Link Road.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- i existing traffic conditions surrounding the site
- ii existing site generation
- iii the traffic generating characteristics of the increased production
- iv suitability of the proposed access arrangements for the site
- v the transport impact of the proposed increased production levels on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Masson Wilson Twiney Pty Ltd traffic reports (April, 2003 and September 2008)
- traffic surveys undertaken by GTA Consultants as referenced in the context of this report
- other documents and data as referenced in this report.

2. Existing Conditions

2.1 Site Location

The subject Cleary Bros Quarry is located south-west of the Princess Highway in Albion Park Rail and access is via the intersection of East West Link Road and Colden Drive which opened in 2002.

Surrounding properties include Albion Park Rail industrial estate located north of the East West Link Road and residential properties located to the north of the site and accessed from western intersections along East West Link Road.

Holcim Quarry is located adjacent to the site and the two quarries share the boundary located along the west of the Cleary Bros site and is accessed from the intersection of East West Link Road and Woollybutt Drive.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

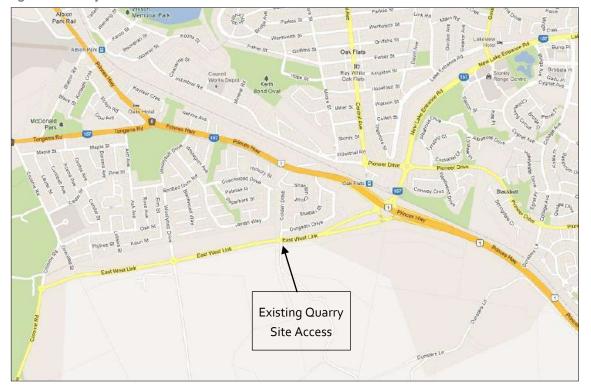


Figure 2.1: Subject Site and Its Environs

(Reproduced with permission from Sydway Publishing Pty Ltd)

2.2 Road Network

2.2.1 East West Link Road

The East West Link Road was constructed and opened in late 2002 with the purpose of providing a major collector road connection between Croome Road and the Princes Highway, thereby relieving the traffic demands on the Princes Highway / Tongarra Road intersection.

The East West Link is currently constructed as a two lane road (one lane in each direction) with a dedicated marked cycle lane and wide sealed shoulder lane on both sides of the road.

Prior to opening it was predicted that the East West Link would operate in 2018 with approximately 11,000 vehicles per day. In October 2012, GTA traffic surveys (see below) indicated that the East West Link road was carrying some 1,063 vehicles in the AM peak hour and 1,186 vehicles per hour in the PM peak hour period. These peak flows would indicate that the East West Link Road is currently carrying in the order of 10,000 - 11,000 vehicles per day and consistent with the road's intended function.

2.2.2 Surrounding Intersections

Two roundabout intersections have been constructed along the East West Link Road to facilitate access to the residential / industrial estate to the north and to the quarries to the south. These intersections are:

- East West Link/ Colden Road/ Cleary Bros access road (roundabout) see Figure 2.2
- East West Link/ Woollybutt Road/ Holcim Quarry access road (roundabout) see Figure 2.3.

Both these intersections currently operate as single lane roundabouts.

Figure 2.2: Intersection of East West Link and Cleary Bros Quarry (looking south)



Figure 2.3: Intersection of East West Link and Holcim Quarry (looking north)



The Cleary Bros Albion Park Quarry is accessed from the intersection of East West Link, Colden Drive and the site access road. The road also provides access to two small farms located along the eastern boundary of the site which were observed to produce frequent traffic movements during the AM and PM peak periods. In addition Colden Drive was observed to be utilised as a primary access to the industrial precinct located north of the site.

2.3 Vehicle Routes

East West Link provides a direct link between the Quarry access road and the existing arterial road network. As such, it provides direct access to the Princess Highway via a grade separated interchange. This route was observed to be undertaken by 95% of Cleary Bros vehicles entering and exiting the site. Vehicles can travel both north and south once on the Princes Highway.

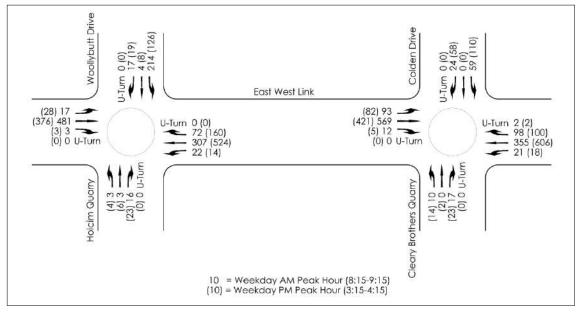
2.4 Surveyed Traffic Volumes (2012)

GTA Consultants undertook traffic movement counts on key roads in the vicinity of the site on 31 October 2012 during the following peak periods:

- 7:45am and 9:45am
- 2:30pm and 4:30pm.

The AM and PM peak hour traffic volumes are summarised in Figure 2.4 with full results contained in Appendix A.

Figure 2.4: Existing AM / PM Peak Hour Traffic Volumes (Survey Date – 31/10/12)



2.5 Heavy Vehicle Movements

On the 31 October 2012, classified vehicle counts were undertaken at the intersection of East West Link, Colden Drive and the Cleary Bros access road. The AM and PM peak period heavy vehicle movements in and out of the site are summarised in Table 2.1.

The results shown in Table 2.1 indicate that the Cleary Bros heavy vehicles volumes peaked during the 8:45-9:45am hour with a volume of 30 vehicles. It is noted that this equated to 19 vehicles entering the site and 11 departing the quarry. As such, it is evident that minimal heavy vehicle loads are carried out during the AM and PM peak periods.

Table 2.1: Cleary Bros Heavy Vehicle Movements

Peak	Time Period	In	Out	Total
	7:45-8:45	12	14	26
	8:00-9:00	14	13	27
AM	8:15-9:15	14	10	24
	8:30-9:30	16	10	26
	8:45-9:45	19	11	30
	14:30-15:30	11	8	19
	14:45-15:45	15	9	24
PM	15:00-16:00	13	10	23
	15:15-16:15	13	11	24
	15:30-16:30	12	7	19

2.6 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION¹, a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the RTA, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.2 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.2: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
В	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
С	C 29 to 42		Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2.3 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Program used under license from Akcelik & Associates Pty Ltd.

