

Proposed Quarry Extension Albion Park

Environmental Impact Statement

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Albion Park

Environmental Impact Statement

For: *Cleary Bros (Bombo) Pty Ltd*

Report No.73R1

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TABLE OF CONTENTS

Page No.

EXECUTIVE SUMMARY

1. INTRODUCTION

1.1	OVERVIEW	1.1
1.2	BACKGROUND TO THE PROPOSAL	1.2
1.2.1	The Applicant	1.2
1.2.2	Development History	1.3
1.2.3	Existing Operations	1.4
1.3	BRIEF DESCRIPTION OF THE PROPOSAL	1.5
1.3.1	Need	1.5
1.3.2	Objectives	1.5
1.3.3	Development Works	1.6
1.3.4	Operation	1.6
1.4	DETERMINATION PROCEDURE	1.7
1.4.1	Purpose of the EIS	1.7
1.4.2	State Significant Development	1.8
1.4.3	Integrated Development	1.8
1.4.4	Development Application Process	1.8
1.4.5	Subsequent Approvals	1.9
1.5	CONSULTATION	1.9
1.5.1	Authority Consultation	1.9
1.5.2	Community Consultation	1.10

2. THE SITE

2.1	PROPERTY DETAILS	2.1
2.1.1	Property Description	2.1
2.1.2	Ownership	2.2
2.1.3	Access Arrangements	2.3
2.1.4	Local Government	2.3
2.2	EXISTING LAND USE	2.3
2.2.1	Quarry Site	2.3
2.2.2	Surrounding Land	2.4
2.3	SITE SUITABILITY	2.5
2.4	CONSIDERATION OF ALTERNATIVES	2.8
2.4.1	No Development	2.8
2.4.2	Alternative Materials	2.8
2.4.3	Alternative Sites	2.8
2.4.4	Alternative Means of Transport	2.9

TABLE OF CONTENTS

Page No.

3.	DESCRIPTION OF THE PROPOSAL	
3.1	HARD ROCK RESOURCE	3.1
3.2	SITE DEVELOPMENT	3.3
3.2.1	General Layout	3.3
3.2.2	Preparation for Quarrying	3.4
3.2.3	Development Programme	3.7
3.3	HARD ROCK EXTRACTION	3.8
3.3.1	Scale of Operation	3.8
3.3.2	Staging	3.8
3.3.3	Method of Extraction	3.9
3.3.4	Overburden Management	3.9
3.3.5	Blasting	3.10
3.3.6	Processing and Transport	3.10
3.3.7	Plant and Equipment	3.11
3.3.8	Hours of Working	3.11
3.3.9	Workforce	3.12
3.3.10	Safety	3.12
3.3.11	Waste Management	3.13
3.4	WATER MANAGEMENT	3.13
3.4.1	Water Demand	3.14
3.4.2	Water Supply	3.14
3.4.3	Surface Water Management	3.15
3.5	DURATION OF QUARRYING	3.16
3.5.1	Life of the Quarry	3.16
3.5.2	Possible Future Extension	3.16
3.6	REHABILITATION	3.17
3.6.1	Objectives	3.17
3.6.2	Quarry Backfill	3.17
3.6.3	Final Landform	3.18
3.6.4	Future Land Use	3.18
3.6.5	Rehabilitation Methods	3.19
3.7	ENVIRONMENTAL MANAGEMENT	3.20
3.7.1	Overview	3.20
3.7.2	Outline of EM & RP	3.20
4.	PLANNING CONTEXT	
4.1	OVERVIEW	4.1
4.2	ENVIRONMENTAL PLANNING & ASSESSMENT ACT	4.1
4.3	THREATENED SPECIES CONSERVATION ACT	4.2

TABLE OF CONTENTS

Page No.

4.4	EPBC ACT	4.3
4.5	ENVIRONMENTAL PLANNING INSTRUMENTS	4.4
4.5.1	Shellharbour LEP, 2000	4.4
4.5.2	Draft Shellharbour Rural LEP	4.5
4.5.3	Illawarra REP No 1,1986	4.6
4.5.4	SEPP 11 – <i>Traffic Generating Developments</i>	4.8
4.6	OTHER PLANS AND REPORTS	4.9
4.6.1	Blue Metal Working Party Report	4.9
4.6.2	Ministerial Direction	4.10
4.6.3	Shellharbour Rural Lands Study	4.10
4.6.4	Proposed Rezoning LES	4.12
5.	ENVIRONMENTAL ASSESSMENT	
5.1	TOPOGRAPHY	5.1
5.1.1	Description	5.1
5.1.2	Assessment of Impact	5.1
5.2	GEOLOGY AND SOILS	5.2
5.2.1	Description	5.2
5.2.2	Assessment of Impact	5.3
5.3	CLIMATE	5.4
5.4	HYDROLOGY AND FLOODING	5.6
5.4.1	Site Drainage	5.6
5.4.2	Groundwater	5.7
5.4.3	Flooding	5.7
5.4.4	Assessment of Impact	5.7
5.5	WATER QUALITY	5.9
5.5.1	Existing Water Quality	5.9
5.5.2	Assessment of Impact	5.10
5.6	NOISE	5.12
5.5.1	Background Noise	5.12
5.5.2	Noise Criteria	5.13
5.5.3	Noise Sources	5.14
5.5.4	Assessment of Impact	5.15
5.7	BLASTING	5.17
5.7.1	Blast Emission Limits	5.17
5.7.2	Performance of Existing Quarry	5.17
5.7.3	Blast Design for Quarry Extension	5.18
5.7.4	Assessment of Impact	5.18
5.8	AIR QUALITY	5.19
5.8.1	Air Quality Criteria	5.19

TABLE OF CONTENTS

Page No.

5.8.2	Existing Air Quality	5.20
5.8.3	Air Quality Predictions	5.21
5.8.4	Dust and Particulate Controls	5.23
5.9	TRANSPORT	5.23
5.9.1	Introduction	5.23
5.9.2	Existing Conditions	5.24
5.9.3	Assessment of Transport Impact	5.25
5.10	FLORA AND FAUNA	5.25
5.10.1	Vegetation Communities	5.26
5.10.2	Vegetation of Conservation Significance	5.26
5.10.3	Fauna	5.27
5.10.4	Eight Part Tests	5.28
5.10.5	Consideration of Other Acts and Policies	5.29
5.10.6	Vegetation and Habitat Assessment	5.29
5.10.7	Environmental Safeguards	5.30
5.11	LANDSCAPE AND VISUAL CHARACTERISTICS	5.31
5.11.1	Existing Landscape	5.31
5.11.2	Proposed Development	5.32
5.11.3	Visual Impact Assessment	5.33
5.11.4	Environmental Safeguards	5.36
5.12	INDIGENOUS HERITAGE	5.37
5.12.1	Investigation by Robert Paton	5.37
5.12.2	Investigation by Mary Dallas	5.38
5.12.3	Assessment of Impact	5.39
5.13	NON-INDIGENOUS HERITAGE	5.39
5.13.1	Settlement History of the Area	5.39
5.13.2	Physical Evidence in the Area of Direct Impact	5.40
5.13.3	Cultural landscape	5.42
5.13.4	Heritage Significance	5.42
5.13.5	Statutory Listings	5.43
5.13.6	Assessment of Impact	5.44
5.13.7	Management and Mitigation Strategies	5.45
5.14	SOCIO-ECONOMICS	5.45
5.14.1	Strategic Value of the Resource for New South Wales	5.45
5.14.2	Importance of the Quarry for Cleary Bros	5.46
5.14.3	Economic Analysis	5.46
5.14.4	Effect on Dairy Farming	5.47
5.14.5	Social Impact	5.48
5.15	PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS	5.49
5.15.1	Occupational Health and Safety	5.49

TABLE OF CONTENTS

Page No.

5.15.2	Security Fencing	5.49
5.15.3	Blast Warning	5.50
5.15.4	Hazardous Substances	5.50
5.15.5	Bushfire Management	5.50
5.16	CUMULATIVE IMPACTS	5.51
5.16.1	Overview	5.51
5.16.2	Traffic	5.51
5.16.3	Landscape	5.52
5.16.3	Operational Impacts	5.52
5.16.5	Other Potential Cumulative Effects	5.53
6.	JUSTIFICATION AND CONCLUSIONS	
6.1	JUSTIFICATION	6.1
6.1.1	Social and Economic Considerations	6.1
6.1.2	Biophysical Considerations	6.2
6.1.3	Ecological Sustainability	6.3
6.2	COMPILATION OF MITIGATION MEASURES	6.5
	REFERENCES	
	APPENDICES	
A.	CLAUSE 71 "PRESCRIBED FORM"	
B.	REQUIREMENTS OF THE DIRECTOR-GENERAL	
C.	INDEX TO DIRECTOR-GENERAL'S REQUIREMENTS	
D.	MINISTER'S DECLARATION (1999) & S117 DIRECTION (1994)	
E.	CONSULTATION RESPONSES	
F.	PRESCRIBED MATTERS FOR CONSIDERATION BY THE CONSENT AUTHORITY	
G.	ENVIRONMENT PROTECTION LICENCE	
H.	OWNER'S CONSENT	
I.	GEOLOGY OF LOT 1	
J.	HYDROGEOLOGICAL STUDY	

- K. WATER QUALITY INVESTIGATION
- L. NOISE AND BLASTING ASSESSMENT
- M. AIR QUALITY ASSESSMENT
- N. TRANSPORT ASSESSMENT
- O. FLORA AND FAUNA ASSESSMENT
- P. ABORIGINAL ARCHAEOLOGICAL ASSESSMENT
- Q. NON-INDIGENOUS HERITAGE ASSESSMENT
- R. ASSESSMENT OF DRY STONE WALLS
- S. ASSESSMENT OF IMPACT ON DAIRYING

LIST OF FIGURES

	<i>Follows Page No.</i>
1.1 LOCATION PLAN	1.1
1.2 CURRENT OPERATIONAL LAYOUT	1.5
2.1 CADASTRAL PLAN	2.1
2.2 TOPOGRAPHIC PLAN	2.2
2.3 SURROUNDING LAND USE	2.3
3.1 EXISTING SURFACE GEOLOGY	3.1
3.2 BASE OF EXCAVATION	3.2
3.3 LONG SECTION	3.3
3.4 PROPOSED QUARRY EXTENSION AND HAUL ROAD	3.4
3.5 STAGING PLAN	3.7
3.6 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 1 to 5	3.8
3.7 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 5 to 10	3.9
3.8 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 10 to 15	3.10
3.9 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 15 to 20	3.11
3.10 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 20 to 25	3.12
3.11 CONCEPTUAL QUARRYING ARRANGEMENT YEARS 25 to 30	3.13
3.12 POSSIBLE FINAL LANDFORM	3.18
4.1 CURRENT ZONING	4.4
4.2 PROPOSED ZONING, DRAFT RURAL LEP	4.5
4.3 AREA OF HIGH CONSERVATION VALUE, DRAFT RURAL LEP	4.6
4.4 BLUE METAL RESOURCE	4.9

5.1	REGIONAL TOPOGRAPHY AND DRAINAGE	5.1
5.2	SITE DRAINAGE	5.6
5.3	PREDICTED NOISE CONTOURS – YEAR 20	5.15
5.4	PREDICTED DUST CONTOURS – YEAR 25	5.22
5.5	EXISTING ROAD ACCESS	5.24
5.6	VEGETATION COMMUNITIES	5.26
5.7	POTENTIAL VIEWING DIRECTIONS	5.33
5.8	LOCATION OF HERITAGE ITEMS AND RELICS	5.41

LIST OF PHOTOGRAPHS

		<i>Follows Page No</i>
1	LOOKING SOUTH ALONG THE WESTERN SPUR	2.4
2	LOOKING WEST ALONG THE NORTHERN SITE BOUNDARY	2.4
3	SOUTH EAST TOWARDS THE BUSHLAND AREA	2.4
4	EAST ACROSS THE SITE, “BELMONT” ON THE HILL	2.4
5	SOUTH ALONG THE “BELMONT” SPUR FROM DUNSTERS LN	2.4
6	DAIRY LANDS & EXISTING QUARRY, FROM DUNSTERS LN	2.4
7	LOOKING WEST FROM SHELL COVE ESTATE	5.31
8	VIEW NORTH WEST FROM THE PRINCES HIGHWAY	5.31
9	VIEW NORTH WEST FROM DUNMORE LAKES ESTATE	5.31
10	LOOKING SOUTH FROM GREEN MEADOWS ESTATE	5.31

GLOSSARY

AHD	- Australian Height Datum
ANZECC	- Australian and New Zealand Environment Conservation Council
AS	- Australian Standard
CSR Limited, CSR Readymix	- Both names refer to the former owner of the land adjoining Cleary Bros' proposed quarry extension, to be traversed by the haul road.
DIPNR	- Department of Infrastructure Planning and Natural Resources
DLEP	- draft local environmental plan
DLWC	- (former) Department of Land and Water Conservation
DMR	- Department of Mineral Resources
DP	- deposited plan
EIS	- environmental impact statement
EM&RP	- environmental management and rehabilitation plan
EP&A Act	- Environmental Planning and Assessment Act
EPA	- (former) Environment Protection Authority
EPBC Act	- Environmental Biodiversity and Conservation Act (Commonwealth)
LEP	- local environmental plan
LES	- local environmental study
MIC	- maximum instantaneous charge
NPWS	- (former) National Parks and Wildlife Service
PEO Act	- Protection of the Environment Operations Act
Planning NSW	- operating name of the former Department of Urban Affairs and Planning
REP	- regional environmental plan
RTA	- Roads and Traffic Authority
SEPP	- State environmental planning policy

During September 2003 the New South Wales Government announced the creation of a new government department, the *Department of Environment and Conservation*, to bring together the Environment Protection Authority, National Parks and Wildlife Service and other agencies. As the identity of the new department has yet to become widely known in the community, this EIS refers to the amalgamated organisations by their former names (*EPA* and *NPWS*).

Following the March 2003 State election, the New South Wales Government created the *Department of Infrastructure Planning and Natural Resources* (DIPNR), essentially combining the former Department of Land and Water Conservation and Department of Urban Affairs and

Planning. Initially the infrastructure and planning group within the new department continued to use the operating name *Planning NSW*, to distinguish itself from the sustainable resources group. Later in 2003 however the name Planning NSW was dropped. For the purposes of clarity and simplicity, where this EIS refers to DIPNR, an indication is given whether the reference is to the former DLWC or former Planning NSW.