Table 2.3: Existing Operating Conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
		South	0.041	13.4	2	A
	***	East	0.317	13.4	12	А
East West Link	AM	North	0.089	15.5	3	В
Road/		West	0.515	14.6	29	В
Colden Drive/ Cleary Bros		South	0.070	15.4	3	В
Access Road	PM	East	0.499	13.9	31	А
		North	0.162	14.9	6	В
		West	0.381	15.0	19	В
	AM	South	0.039	14.5	2	A
		East	0.264	13.4	13	Α
East West Link		North	0.229	15.3	9	В
Road/		West	0.360	13.1	17	A
Woollybutt Drive/ Holcim		South	0.051	14.4	2	А
access Road	PM	East	0.448	13.5	26	Α
	PIVI	North	0.142	14.6	5	В
		West	0.326	14.6	15	В

On the basis of the above assessment, it is clear that the intersections of the East West Link Road with the Cleary Bros access Road and the Holcim Quarry access Road currently operate well with minimal queues and delays on all approaches.

Further to this the intersection of the site access road and East West Link currently operates at a Level of Service B and therefore operates well and has spare capacity to accommodate an increase in traffic volumes.

2.7 Traffic Generation Characteristics of Existing Cleary Bros Quarry Operation

As noted above, the Quarry currently has approval to produce 600,000 tpa however there is no restriction on the number of trucks that can enter and exit the quarry in association within the transport of quarry production materials.

With regard to the potential traffic implications of Quarry operations to the surrounding road network, it is the volume of traffic generated on a daily and more importantly an hourly basis that determines the extent of impacts and not annual production.

Traffic generation potential of the Cleary Bros Quarry at Albion Park is dedicated by:

- Production capacity and ability to load trucks with material for export
- Haulage fleet characteristics (number and type of trucks)
- Market demand.

For the month of October 2012, data relating to the daily volume of truck movements of exported production material has been provided to GTA Consultants by Cleary Bros. The data provided shows both the volume of material exported and number of trucks leaving the Quarry on a daily basis.

The data is summarised in Figure 2.5 and Figure 2.6. It is noted that GTA Consultants undertook traffic surveys on 31 October 2012 which is included in the presented data. Anecdotally, October 2012 was understood to be a busy month with regard to the export of product from the Quarry.

Furthermore it is noted that the GTA Consultants traffic surveys were undertaken on a busy day (5,018 tonnes and 137 trucks) in October 2012 and thus the surveys represent a period when the Quarry was operating during a busy period.

Figure 2.5: Daily Number of Truck Loads Leaving the Quarry during October 2012

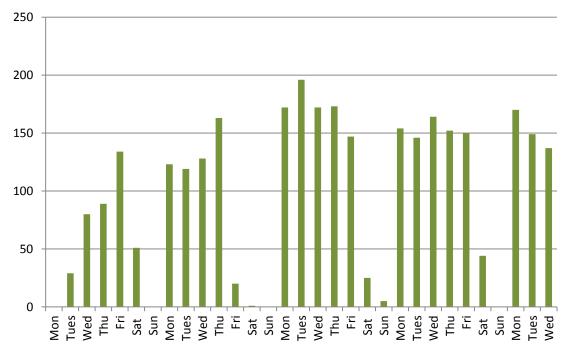


Figure 2.6: Daily Tonnage of Production Exported from the Quarry during October 2012

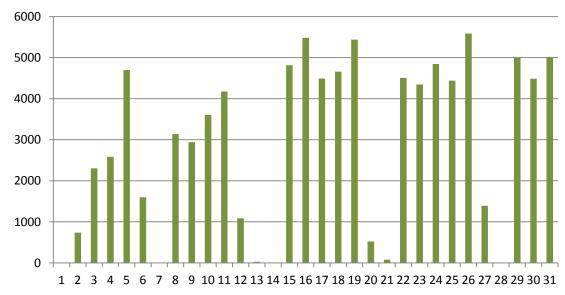


Figure 2.5 and Figure 2.6 clearly show large daily variations in the volume of product exported from the Quarry. As shown above, the Quarry is effectively operational 5 ½ days per week with little to no traffic generated on Sundays (and public holidays) and less than average traffic generated on Saturdays.

2.8 Peak Quarry Day Intersection Operation Analysis

As shown in Figure 2.5, traffic surveys undertaken as part of this assessment were representative of a busy day in October but not the busiest day during the month.

On the surveyed day (31/10/2012) the Quarry was recorded via the gate receipts to generate some 137 truck movements (outbound). The gate receipts indicate that the busiest October day generated some 196 truck movements.

In order to assess the peak Quarry operating day, the surveyed peak hour Quarry traffic generation was increased proportionally to the daily truck movements in October (ie. increased by 43%).

The peak Quarry day hourly flows were then analysed using the SIDRA INTERSECTION software. The results are presented in Table 2.4.

Table 2.4: Existing 'Peak Quarry Day' Operating Conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
East West Link Road/ Colden Drive/ Cleary Bros Access Road	AM	South	0.063	13.5	2	А
		East	0.331	13.5	13	А
		North	0.092	15.7	4	В
		West	0.531	14.7	30	В
	PM	South	0.105	15.6	5	В
		East	0.511	13.9	32	А
		North	0.164	15.0	6	В
		West	0.390	15.2	19	В
East West Link Road/ Woollybutt Drive/ Holcim access Road	АМ	South	0.039	14.5	2	В
		East	0.267	13.4	13	А
		North	0.230	15.3	9	В
		West	0.365	13.1	17	А
	PM	South	0.052	14.5	2	А
		East	0.452	13.5	26	Α
		North	0.143	14.7	5	В
		West	0.334	14.6	15	В

On the basis of the above assessment, it is clear that the intersections of the East West Link Road with the Cleary Bros access Road and the Holcim Quarry access Road currently operate well during "Peak Quarry Day Operation" with minimal queues and delays on all approaches.

Further to this the intersection of the site access road and East West Link currently operates at a Level of Service B and therefore operates well and has spare capacity to accommodate an increase in traffic volumes.





3. Traffic Implications of Proposed Annual Production Level Increase

3.1 Overview of Proposed Production Level Increase

It is proposed that the annual production level of the Cleary Bros Quarry be increased from 600,000 tpa to 900,000 tpa.