EXECUTIVE SUMMARY

Introduction

Cleary Bros (Bombo) Pty Ltd operates a hard rock quarry and processing plant at Croom, south of Albion Park Rail in the City of Shellharbour. The existing quarry has reached the end of its economic life and will cease production in the near future. To provide continuity of hard rock supply to the company's processing plant, Cleary Bros is seeking approval to extend the quarry onto a nearby property.

As the proposal is State significant development, development applications have been submitted to the Department of Infrastructure Planning and Natural Resources for determination by the Minister for Infrastructure and Planning. The provisions of integrated development apply, as separate permits and licences are required from the Environment Protection Authority and the Department of Infrastructure Planning and Natural Resources.

The Site

The proposed quarry will occupy about 18 hectares of existing farmland, owned by Canda Nominees Pty Ltd, part of the Cleary Bros Group. The site is in the form of a natural south-facing amphitheatre, largely cleared for grazing with a few isolated trees and small pockets of regrowth vegetation.

A haul road is to be constructed to link the quarry extension with Cleary Bros' existing quarry. For approximately 400 metres of its length, the haul road will traverse an intermediate property owned by Readymix Holdings Pty Ltd.

Surrounding land is either used for grazing or for extractive industry purposes. There is one occupied property in the vicinity of the site, with the nearest residence, "The Hill", located on the adjoining dairy farm about 450 metres from the proposed quarry.

Need and Alternatives

Cleary Bros' Albion Park quarry is the source of hard rock used both for direct sale to customers and as a vital input to the company's concrete batching and engineering projects. It is essential for the company to secure access to a replacement resource in order for these major business arms to remain competitive.

The quarry extension site is consistent with site selection criteria for an extractive industry published by the (former) Department of Urban Affairs and Planning.

Cleary Bros is not aware of any alternative quarry site in the Illawarra region that would meet the company's needs. Road haulage is the most efficient means of transporting quarry product to the processing plant and to market.

Development

To prepare the site for extraction, erosion and sediment controls will be installed and topsoil collected from initial areas to be disturbed. The haul road will be constructed partly in cut to restrict its visibility. A vegetated sight bund will be provided beside part of the haul road so quarry vehicles are not visible from residential land to the north. A second berm will be constructed around the north east corner of the quarry to limit noise levels at the nearest residence and restrict views into the quarry from the dairy lands. When these earthworks are complete topsoil will be spread and screening vegetation planted at various locations.

A continuous band of vegetation along a creek to the south of the quarry will be fenced to ensure its protection. A program of revegetation will be undertaken using local provenance seedlings to expand and infill bushland back to the fence line.

Monitoring devices will be installed to record creek flow, groundwater levels, wind, dust deposition and blast emissions.

Operation

Extraction from the existing quarry will be phased out when the extension produces saleable rock. Production levels are driven by market demand, but Cleary Bros anticipates the current annual level of up to 400,000 tonnes of product will be maintained for the foreseeable future. The quarry will operate within the same hours as the existing quarry, generally 7 am to 5.30 pm Monday to Friday and 7 am to 1 pm on Saturday. The current licence specifies reduced hours for some activities, such as blasting.

There are two flows of Bumbo latite to be extracted, separated by a tuffaceous agglomerate and overlaid by a highly weathered overburden. It is estimated the site contains approximately 13 million tonnes of winnable resource over 30 years of operation. The quarry will be developed in five-year stages, commencing in the south western corner.

Material will be removed from working faces up to 12 metres high. Blasting will loosen the latite and tuffaceous agglomerate. Loaders will transfer the material to off-road haulage trucks for transport. Hard rock will be processed through the existing processing plant. Operation of the processing plant will not alter as a result of the quarry extension.

Initially, topsoil and overburden will be transferred to the existing quarry for storage. Later, when an emplacement area becomes available on the quarry floor, overburden and tuffaceous agglomerate will be progressively emplaced and revegetated. Clean fill will be progressively brought to the quarry site to assist in backfilling.

Up to 12 personnel are employed at the existing quarry and processing plant, but when drivers are added, some 30 to 40 people are employed in supplying quarry products.

Clean runoff water will be diverted around the quarry wherever possible. Some of the runoff captured within the quarry will be used for dust suppression and the remainder released to the creek system, after treatment, to maintain riparian flows.

The site will be restored to a safe, stable and self-draining landform suitable for return to grazing or other uses as may emerge in discussions with Shellharbour Council closer to the end of the project.

Planning Instruments

Development on the site is regulated by Shellharbour Local Environmental Plan, 2000 and Illawarra Regional Environmental Plan No 1. Other relevant instruments include draft Shellharbour Rural LEP and State Environmental Planning Policy No 11 - *Traffic Generating Development*.

At the present time the land proposed for quarrying and (most of) the haul road is zoned 7(d) - *Environment Protection (Scenic)*. Neither the quarry nor the haul road is permissible within this zoning. In 1998 Cleary Bros submitted a rezoning proposal to Shellharbour City Council. Council has responded by preparing a draft LEP supported by a local environmental study proposing to change the zoning to 4(c) - *Extractive Industrial*. It is understood the draft LEP will be publicly exhibited concurrently with the development applications.

Assessment of the proposal has led to the conclusion that a species impact statement is not required and the proposal is not a "controlled action", meaning there is no requirement for referral to the Commonwealth Minister for the Environment.

Environmental Impact Assessment

The quarry will be managed in accordance with an environmental management and rehabilitation plan, to be prepared following receipt of development consent.

Topography

The quarry site is a natural amphitheatre lying between two spurs of the Wentworth Hills. It ranges in altitude from 140 to 70 metres AHD and includes steep grassy

slopes with a maximum gradient of about 28 per cent. The proposed final landform will preserve the amphitheatre shape and establish a more uniform slope to a gently sloping base.

Hydrology and Flooding

The property is near the top of its catchment with only limited inflow of surface runoff. Downstream creek flow will be monitored so that water releases can be programmed to mirror natural flows following rainfall. Groundwater levels will be monitored as recommended in the hydrogeological assessment to indicate if further releases are needed to compensate for loss of seepage flow.

Water Quality

Water quality sampling in the creek system indicates elevated levels of copper and zinc, thought to be sourced in the volcanic rocks. Total suspended solids and turbidity are higher in the main creek flowing through the property than in the tributary draining the quarry site. Erosion and sediment controls will be employed to control sediment in site runoff. Water releases from the quarry to the creek will only take place when water meets quality limits specified in the licence.

Noise

A noise assessment has been carried out for the quarry, concluding that operational noise levels will be within noise goals at all residential receptors. If construction of the earth berm around the north-eastern corner of the site extends for more than four weeks, construction noise goals will be temporarily exceeded at "The Hill". A construction noise management plan will be developed to minimise this exceedence. Traffic noise will remain well below the relevant daytime noise goal.