With regard to peak daily export levels and associated traffic generation, the proposed annual increase will not change the existing peak operating conditions.

For example it not proposed to increase the Quarry's production capacity nor the Quarry's capacity to load trucks.

Essentially the increase in annual production levels allows the Quarry to operate with more busy days per year than currently occurs.

3.2 Implications to Road Network Operation

As detailed in Section 2, the road network surrounding the Cleary Bros Quarry is operating satisfactorily with good levels of service, minimal delays and significant spare capacity during peak operating periods at the Quarry.

The road network performance analysis presented in this report is based on daily production level of:

- 5,018 tonnes (Section 2.7)
- 5,482 tonnes (Section 2.8).

Traffic Impact Assessment

Assuming a 5 ½ day working week and 50 weeks of production per year, the annual production level corresponding to the daily production levels assessed are:

- 5,018 tonnes / day represents approximately 1,380,000 tpa
- 5,482 tonnes / day represents approximately 1,508,000 tpa.

Put a different way, the average daily production level for an approval of 900,000 tpa would be approximately 3,275 tonnes per day.

The analysis has indicated that the Quarry traffic generation of some 53% -67% higher than the proposed average daily generation can be satisfactorily accommodated by the surrounding road network.

The traffic analysis of the existing (2012) road network operation presented above has indicated that the construction of the East West Link road is functioning as planned. That is the volume of traffic using the East West Link road is consistent with expectations and the is functioning as major collector road as an alternate route for access to and from the Princes Highway and reducing traffic through otherwise residential streets.

It is noted that the 2009 approval of the Quarry for 600,000 tpa was based on a peak production level of just under 90,000 tonnes per month. The production level during October 2012 was just under 92,000



Traffic Implications of Proposed Annual Production Level Increase



tonnes per month. A monthly production of 90,000 tonnes per month (as approved) equates to an annual production of 1,080,000 tpa.



draft

4. Summary

In summary, it is proposed that there will be no noticeable change to the peak operating periods of the Cleary Bros Albion Park Quarry with regards to traffic generation.

The analysis presented in this report has concluded that the existing (and thus proposed) Quarry traffic generation can be adequately accommodated by the surrounding road network which is operating satisfactorily with good levels of service and significant spare capacity.

Thus the proposed increase to annual production levels from 600,000 tpa to 900,000 tpa is considered acceptable with regard to road network operation.

Appendix A

Survey Results

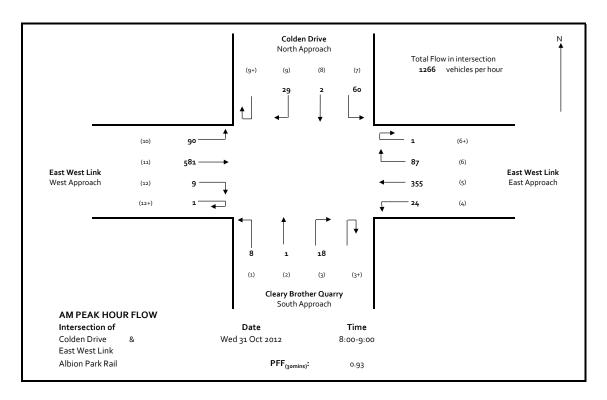


Intersection of Cleary Brother Quarry & East West Link, Albion Park Rail

Date: Wed 31 Oct 2012

							1	5 minut	e Data								
								Move	ment								
Time		Cleary Brot South A		У			est Link proach				n Drive pproach				est Link oproach		Total
Time	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	rotai
	1	2	3	3+	4	5	6	6+	7	8	9	9+	10	11	12	12+	
6:00-6:15																	
6:15-6:30																	
6:30-6:45																	
6:45-7:00																	
7:00-7:15																	
7:15-7:30																	
7:30-7:45																	
7:45-8:00	3	0	5		4	92	20	0	14	0	6		13	126	0	0	283
8:00-8:15	0	1	5		5	91	23	0	16	2	7		16	127	0	1	294
8:15-8:30	2	0	3		2	77	26	0	12	0	9		22	133	4	0	290
8:30-8:45	4	0	5		9	96	15	1	17	0	8		22	168	1	0	346
8:45-9:00	2	0	5		8	91	23	0	15	0	5		30	153	4	0	336
9:00-9:15	2	0	4		2	91	34	1	15	0	2		19	115	3	0	288
9:15-9:30	3	1	4		4	74	19	0	29	0	3		28	93	2	0	260
9:30-9:45	2	1	3		10	86	11	0	25	1	11		12	86	3	0	251
9:45-10:00																	
Total	18	3	34	0	44	698	171	2	143	3	51	0	162	1001	17	1	2348

								Hourly	flows								
								Move	ment								
Time		Cleary Brot South A		У		East We	est Link proach			Colden North A				East We West Ap			Total
	Left 1	Through 2	Right 3	U Turn 3+	Left 4	Through 5	Right 6	U Turn 6+	Left 7	Through 8	Right 9	U Turn 9+	Left 10	Through 11	Right 12	U Turn 12+	
6:00-7:00																	
6:15-7:15																	
6:30-7:30																	
6:45-7:45																	
7:00-8:00																	
7:15-8:15																	
7:30-8:30																	
7:45-8:45	9	1	18		20	356	84	1	59	2	30		73	554	5	1	1213
8:00-9:00	8	1	18		24	355	87	1	60	2	29		90	581	9	1	1266
8:15-9:15	10	0	17		21	355	98	2	59	0	24		93	569	12	0	1260
8:30-9:30	11	1	18		23	352	91	2	76	0	18		99	529	10	0	1230
8:45-9:45	9	2	16		24	342	87	1	84	1	21		89	447	12	0	1135
9:00-10:00																	
Peak Hour	8	1	18		24	355	87	1	60	2	29		90	581	9	1	1266



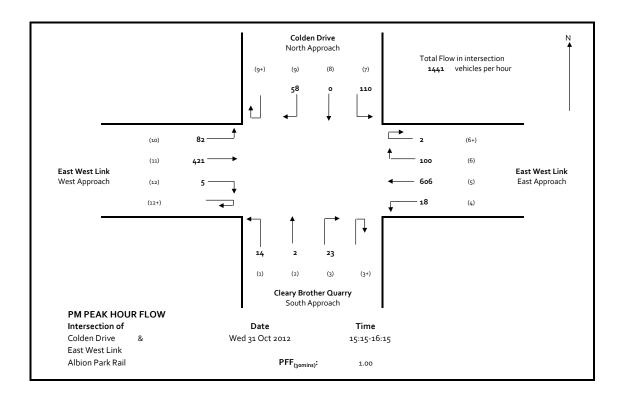


Intersection of Cleary Brother Quarry & East West Link, Albion Park Rail

Date: Wed 31 Oct 2012

							1	5 minut	e Data								
								Move	ement								
		Cleary Brot		у		East We	est Link			Colder	n Drive			East We	est Link		1
Time		South A	pproach			East Ap	proach			North A	pproach			West Ap	proach		Total
	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	
	1	2	3	3+	4	5	6	6+	7	8	9	9+	10	11	12	12+	
14:15-14:30	0	0	0		0	0	0		0	0	0		0	0	0		
14:30-14:45	0	0	1		1	131	2	0	16	0	2		4	87	1		245
14:45-15:00	0	0	2		6	143	14	1	19	0	8		11	94	4		302
15:00-15:15	3	2	6		4	130	13	1	24	0	9		14	97	1		304
15:15-15:30	5	0	6		4	155	26	0	23	0	11		13	105	1		349
15:30-15:45	2	0	8		7	144	20	0	31	0	13		17	130	2		374
15:45-16:00	2	0	2		3	157	29	1	29	0	8		24	89	1		345
16:00-16:15	5	2	7		4	150	25	1	27	0	26		28	97	1		373
16:15-16:30	1	0	2		5	163	20	0	21	0	10		13	109	1		345
16:30-16:45	3	0	4		6	139	22	0	38	0	18		30	80	3		343
16:45-17:00																	ļ
17:00-17:15																	<u> </u>
17:15-17:30																	<u> </u>
17:30-17:45																	ļ
17:45-18:00																	<u> </u>
18:00-18:15																	<u> </u>
Total	21	4	38	0	40	1312	171	4	228	0	105	0	154	888	15	0	2980

								Hourly	flows								
								Move	ment								
Time		Cleary Brot South A		У		East We				Colder North A	n Drive pproach			East We West Ap			Total
	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	
	1	2	3	3+	4	5	6	6+	7	8	9	9+	10	11	12	12+	
14:15-15:15	3	2	9		11	404	29		59	0	19		29	278	6		849
14:30-15:30	8	2	15		15	559	55	2	82	0	30		42	383	7		1200
14:45-15:45	10	2	22		21	572	73	2	97	0	41		55	426	8		1329
15:00-16:00	12	2	22		18	586	88	2	107	0	41		68	421	5		1372
15:15-16:15	14	2	23		18	606	100	2	110	0	58		82	421	5		1441
15:30-16:30	10	2	19		19	614	94	2	108	0	57		82	425	5		1437
15:45-16:45	11	2	15		18	609	96	2	115	0	62		95	375	6		1406
Peak Hour	14	2	23		18	606	100	2	110	0	58		82	421	5		1441



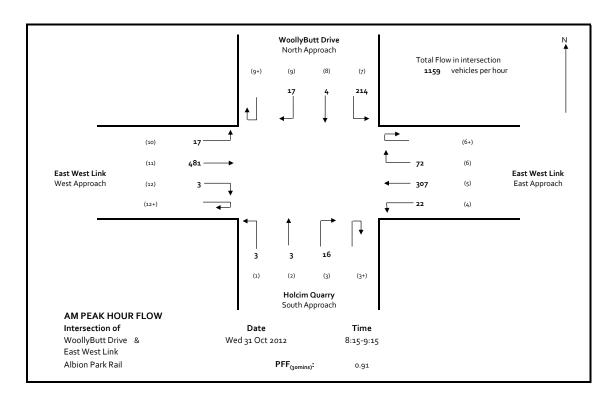


Intersection of Holcim Quarry & East West Link, Albion Park Rail

Date: Wed 31 Oct 2012

							1	5 minut	e Data								
								Move	ment								
Time		Holcim South A					est Link proach			WoollyB North A	utt Drive pproach				est Link pproach		Total
Time	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	rotai
	1	2	3	3+	4	5	6	6+	7	8	9	9+	10	11	12	12+	
6:00-6:15																	
6:15-6:30																	
6:30-6:45																	
6:45-7:00																	
7:00-7:15																	
7:15-7:30																	
7:30-7:45																	
7:45-8:00	0	1	6		7	79	16		37	1	4		1	96	1		249
8:00-8:15	0	1	3		5	73	17		37	0	5		3	109	1		254
8:15-8:30	1	1	6		4	80	15		55	1	5		3	116	0		287
8:30-8:45	0	0	4		8	88	21		55	1	7		8	160	1		353
8:45-9:00	1	1	2		2	63	14		51	0	2		5	103	1		245
9:00-9:15	1	1	4		8	76	22		53	2	3		1	102	1		274
9:15-9:30	3	0	3		3	64	17		29	0	3		4	94	0		220
9:30-9:45	2	1	3		5	73	15		32	0	2		5	68	2		208
9:45-10:00																	
Total	8	6	31	0	42	596	137	0	349	5	31	0	30	848	7	0	2090

								Hourly 1	flows								
								Move	ment								
Time		Holcim South A					est Link proach			WoollyB North A				East We West Ap			Total
	Left 1	Through 2	Right 3	U Turn 3+	Left 4	Through 5	Right 6	U Turn 6+	Left 7	Through 8	Right 9	U Turn 9+	Left 10	Through 11	Right 12	U Turn 12+	
6:00-7:00																	
6:15-7:15																	
6:30-7:30																	
6:45-7:45																	
7:00-8:00																	
7:15-8:15																	
7:30-8:30																	
7:45-8:45	1	3	19		24	320	69		184	3	21		15	481	3		1143
8:00-9:00	2	3	15		19	304	67		198	2	19		19	488	3		1139
8:15-9:15	3	3	16		22	307	72		214	4	17		17	481	3		1159
8:30-9:30	5	2	13		21	291	74		188	3	15		18	459	3		1092
8:45-9:45	7	3	12		18	276	68		165	2	10		15	367	4		947
9:00-10:00																	
Peak Hour	3	3	16		22	307	72		214	4	17		17	481	3		1159