Blasting

More than three years of monitoring blast trials at the existing quarry has led to a blast design that can be used to within 500 metres of a residential receptor while maintaining EPA goals for airblast overpressure and ground vibration. Quarry extraction will start at the farthest Stage from "The Hill", giving an opportunity to further monitor blast effects and adjust designs as extraction moves closer. A base line property condition survey of structures on the neighbouring dairy farm will be undertaken prior to commencement, subject to owner agreement.

Air Quality

An air quality assessment has predicted levels of dust deposition, total suspended particulates and PM₁₀ (particulate matter less than 10 microns) for each stage of the quarry development. Existing dust deposition at "The Hill" has been estimated from

dust monitors at three locations in the area. Air quality monitoring has predicted pollutant levels at “The Hill” to fall well within the relevant criteria.

Transport

The proposal will not significantly alter the number of vehicle movements on the access road to the existing processing plant. When quarry backfill is delivered in future years it will occur on an opportunistic basis and is not expected to alter the existing daily range of vehicle numbers servicing the site. The transport assessment concluded that the existing road network readily absorbs the existing traffic associated with the current operation. The recently opened East-West Route has provide an improved connection to the site.

Flora and Fauna

The flora and fauna assessment found that there are three threatened plant species on the property and two endangered ecological communities. However the study reported that apart from some small patches of regrowth rainforest, vegetation of conservation significance is outside the area proposed for quarrying. No evidence of threatened fauna species was found, but it is possible that the Grey-headed Flying-fox may feed on fig trees on the site. Safeguards have been incorporated in the proposal aimed at rainforest conservation, fig tree replacement and maintaining riparian flows in the creek system.

Landscape and Visual Characteristics

Views into the site are largely blocked by its amphitheatre shape and remote location. Ridgelines will block views from middle-distance residential areas to the north and east. Views into the site from the adjoining Readymix quarry land are not considered significant in that context. Limited viewing of the upper section of the quarry and haul road will be obtainable from parts of the adjoining dairy property, but are unlikely from “The Hill” which is surrounded by trees. Screening is proposed to lessen this viewing opportunity. It will be possible to observe the same uppermost section of the quarry in long distance views from the Dunmore area and beyond, but the expansive view of the Wentworth Hills and the separation from the viewer will substantially limit the visual impact.

Indigenous Heritage

Two archaeologists have surveyed the site in company with representatives of the local Aboriginal land council. No relics were discovered on either occasion. The more recent survey recommended that no further archaeological survey is required. Letters from the land council and tribal elders support this recommendation.

Non-Indigenous Heritage

The non-indigenous heritage assessment researched the history and physical evidence of historic settlement in the area. The cultural landscape features dairying, that has occurred on the Wentworth Hills since 1840s and quarrying, that has been in progress almost as long. "The Hill" is listed as a heritage item on the Shellharbour LEP and Illawarra REP. This structure, its curtilage and property will not be physically affected by the development. Relics on the site to be disturbed include two sections of dry stone wall, "Kyawana", an abandoned and derelict farm house and miscellaneous farm dams and fences. Archival recording of relics is proposed prior to removal.

Socio Economics

A continuation of quarrying at Albion Park is vital to maintain the State's supply of extractive resources as Sydney-based supplies begin to exhaust. Hard rock extraction at Albion Park underpins much of Cleary Bros operations and is essential for various divisions of the company to remain viable. An economic analysis has shown that the proposal has a net positive benefit over cost and that failure to extend the quarry is likely to lead to a significant economic and employment impact in the Illawarra. An investigation into the effect of the proposal on nearby dairy farming concludes that the farm will need to find a replacement dry run for cattle, but that it is not uncommon for dairies to have some cattle on another site accessible by vehicle.

Health and Hazards

The proposal will meet all operational health and safety requirements and include safeguards aimed at ensuring no risk to persons on nearby properties. Bushfire fighting procedures will be included in the quarry management plan.

Cumulative Impacts

Cumulative impacts from the proposal and existing Readymix quarrying have been considered particularly in relation to noise and air quality where numerical goals apply. It has been confirmed that the goals will not be exceeded.

Justification

The proposal is considered justified because of the benefits to the State, the Illawarra region and to Cleary Bros continued operation. Significant aspects of the biophysical environment will be protected, in particular flora and fauna and the overall green appearance of the Wentworth Hills from the surrounding low country. The environmental assessment has shown the effect of the quarry on its immediate surroundings can be limited to acceptable standards by inclusion of proven environmental controls.

Chapter 1

INTRODUCTION

1.1 OVERVIEW

Cleary Bros (Bombo) Pty Ltd (the company) has been extracting and processing hard rock at its properties at Albion Park for some 40 years. Rock extracted from the operation is a high quality *Bumbo Latite*, commonly referred to as “basalt” or “blue metal”. This material is crushed for use in concrete aggregates, road making and general civil construction projects. Larger rocks from the quarry have been used for breakwater construction in Port Kembla harbour. In recent years the operation has produced from 350,000 to 400,000 tonnes of product annually, supplying approximately 30 per cent of the market in the Illawarra Region.

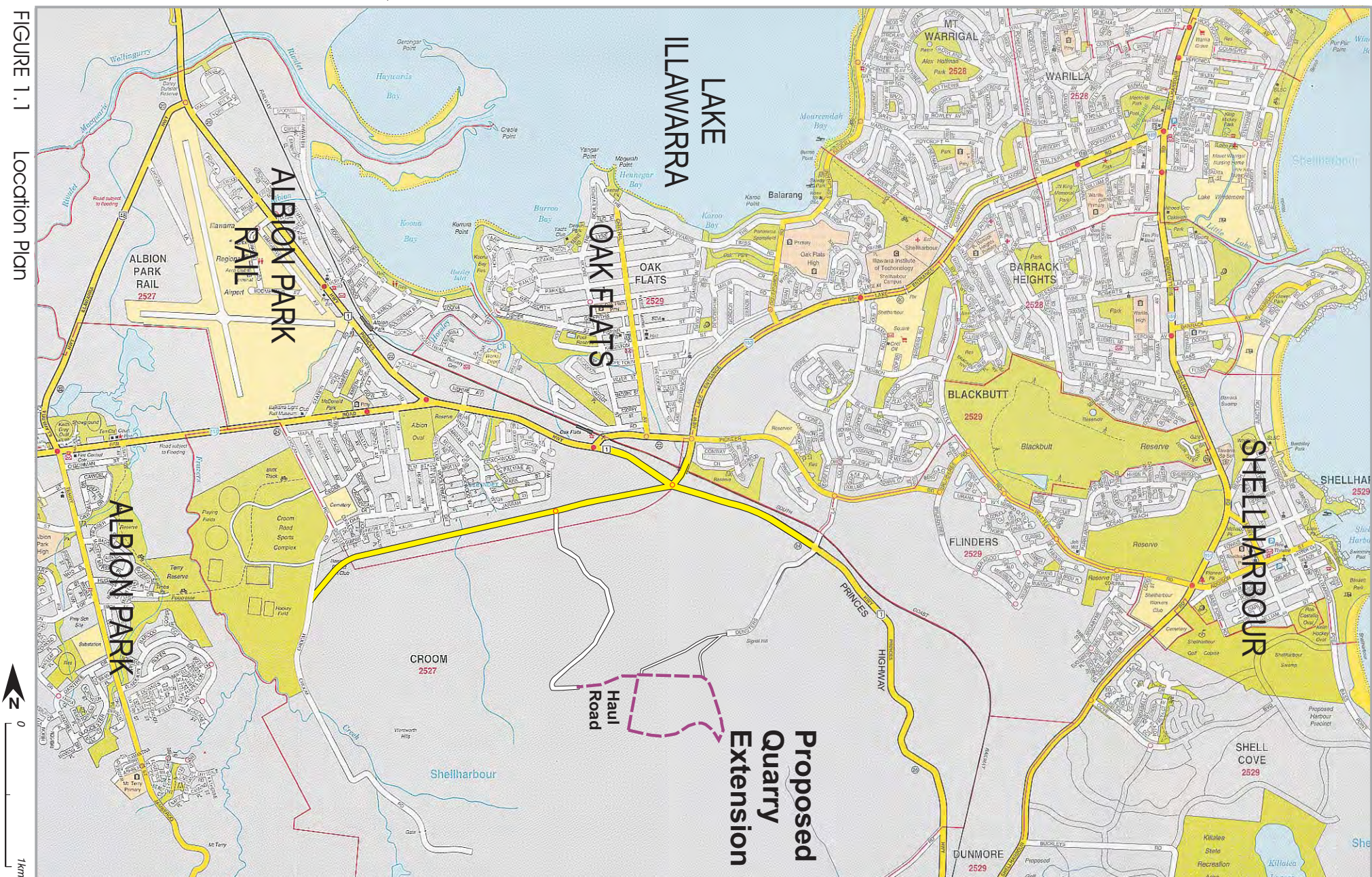
The quarrying reserves approved for extraction by Cleary Bros have been almost fully exhausted. The company is now extracting remnant material with marginal economic benefit, pending approval for extension of its quarry. The company desires to secure approval for continued hard rock extraction from a nearby property, containing some 13 million tonnes of resource. At current production rates, this additional resource will extend the company's operations at Albion Park for about 30 years.