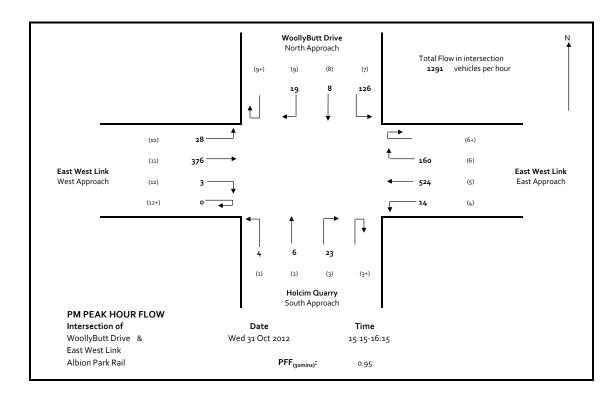


Intersection of Holcim Quarry & East West Link, Albion Park Rail

Wed 31 Oct 2012 Date:

							15	minute	Data								
								Move	ment								
		Holcim	Quarry			East W	est Link			WoollyB	utt Drive			East We	est Link		1
Time		South A	pproach			East Ap	proach			North A	pproach			West Ap	proach		Total
	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	Left	Through	Right	U Turn	
	1	2	3	3+	4	5	6	6+	7	8	9	9+	10	11	12	12+	
14:15-14:30	0	0	0		0	0	0		0	0	0		0	0	0	0	
14:30-14:45	0	0	1		0	103	33		33	0	1		1	44	0	0	216
14:45-15:00	0	3	1		8	112	35		44	3	3		9	64	1	1	284
15:00-15:15	0	3	4		4	125	41		39	0	6		7	100	1	0	330
15:15-15:30	1	5	5		5	131	41		29	1	8		5	94	0	0	325
15:30-15:45	2	0	5		2	109	37		30	1	0		5	98	1	0	290
15:45-16:00	0	0	7		6	140	42		28	3	6		3	81	2	0	318
16:00-16:15	1	1	6		1	144	40		39	3	5		15	103	0	0	358
16:15-16:30	3	1	4		3	126	45		49	1	3		4	72	0	0	311
16:30-16:45																	
16:45-17:00																	
17:00-17:15																	
17:15-17:30																	ļ
17:30-17:45																	<u> </u>
17:45-18:00																	<u> </u>
18:00-18:15																<u> </u>	<u> </u>
Total	7	13	33	0	29	990	314	0	291	12	32	0	49	656	5	1	2432

							I	lourly f	lows								
								Move	ment								
Time		Holcim South A				East We East Ap	est Link oproach			WoollyB North A				East West Ap	est Link oproach		Total
	Left 1	Through 2	Right	U Turn	Left 4	Through		U Turn 6+	Left	Through 8	Right	U Turn 9+	Left 10	Through	Right	U Turn 12+	
14:15-15:15	0	6	6	3.	12	340	109	0.	116	3	10	9.	17	208	2	1	830
14:30-15:30	1	11	11		17	471	150		145	4	18		22 302 2 1				1155
14:45-15:45	3	11	15		19	477	154		142	5	17		26 356 3 1				1229
15:00-16:00	3	8	21		17	505	161		126	5	20		20	373	4	0	1263
15:15-16:15	4	6	23		14	524	160		126	8	19		28	376	3	0	1291
15:30-16:30	6	2	22		12	519	164		146	8	14		27	354	3	0	1277
Peak Hour	4	6	23		14	524	160		126	8	19		28	376	3	0	1291



Appendix B

SIDRA INTERSECTION Results

121114 13S1169000 Intersection of East West Link, Colden Drive and Cleary Bros. Quarry Existing Conditions
AM Peak Hour (8:15-9:15)
Roundabout

Moven	nent Per	formance -	Vehicles								
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back (Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South:	Cleary Br	os. Quarry									
1	L	11	20.0	0.041	7.4	LOSA	0.2	1.5	0.49	0.56	39.2
2	Т	1	0.0	0.041	5.4	LOS A	0.2	1.5	0.49	0.47	37.4
3	R	18	53.0	0.041	13.4	LOS A	0.2	1.5	0.49	0.73	37.3
Approa	ch	29	39.3	0.041	11.0	LOS A	0.2	1.5	0.49	0.66	37.9
East: Ea	ast West	Link									
4	L	22	57.0	0.317	10.2	LOS A	1.7	12.4	0.15	0.54	60.5
5	Т	374	3.0	0.317	8.8	LOS A	1.7	12.4	0.15	0.53	61.1
6	R	103	1.0	0.317	13.4	LOSA	1.7	12.4	0.15	0.84	52.9
Approa		499	5.0	0.317	9.8	LOSA	1.7	12.4	0.15	0.59	59.2
North: 0	Colden D										
7	L	62	2.0	0.089	9.2	LOS A	0.5	3.4	0.59	0.66	49.8
8	Т	1	0.0	0.089	5.5	LOS A	0.5	3.4	0.59	0.56	47.5
9	R	25	0.0	0.089	15.5	LOS B	0.5	3.4	0.59	0.79	46.8
Approa	ch	88	1.4	0.089	10.9	LOS A	0.5	3.4	0.59	0.70	48.8
West: E	ast West	: Link									
10	L	98	2.0	0.515	9.4	LOSA	4.0	28.8	0.42	0.62	56.8
11	Т	599	2.0	0.515	9.5	LOSA	4.0	28.8	0.42	0.57	58.6
12	R	13	33.0	0.515	14.6	LOS B	4.0	28.8	0.42	0.81	53.0
Approa	ch	709	2.6	0.515	9.6	LOSA	4.0	28.8	0.42	0.58	58.3
All Vehi	cles	1326	4.2	0.515	9.8	LOSA	4.0	28.8	0.33	0.59	57.1

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Project: P:\13S1100-1199\13S1169000 - Cleary Bros Quarry Albion Park Rail\Modelling\121114 13S1169000

Intersection of Colden Drive and East West Link.sip
8000056, GTA CONSULTANTS, FLOATING



Site: AM - Existing

121114 13S1169000 Intersection of East West Link, Colden Drive and Cleary Bros Quarry Existing Conditions PM Peak Hour (3:15-4:15) Roundabout

Mover	nent P <u>er</u>	formance -	Vehicles								
Mov ID		Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back (Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South:	Cleary Br	os Quarry	/0	V/C	360		VCII	'''		pei veii	KIII/II
1	L	15	36.0	0.070	10.0	LOSA	0.3	3.0	0.66	0.72	37.8
2	Т	2	0.0	0.070	7.1	LOSA	0.3	3.0	0.66	0.59	36.3
3	R	24	35.0	0.070	15.4	LOS B	0.3	3.0	0.66	0.81	36.2
Approa	ich	41	33.6	0.070	13.1	LOSA	0.3	3.0	0.66	0.76	36.8
East: E	ast West	Link									
4	L	19	67.0	0.499	10.7	LOSA	4.3	30.7	0.32	0.55	58.9
5	Т	638	1.0	0.499	9.0	LOSA	4.3	30.7	0.32	0.52	59.5
6	R	105	4.0	0.499	13.9	LOS A	4.3	30.7	0.32	0.77	52.7
Approa	ich	762	3.1	0.499	9.7	LOSA	4.3	30.7	0.32	0.56	58.5
North: 0	Colden Dr	rive									
7	L	116	7.0	0.162	8.7	LOSA	0.8	6.0	0.51	0.64	50.3
8	Т	1	0.0	0.162	4.9	LOS A	0.8	6.0	0.51	0.50	48.2
9	R	61	2.0	0.162	14.9	LOS B	0.8	6.0	0.51	0.79	47.2
Approa	ich	178	5.2	0.162	10.8	LOSA	8.0	6.0	0.51	0.69	49.1
West: E	East West	Link									
10	L	86	0.0	0.381	8.4	LOSA	2.6	18.7	0.37	0.58	57.8
11	Т	443	4.0	0.381	9.0	LOS A	2.6	18.7	0.37	0.55	59.5
12	R	5	60.0	0.381	15.0	LOS B	2.6	18.7	0.37	0.86	53.4
Approa	ich	535	3.9	0.381	9.0	LOS A	2.6	18.7	0.37	0.56	59.2
All Vehi	icles	1516	4.4	0.499	9.7	LOSA	4.3	30.7	0.37	0.58	56.5

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Project: P:\13S1100-1199\13S1169000 - Cleary Bros Quarry Albion Park Rail\Modelling\121114 13S1169000

Intersection of Colden Drive and East West Link.sip
8000056, GTA CONSULTANTS, ENTERPRISE



Site: PM - Existing

121114 13S1169000 Intersection of East West Link, Woollybutt Drive and Holcim Quarry Existing Conditions
AM Peak Hour (8:15-9:15)
Roundabout

Moven	nent Pe	rformance - '	Vehicles								
		Demand	1.15.7	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Courtle	Llalaina O	veh/h	%	v/c	sec		veh	m		per veh	km/h
	Holcim Q	•	0.0	0.000	7.0	1.00.4	0.4	4.0	0.40	0.50	20.0
1	L	3	0.0	0.039	7.3	LOSA	0.1	1.6	0.48	0.53	39.0
2	Т	3	0.0	0.039	5.3	LOSA	0.1	1.6	0.48	0.42	37.6
3	R	17	90.0	0.039	14.5	LOSA	0.1	1.6	0.48	0.73	37.2
Approa	ch	23	65.5	0.039	12.3	LOSA	0.1	1.6	0.48	0.66	37.4
East: Ea	ast West	Link									
4	L	23	55.0	0.264	10.0	LOSA	1.7	12.6	0.14	0.53	60.7
5	Т	323	2.0	0.264	8.7	LOS A	1.7	12.6	0.14	0.52	61.2
6	R	76	0.0	0.264	13.4	LOS A	1.7	12.6	0.14	0.83	52.9
Approa	ch	422	4.5	0.264	9.7	LOSA	1.7	12.6	0.14	0.58	59.5
North: V	Noollybu	tt Drive									
7	L	225	2.0	0.229	8.9	LOSA	1.2	8.9	0.56	0.68	50.2
8	Т	4	25.0	0.229	5.5	LOS A	1.2	8.9	0.56	0.53	48.1
9	R	18	0.0	0.229	15.3	LOS B	1.2	8.9	0.56	0.84	47.1
Approa	ch	247	2.2	0.229	9.3	LOSA	1.2	8.9	0.56	0.69	49.9
West: E	ast West	t Link									
10	L	18	0.0	0.360	8.2	LOSA	2.4	16.8	0.32	0.57	58.4
11	Т	506	2.0	0.360	8.7	LOSA	2.4	16.8	0.32	0.54	60.2
12	R	3	0.0	0.360	13.1	LOSA	2.4	16.8	0.32	0.88	53.5
Approa	ch	527	1.9	0.360	8.8	LOSA	2.4	16.8	0.32	0.54	60.1
All Vehi	cles	1220	4.1	0.360	9.2	LOSA	2.4	16.8	0.31	0.59	56.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Project: P:\13S1100-1199\13S1169000 - Cleary Bros Quarry Albion Park Rail\Modelling\121102 13S1169000

Intersection of Woollybutt Drive and East West Link.sip

8000056, GTA CONSULTANTS, FLOATING



Site: AM - Existing

121114 13S1169000 Intersection of East West Link, Woollybutt Drive and Holcim Quarry Existing Conditions PM Peak Hour (3:15-4:15) Roundabout