The regional location of the proposed quarry extension is shown on *Figure 1.1*.

This environmental impact statement accompanies two development applications submitted to the Department of Infrastructure Planning and Natural Resources. The applications seek consent to extract hard rock from a former dairying property about 400 metres east of the current extraction area in the Wentworth Hills at Croom, near Albion Park. Development of this site will add to a cluster of active quarries and former extractive sites located along a range of basalt-containing hills, extending from Stockyard Mountain to the ocean at Bass Point.

Extractive industry is not permissible development within the current zoning of the quarry site. Following established procedure, a separate application was submitted to Shellharbour City Council in 1998 requesting Council to alter the zoning of the quarry site from 7(d) – *Environmental Protection (Scenic)* to 4(c) – *Extractive Industrial*. PlanningNSW convened a planning focus meeting in November 2000, hosted by Cleary Bros, to receive comments from public authorities in relation to this application.

FIGURE 1.1 Location Plan



During the period when this EIS has been in preparation, a separate local environmental study (LES) has been independently prepared under the direction of Shellharbour City Council to consider the rezoning application. Cleary Bros has reimbursed Council for the costs of preparing the LES. In September 2003, Shellharbour Council resolved to publicly exhibit the LES together with amendments to Shellharbour Local Environmental Plan 2000 and draft Shellharbour Rural LEP 2003. Draft copies of the LES in progress were made available to Cleary Bros for review and comment in February 2002 and March 2003. The final LES has not been sighted by Cleary Bros prior to publication. It is understood that the development applications for the quarry extension accompanied by this EIS will be concurrently exhibited with the LES and LEP amendments.

1.2 BACKGROUND TO THE PROPOSAL

1.2.1 *The Applicant*

Cleary Bros (Bombo) Pty Ltd is one of the companies within the Cleary Bros Group, a privately owned enterprise based in the Illawarra Region. The Group is a successful independent operator in the construction and materials supply industries, having grown over a period of more than 70 years by diversifying and vertically integrating its operations.

The late John Joseph Cleary started the enterprise with his two brothers, who he subsequently bought out of the business. His three sons, John, Brian and Dennis are the present generation of "Cleary brothers" and have been instrumental in providing the vision required to develop the group's activities to their present size and diversity.

From its beginnings associated with the transport and timber industries, Cleary Bros now operates a number of divisions including:

- earthmoving equipment and transport services through an extensive fleet of heavy equipment, trucks and mobile cranes;
- quarrying basalt, sandstone and sand from three extractive sites:
 - a sand extraction operation at Gerroa,
 - a sandstone extraction operation at Menangle; and
 - the Albion Park hard rock quarry

Large mobile screening/crushing plants are used with pug mills for producing stabilised road base and other specialised products;

- pre-mixed concrete, manufactured by four concrete plants located in the Illawarra area;
- civil engineering consulting and construction, including project management, where an array of expertise has been developed in:

- roadworks and drainage construction;
 - heavy earthworks;
 - project management; and
- environmental engineering and waste management services

Each of the divisional activities is supported by extensive service and repair facilities through a number of large workshops and specialised service vehicles. An ongoing policy of the group is to maximise the use of local resources to ensure the reliability of operations and to continue support for the Illawarra area.

The company has established a reputation for quality and reliability. Operations are conducted within an environmental management system compliant with AS14000.

Cleary Bros currently employs approximately 400 people, of which about 30 to 40 are directly involved with quarrying, processing and delivery of material from Albion Park quarry. A much larger number of the group's employees are reliant upon the quarry's production. An economic evaluation has been carried out to determine the effects on regional employment provided by the group if quarrying operations were to cease at Albion Park (refer to section 5.14).

The Group also maintains active involvement with many community organisations. Cleary Bros contributes significantly to the Illawarra community in the form of cash donations and work in kind. The group also makes a number of senior executives available for assistance with committee work associated with community organisations.

1.2.2 Development History

Current operations at Cleary Bros' existing Albion Park quarry have been approved under several development consents and amendments. The existing quarry was originally referred to as the "Beacon Hill" quarry, so named for the presence of an air navigation beacon. The quarry comprises three contiguous extraction areas referred to in the consents as areas "A", "B" and "C". Table 1.1 summarises the various approvals issued by Shellharbour Council for the existing operation.

Table 1.1 DEVELOPMENT HISTORY

Date	Approval Type	Approval
25 Feb 1977	Consent No 6/77	Extract hard rock from Area "A"
16 Nov 1988	Consent No 88/67	Extract hard rock from Area "B"
23 July 1992	Amendment to 88/67	Deviate haul road into Area "B"
29 Oct 1993	Amendment to 88/67	Extend quarry operational hours

19 Nov 1994	LEP No 71 (93/7)	Rezone 0.83 hectares to 4(c) Extractive Industry
3 Jan 1996	Consent No 95/164	Extract Hard Rock From Area "C"
5 May 1999	Amendment to 6/77	Deepen the existing quarry (Area "A")

The processing plant has been in operation for considerably longer than the current quarry. It was initially used for processing hard rock extracted from the property upon which the processing plant is situated. Development consent No 6/77 for the existing quarry requires *"That controls relating to the use of the present crushing plant and equipment, as enumerated in the Deed Agreement dated 12 November 1963 shall continue to apply"* (Condition 12).