Moven	nent Pe	rformance - '	Vehicles								
		Demand	1.15.7	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Courtle	l lalaina O	veh/h	%	v/c	sec		veh	m		per veh	km/h
	Holcim Q	•	50.0	0.054	0.5	1.00.4	0.0	0.0	0.04	0.00	20.4
1	L	4	50.0	0.051	9.5	LOSA	0.2	2.0	0.61	0.69	38.4
2	Т	6	0.0	0.051	6.2	LOSA	0.2	2.0	0.61	0.54	36.9
3	R	24	30.0	0.051	14.4	LOSA	0.2	2.0	0.61	0.77	36.7
Approa	ch	35	27.0	0.051	12.3	LOSA	0.2	2.0	0.61	0.72	37.0
East: Ea	ast West	Link									
4	L	15	36.0	0.448	9.6	LOS A	3.6	25.8	0.20	0.53	60.1
5	Т	552	1.0	0.448	8.8	LOS A	3.6	25.8	0.20	0.51	60.6
6	R	168	1.0	0.448	13.5	LOS A	3.6	25.8	0.20	0.80	52.8
Approa	ch	735	1.7	0.448	9.9	LOS A	3.6	25.8	0.20	0.58	58.7
North: V	Noollybu	tt Drive									
7	L	133	4.0	0.142	8.3	LOSA	0.7	5.1	0.48	0.62	50.7
8	Т	8	25.0	0.142	4.8	LOS A	0.7	5.1	0.48	0.46	48.9
9	R	20	0.0	0.142	14.6	LOS B	0.7	5.1	0.48	0.80	47.6
Approa	ch	161	4.6	0.142	8.9	LOS A	0.7	5.1	0.48	0.64	50.2
West: E	ast West	t Link									
10	L	29	0.0	0.326	8.7	LOSA	2.0	14.5	0.42	0.61	57.5
11	Т	396	2.0	0.326	9.2	LOSA	2.0	14.5	0.42	0.58	59.1
12	R	3	35.0	0.326	14.6	LOS B	2.0	14.5	0.42	0.88	53.4
Approa	ch	428	2.1	0.326	9.2	LOSA	2.0	14.5	0.42	0.59	59.0
All Vehi	icles	1359	2.8	0.448	9.6	LOSA	3.6	25.8	0.31	0.59	56.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Project: P:\13S1100-1199\13S1169000 - Cleary Bros Quarry Albion Park Rail\Modelling\121102 13S1169000

Intersection of Woollybutt Drive and East West Link.sip

8000056, GTA CONSULTANTS, FLOATING



Site: PM - Existing

121114 13S1169000 Intersection of East West Link, Colden Drive and Cleary Bros. Quarry Existing Peak Conditions (Busiest Oct 2012 Quarry Day)
AM Peak Hour (8:15-9:15)
Roundabout

Movement Performance - Vehicles											
		Demand	1.0.7	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Courthy	Class D	veh/h	%	v/c	sec		veh	m		per veh	km/h
	,	os. Quarry	00.0	0.000					0.50	0.50	00.4
1	L	17	20.0	0.063	7.4	LOSA	0.3	2.4	0.50	0.58	39.1
2	Т	1	0.0	0.063	5.5	LOSA	0.3	2.4	0.50	0.49	37.3
3	R	27	53.0	0.063	13.5	LOSA	0.3	2.4	0.50	0.75	37.2
Approac	ch	45	39.5	0.063	11.1	LOSA	0.3	2.4	0.50	0.68	37.9
East: Ea	ast West	Link									
4	L	33	57.0	0.331	10.2	LOS A	1.8	13.0	0.17	0.55	60.3
5	Т	374	3.0	0.331	8.9	LOSA	1.8	13.0	0.17	0.53	60.9
6	R	103	1.0	0.331	13.5	LOSA	1.8	13.0	0.17	0.84	52.9
Approac	ch	509	6.1	0.331	9.9	LOS A	1.8	13.0	0.17	0.59	59.1
North: 0	Colden D	rive									
7	L	62	2.0	0.092	9.3	LOS A	0.5	3.6	0.61	0.67	49.7
8	Т	1	0.0	0.092	5.7	LOS A	0.5	3.6	0.61	0.57	47.3
9	R	25	0.0	0.092	15.7	LOS B	0.5	3.6	0.61	0.80	46.7
Approac	ch	88	1.4	0.092	11.1	LOS A	0.5	3.6	0.61	0.70	48.7
West: E	ast West	Link									
10	L	98	2.0	0.531	9.5	LOSA	4.2	30.3	0.45	0.63	56.6
11	Т	599	2.0	0.531	9.7	LOS A	4.2	30.3	0.45	0.58	58.3
12	R	20	33.0	0.531	14.7	LOS B	4.2	30.3	0.45	0.81	53.0
Approac		717	2.9	0.531	9.8	LOSA	4.2	30.3	0.45	0.59	57.9
All Vehi	cles	1360	5.2	0.531	10.0	LOSA	4.2	30.3	0.36	0.60	56.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Intersection of Colden Drive and East West Link-Peak .sip
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Site: AM - Existing Peak

121114 13S1169000 Intersection of East West Link, Colden Drive and Cleary Bros Quarry Existing Peak Conditions (Busiest Quarry Day Oct 2012) PM Peak Hour (3:15-4:15) Roundabout

Movem	nent Per	formance - \	Vehicles								
M 15	<u> </u>	Demand	1.157	Deg.	Average	Level of	95% Back o		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
South: 0	Cleary Bro	veh/h os Quarry	%	v/c	sec		veh	m		per veh	km/h
1	L	22	36.0	0.105	10.2	LOSA	0.5	4.6	0.67	0.75	37.8
2	Т	3	0.0	0.105	7.2	LOSA	0.5	4.6	0.67	0.62	36.2
3	R	36	35.0	0.105	15.6	LOS B	0.5	4.6	0.67	0.83	36.2
Approac	ch	61	33.6	0.105	13.2	LOSA	0.5	4.6	0.67	0.79	36.7
East: Ea	ast West I	Link									
4	L	28	67.0	0.511	10.7	LOSA	4.4	32.1	0.33	0.56	58.8
5	Т	638	1.0	0.511	9.1	LOSA	4.4	32.1	0.33	0.53	59.3
6	R	105	4.0	0.511	13.9	LOSA	4.4	32.1	0.33	0.77	52.7
Approac	ch	772	3.8	0.511	9.8	LOSA	4.4	32.1	0.33	0.56	58.4
North: C	Colden Dr	ive									
7	L	116	7.0	0.164	8.8	LOSA	0.8	6.2	0.53	0.65	50.2
8	Т	1	0.0	0.164	5.0	LOS A	0.8	6.2	0.53	0.51	48.1
9	R	61	2.0	0.164	15.0	LOS B	0.8	6.2	0.53	0.80	47.2
Approac	ch	178	5.2	0.164	10.9	LOSA	0.8	6.2	0.53	0.70	49.1
West: E	ast West	Link									
10	L	86	0.0	0.390	8.5	LOSA	2.6	19.2	0.40	0.59	57.6
11	Т	443	4.0	0.390	9.1	LOSA	2.6	19.2	0.40	0.56	59.3
12	R	7	60.0	0.390	15.2	LOS B	2.6	19.2	0.40	0.86	53.4
Approac	ch	537	4.1	0.390	9.1	LOSA	2.6	19.2	0.40	0.57	59.0
All Vehi	cles	1547	5.3	0.511	9.8	LOSA	4.4	32.1	0.39	0.59	56.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Intersection of Colden Drive and East West Link-Peak .sip
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Site: PM - Existing Peak

Site: AM - Existing Peak Day

121114 13S1169000 Intersection of East West Link, Woollybutt Drive and Holcim Quarry Existing Peak Day Conditions (Busiest Quarry Day Oct 2012)
AM Peak Hour (8:15-9:15)
Roundabout

Movement Performance - Vehicles											
	_	Demand	1.15.7	Deg.	Average	Level of	95% Back		Prop.	Effective	Average
Mov ID	Turn	Flow	HV	Satn	Delay	Service	Vehicles	Distance	Queued	Stop Rate	Speed
Couth	Holcim Q	veh/h	%	v/c	sec		veh	m		per veh	km/h
		tuarry 3	0.0	0.000	7.0	1.00.4	0.1	1.0	0.40	0.52	20.0
1	L	_	0.0	0.039	7.3	LOSA	0.1	1.6	0.48	0.53	39.0
2	T	3	0.0	0.039	5.3	LOSA	0.1	1.6	0.48	0.42	37.6
3	R	17	90.0	0.039	14.5	LOS B	0.1	1.6	0.48	0.73	37.1
Approa	ch	23	65.5	0.039	12.3	LOSA	0.1	1.6	0.48	0.66	37.4
East: Ea	ast West	Link									
4	L	23	55.0	0.267	10.0	LOSA	1.8	12.8	0.14	0.53	60.7
5	Т	328	2.0	0.267	8.7	LOSA	1.8	12.8	0.14	0.52	61.2
6	R	76	0.0	0.267	13.4	LOSA	1.8	12.8	0.14	0.83	52.9
Approa	ch	427	4.5	0.267	9.6	LOSA	1.8	12.8	0.14	0.58	59.6
North: V	Noollybu ¹	tt Drive									
7	L	225	2.0	0.230	8.9	LOSA	1.3	8.9	0.57	0.69	50.1
8	T	4	25.0	0.230	5.5	LOSA	1.3	8.9	0.57	0.54	48.0
9	R	18	0.0	0.230	15.3	LOS B	1.3	8.9	0.57	0.84	47.1
Approa	ch	247	2.2	0.230	9.3	LOSA	1.3	8.9	0.57	0.69	49.9
West: E	ast West	t Link									
10	L	18	0.0	0.365	8.2	LOSA	2.4	17.0	0.32	0.57	58.3
11	Т	513	2.0	0.365	8.7	LOSA	2.4	17.0	0.32	0.54	60.1
12	R	3	0.0	0.365	13.1	LOSA	2.4	17.0	0.32	0.88	53.5
Approa	ch	534	1.9	0.365	8.8	LOSA	2.4	17.0	0.32	0.54	60.0
All Vehi	cles	1232	4.1	0.365	9.2	LOSA	2.4	17.0	0.31	0.59	56.9

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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Intersection of Woollybutt Drive and East West Link - Peak.sip

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Site: PM - Existing Peak Day

121114 13S1169000 Intersection of East West Link, Woollybutt Drive and Holcim Quarry Existing Peak Day Conditions (Busiest Quarry Day Oct 2012) PM Peak Hour (3:15-4:15) Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delav	Level of Service	95% Back (Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: F	Holcim Q	uarry									
1	L	4	50.0	0.052	9.5	LOSA	0.2	2.1	0.61	0.69	38.4
2	T	6	0.0	0.052	6.2	LOSA	0.2	2.1	0.61	0.54	36.9
3	R	24	30.0	0.052	14.5	LOSA	0.2	2.1	0.61	0.77	36.7
Approac	ch	35	27.0	0.052	12.4	LOS A	0.2	2.1	0.61	0.72	36.9
East: Ea	ast West	Link									
4	L	15	36.0	0.452	9.6	LOSA	3.7	26.2	0.20	0.53	60.1
5	T	558	1.0	0.452	8.8	LOSA	3.7	26.2	0.20	0.51	60.6
6	R	168	1.0	0.452	13.5	LOSA	3.7	26.2	0.20	0.80	52.8
Approac	ch	741	1.7	0.452	9.9	LOSA	3.7	26.2	0.20	0.58	58.7
North: V	Voollybu	tt Drive									
7	L	133	4.0	0.143	8.4	LOSA	0.7	5.2	0.49	0.62	50.6
8	Т	8	25.0	0.143	4.9	LOSA	0.7	5.2	0.49	0.47	48.8
9	R	20	0.0	0.143	14.7	LOS B	0.7	5.2	0.49	0.80	47.5
Approac	ch	161	4.6	0.143	9.0	LOSA	0.7	5.2	0.49	0.64	50.1
West: E	ast West	t Link									
10	L	29	0.0	0.334	8.7	LOSA	2.1	14.9	0.43	0.61	57.5
11	Т	406	2.0	0.334	9.2	LOSA	2.1	14.9	0.43	0.58	59.1
12	R	3	35.0	0.334	14.6	LOS B	2.1	14.9	0.43	0.88	53.4
Approac	ch	439	2.1	0.334	9.2	LOS A	2.1	14.9	0.43	0.59	58.9
All Vehic	cles	1376	2.8	0.452	9.6	LOSA	3.7	26.2	0.31	0.59	56.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

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APPENDIX 8:

"QEMP Extract – Quarry Water Balance"

OUARRY 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

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:

Table 1 QUARRY EXTENSION WATER DEMAND

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
Fire fighting	Collected rainfall runoff	nil

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

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.

Table 2 QUARRY EXTENSION WATER SUPPLY

Stage	Additional Catchment (hectares)	Cumulative Catchment (hectares)	Average Annual Runoff (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

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.