Cleary Bros holds an environment protection licence for the operation issued by the Environment Protection Authority under the Protection of the Environment Operations Act, 1997. A copy of the current licence is included in *Appendix G*.

1.2.3 Existing Operations

The company's existing Albion Park quarry is located about 400 metres west of the proposed extension. This quarry is oriented from north-west to south east with approximate dimensions 500 by 180 metres.

Quarrying operations are managed to satisfy market requirements for the various quarry products. Extraction is planned having regard to the suitability and relative thickness of various rock types encountered and boundary constraints, established to minimise visual impact.

Within the extraction area all topsoil and overburden have been removed. Hard rock extraction relies on blasting to fracture the rock and extend working "benches" in a manner that maximises the quantities of higher-quality rock produced. Blasting is also required to assist with removing intermediate tuffaceous agglomerate lying between upper and lower latite layers.

Blasting is undertaken on average two to three times per month. The quantity of rock fractured within each blast can range from about 7,000 to 30,000 tonnes, reflecting demand at the processing plant, the quality of the rock and the configuration of the area to be blasted. Blasting is carried out at a regular frequency for about 11 months of the year. There is limited blasting during January when demand is low.

Fractured rock is picked up by excavator, placed in off-road dump trucks or highway trucks and transported to either the processing plant or directly off-site. Oversize rock fragments (greater than 900 millimetres) are reduced in size prior to processing using a track-mounted hydraulic excavator fitted with a rock-breaker.

Processing is undertaken at a site approximately 600 metres north of the existing quarry. The processing plant involves primary, secondary and tertiary crushing and screening to reduce the extracted rock in size and obtain the required products. Product is stockpiled on this site prior to loading and transport. There is also a concrete batching plant and a truck workshop located at the processing plant.

The current operational layout is shown on *Figure 1.2*

1.3 BRIEF DESCRIPTION OF THE PROPOSAL

1.3.1 Need

The reason for proposing an extension to Albion Park quarry is that hard rock resources at Cleary Bros' existing quarry are almost exhausted. The company does not operate any other quarry with extractable hard rock resources that can supply quarry products as a replacement for the output from Albion Park quarry.

Cleary Bros operates a successful business as an independent supplier of quarry products and batched concrete and undertakes civil engineering projects where these company-supplied products are used. The continued competitiveness of Cleary Bros within these markets is dependent upon having a reliable supply of hard rock from a quarry controlled by the company. If the company were forced to source supply of its fundamental resource from competitors, there would be no certainty for the long-term viability of its operations reliant on quarry materials.

Consequently the company is compelled to seek approval to extract additional hard rock resources to secure its long-term supply of this raw material vital to its operations.

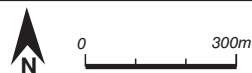
1.3.2 Objectives

The objectives of the proposal examined in this EIS include:

- extend Cleary Bros' Albion Park quarry operations by developing a hard rock quarry on Lot 1 DP 858245;
- construct a haul road, crossing the adjoining Lot 2 DP 858245, to link the new quarry with the existing quarry and processing plant;
- operate the quarry to extract hard rock for processing and sale at the company's existing processing plant or for direct delivery to customers, in accordance with approvals granted by regulatory bodies;



FIGURE 1.2 Current Operational Layout



- manage the facility to achieve environmental performance objectives derived from conditions of approval and consolidated in an environmental management and rehabilitation plan; and
- provide a safe, stable and self-draining final landform, designed for minimum maintenance and suitable for a land use identified, as the time of completion approaches, to be of future benefit to the community.

1.3.3 *Development Works*

Development works required to establish the quarry are summarised as follows:

- install monitoring apparatus including piezometers, flow gauges, dust monitors, wind recorder and blast monitors;
- define the southern extent of the quarry and commence regeneration of indigenous bushland in grassed areas between that boundary and the creek;
- install erosion and sediment controls to minimise soil and water impacts from initial works including haul road, bund walls and the first area to be quarried;
- construct a haul road and associated sight bunds from the existing quarry into the site. This road will cross the neighbouring property owned by Readymix Holdings Pty Ltd;
- construct and vegetate an earthen berm around the north-eastern corner of the site to restrict noise propagation from the quarry and limit views into the property. This wall will be constructed with material won from the haul road cutting and overburden from the quarrying area and capped with topsoil from the site;
- remove existing dilapidated dry stone walls from the quarrying area and use the stones to construct a rock feature at the entry to Cleary Bros property; and
- provide basic staff amenities, including pump out toilet.

Site development works are programmed to take from six to twelve months. Assuming commencement by mid 2004, the site will be ready for production of hard rock by the end of 2004. At that time extraction from the existing quarry will cease.

There is no proposal to further develop the existing processing plant or alter its current operation. The processing plant is located on a separate allotment and currently operates under a separate development consent.

1.3.4 *Operation*

When the new quarrying area has been prepared, Cleary Bros will progressively transfer extractive operations, phasing the existing quarry out of production. In the initial years the current quarry will receive overburden and topsoil from the

extension. It will be configured to a stable landform, in accordance with the requirements of the existing approval.

Hard rock extracted from the quarry extension will be trucked via the new haul road and through the existing quarry to the processing plant. The rate of extraction and hence the volume of material passing through the processing plant is not anticipated to change as a result of transferring extraction to the quarry extension.

Hours of working in the quarry extension will remain within the current restrictions, being 7.00 am to 5.30 pm Monday to Friday and 7.00 am to 1.00 pm on Saturdays, for most activities. Further restrictions apply to hours for blasting (refer section 3.3.8).

As explained in section 5.7, the blasting regime will be designed to ensure that EPA guidelines for air blast and vibration can be met at the nearest residences. Other environmental controls will be implemented at the site as detailed in this EIS subject to any modifications included in the development consent and licence issued for the operation.

As quarrying progresses, clean fill will be progressively back-loaded to the site to raise the quarry base, ensuring that the final landform is self-draining with reasonable slopes and an acceptable landform for its future use.

1.4 DETERMINATION PROCEDURE

1.4.1 Purpose of the EIS

Development consent is being sought to extend Cleary Bros Albion Park quarry operation. The quarry proposal is designated development under the *Environmental Planning and Assessment (EP&A) Act, 1979*, requiring an environmental impact statement to accompany the development applications. This EIS has been prepared for that purpose, having regard to the requirements of the EP&A Regulation, 2000.

The information specified in Clause 71 of the Regulation to be contained in the “prescribed form” for an EIS, has been included as *Appendix A*.

The requirements of the Director-General of Infrastructure Planning and Natural Resources regarding the form and content of the EIS have been obtained and are included as *Appendix B*. The requirements were originally obtained in 2001 and updated in 2003 following expiration of the statutory two-year period. An index of the location in the EIS where a response has been provided for each matter is included in *Appendix C*.

The Director-General’s requirements refer to an EIS guideline entitled *Extractive Industry – Quarries*, published by the (former) Department of Urban Affairs and

Planning in 1996. That document has been consulted and considered in preparing the EIS.

1.4.2 State Significant Development

The proposal is “State significant development” because it falls within the ambit of a declaration by the Minister for Urban Affairs and Planning dated 3 August 1999. A copy of the declaration is included in *Appendix D*. The Minister’s declaration applies to the proposed development because it is an extractive industry recovering a resource that has been identified as being of State or regional significance and because the total resource is greater than five million tonnes.

In accordance with the provisions in the EP&A Act for State significant development, the consent authority for the proposal is the Minister for Infrastructure and Planning.

1.4.3 Integrated Development

The provisions in the EP&A Act for “integrated development” also apply to the proposal because approvals are required from the Environment Protection Authority and the Department of Infrastructure Planning and Natural Resources (former DLWC). Subsequent approvals to be obtained are listed in section 1.4.5.

1.4.4 Development Application Process

The completed environmental impact statement and development applications will be submitted to the Department of Infrastructure Planning and Natural Resources (former Planning NSW). In accordance with the provisions for integrated development, copies will also be submitted to the Environment Protection Authority and the Department of Infrastructure Planning and Natural Resources (former DLWC). DIPNR will publicly exhibit the development applications and EIS.

It is understood that Shellharbour City Council will exhibit a draft local environmental plan (DLEP) and local environmental study (LES) concurrently with the exhibition of the EIS. Public exhibition of the DLEP and LES is part of the process for altering the zoning of the land to make the proposed quarry extension a permissible use. The need for this zoning change is further discussed in Chapter 4.

Shellharbour City Council will consider submissions received in response to the exhibition of the DLEP and LES. If Council is satisfied that the zoning change should proceed, it will forward its recommendations to DIPNR (former Planning NSW). DIPNR will deal concurrently with the rezoning application and development applications, considering submissions to the EIS and the submission from Shellharbour Council with respect to the draft LEP. DIPNR will then forward its assessment to the Minister for Infrastructure and Planning. If the Minister decides to

approve the applications, the rezoning will be gazetted and development consent will subsequently issue to Cleary Bros.

1.4.5 Subsequent Approvals

Following receipt of development consent, further approvals from the consent authority or other agencies will be required as follows:

- Environment Protection Authority – environment protection licence under the *Protection of the Environment Operations (PEO) Act, 1997*. The proposal will be a scheduled activity under the PEO Act; and
- Department of Infrastructure Planning and Natural Resources (former DLWC):
 - permit under Part 3A of the *Rivers and Foreshores Improvement Act, 1948* to excavate within “protected land”, being land that is within 40 metres of a stream, in this case tributaries of the unnamed creek flowing through the site;
 - licence under section 10 of the *Water Act 1912* to take, use and dispose of collected stream water for any purpose; and
 - licence under section 116 of the *Water Act 1912* to sink boreholes for the purpose of groundwater monitoring.

It is not anticipated that a construction certificate will be required because there is no proposal to carry out building work, other than provide a portable toilet.

1.5 CONSULTATION

1.5.1 Authority Consultation

Cleary Bros, Shellharbour City Council and (former) Planning NSW have extensively consulted Government authorities over a protracted period. Cleary Bros hosted a planning focus meeting on 9 November 2000, convened by Planning NSW, to consider the proposed quarry extension and the zoning variation. The following agencies attended the meeting:

- Department of Urban Affairs and Planning;
- Department of Land and Water Conservation;
- Environment Protection Authority;
- Department of Mineral Resources;
- Department of Agriculture;

- Shellharbour City Council;
- Roads and Traffic Authority.

The National Parks and Wildlife Service was invited to the planning focus meeting but was unable to be represented.

Most of the above authorities have submitted further responses as part of the process of renewing the Director-General's requirements for the EIS in 2003. Separate correspondence was forwarded to the NSW Heritage Office in 2001 seeking advice as to whether any approval was required from that body in relation to a nearby homestead, "The Hill". The reply from the NSW Heritage Office indicated that as "The Hill" is not listed on the NSW State Heritage Register the Heritage Office defers any comment on its management to Shellharbour City Council.

Copies of the most recent response from each agency are included in *Appendix E*.

1.5.2 Community Consultation

When Shellharbour Council considered the rezoning request from Cleary Bros and a similar request from CSR Readymix to rezone adjoining land in December 1999, local landowners attended the Council meeting to put their views. After considering the presentations from landowners, Council determined to proceed with preparation of the LES and draft LEP for extension of Cleary Bros quarry.

Having regard to the location of the proposed quarry extension and the size, ownership and orientation of rural properties in the area, the community likely to be affected by the quarry extension is considered to be the owners of adjoining properties. These properties include "The Hill" dairy farm and lands owned by quarrying companies, Readymix Holdings and Canda Nominees (a Cleary Bros company).

Cleary Bros has been in discussion with the owners of the adjoining Lot 2 DP 858245 for several years. During that time, the former owner, CSR Limited, underwent a de-merger transferring ownership of the property to one of its de-merged entities, Readymix Holdings Pty Ltd. In September 2002 Cleary Bros met with representatives of the former owner and agreed on the location of the haul road as shown in this EIS. For the record, *Appendix E* contains correspondence received from the former owner in 2001 and 2002. At a subsequent meeting with representatives of Readymix Holdings in October 2003, Cleary Bros agreed to a request that a separate development application be submitted for the portion of the haul road proposed to be constructed on Readymix property. Readymix Holdings Pty Ltd subsequently granted consent to submission of that separate development application.

In 2001 Cowman Stoddart interviewed the owners of "The Hill". Matters raised in that interview are reported and addressed in *Appendix S*, which includes a letter from the owners. To obtain a more recent understanding of the neighbour's views, correspondence was forwarded to the owners of "The Hill" in May and June 2003, seeking advice of any further matters that should be taken into consideration in the

EIS. The owner responded by telephone and discussed a number of issues, generally encompassed within the matters previously addressed by Cowman Stoddart. The owner expressed concern that recent blasts in the nearby quarries had seemed stronger than normal.

The owner was advised that an opportunity for formal submission would be available later in 2003 when it was anticipated the development applications and EIS would be placed on public exhibition.

Chapter 2

THE SITE

2.1 PROPERTY DETAILS

2.1.1 *Property Description*

The development applications and this environmental impact statement refer to four parcels of land. Development consent is sought to undertake development on the properties listed in *Table 2.1*.

Table 2.1 PROPERTY DESCRIPTION

Property Description	Owner	Proposed Development
Lot 1 DP 858245	Canda Nominees Pty Ltd	Quarry extension and ancillary works
Lot 2 DP 858245	Readymix Holdings Pty Ltd	New haul road and ancillary works
Lot 2 DP 1021840	Cleary Bros (Bombo) Pty Ltd	Haul road, overburden placement, topsoil storage and ancillary works (existing quarry)
Lot 23 DP 1039967	Cleary Bros (Bombo) Pty Ltd	Haul road, processing plant, product storage and sale (existing processing plant).

The existing Cleary Bros quarry and processing plant are located on the latter two parcels of land listed in *Table 2.1*. Activities to be undertaken on those sites consequential to the proposed quarry extension will be a continuation of activities authorised by existing development consents.

Figure 2.1 shows the location of the affected properties on an aerial photograph base with cadastral information superimposed. The locations where new works will be undertaken are highlighted on the figure.

The principal quarrying activity will take place on Lot 1 DP 858245. This 40-hectare allotment is approximately square-shaped with an indent in its south-western corner. The longest (northern) boundary of Lot 1 is about 700 metres in length. The land falls steeply to the south from a high point of 140 metres (AHD) in the north-western

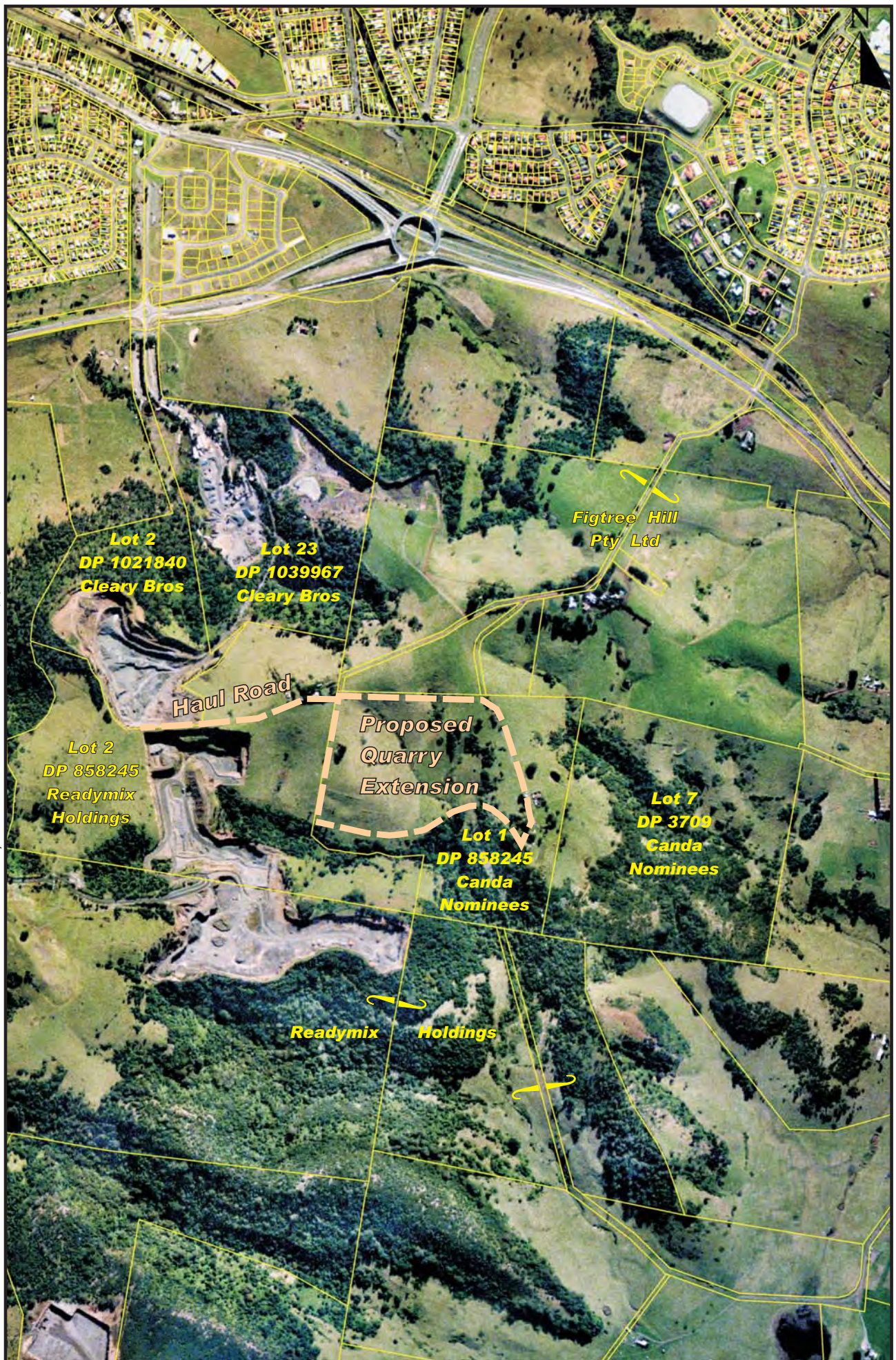


FIGURE 2.1 Cadastral Plan



corner. Two spurs extend from the north along the eastern and western boundaries of the property. On the eastern side the spur has a flat-topped section with an elevation of 115 to 120 metres. The unoccupied homestead, “Belmont”, is located towards the southern end of this feature. A watercourse drains the central area of the property southwards to an unnamed creek flowing just within the southern boundary. The creek flows from the property near its south-eastern corner, where the elevation drops to about 30 metres.

It is proposed that Lot 2 DP 858245 will be traversed by the haul road linking the quarry site with the existing Cleary Bros Albion Park quarry. The haul road will traverse about 400 metres of the north-eastern section of this property where the elevation ranges from 120 to 145 metres AHD.

Figure 2.2 is a topographic plan showing the contours of the quarry site and the land to be traversed by the proposed haul road.

2.1.2 Ownership

As listed in *Table 2.1*, Lot 1 DP 858245 is owned by Canda Nominees Pty Ltd, a Cleary Bros company and Lot 2 DP 858245 by Readymix Holdings Pty Ltd. Each owner has consented to lodgement of the respective development application. The letter of consent from Canda Nominees is included as *Appendix H*. The properties containing the existing quarry and processing plant are owned by the applicant, Cleary Bros.

The former owner of Lot 1 permanently vacated the “Belmont” homestead on that property in April 2003. Until that time the occupancy continued under an arrangement with Cleary Bros that provided for tenancy to be available for as long as the former owner wished to personally reside there. With the ending of that arrangement the house is currently unoccupied, although Cleary Bros may arrange for it to be reoccupied on the company’s terms. “Belmont” is assumed to be unoccupied for the purposes of this environmental impact statement. [In the appendices to this EIS, some of the specialist reports prepared prior to April 2003, such as noise, blasting and air quality, refer to the continued occupancy of “Belmont” as a constraint to the quarry extension. That constraint no longer exists and is clarified at appropriate locations within the body of the EIS.]

During 2003 the former owner of Lot 2 DP 858245, CSR Limited, underwent a de-merger into two groups: CSR and Rinker. The Readymix operations now form part of the Rinker Group and as a consequence, ownership of Lot 2 DP 858245 has transferred to the entity shown in *Table 2.1*. Some of the specialist reports in the appendices to this EIS may refer to Lot 2 or the quarry on it as being owned or operated by CSR or CSR Readymix, as was the case when those reports were prepared. Such references should now be taken to refer to Readymix Holdings.



FIGURE 2.2 Topographic Plan



2.1.3 Access Arrangements

Cleary Bros will negotiate with Readymix to obtain a formal right of access across Readymix land to the quarry extension. It is proposed that suitable arrangements will be in place when this becomes a necessary step in progressing the project. Formal right of access will be needed prior to commencing work on the quarry site.

In granting approval for a development application to be submitted with respect to Readymix land, Readymix has indicated it wishes to review the project and if necessary make submissions when the details of the development application and rezoning application are finalised and publicly exhibited.

2.1.4 Local Government

The land is within the City of Shellharbour. The nearest boundary with the adjoining local government area, Kiama, is approximately 2.5 kilometres south-east of the site.

2.2 EXISTING LAND USE

2.2.1 Quarry Site

The area of land proposed for quarrying and the adjoining ridgetop area near “Belmont” are mostly cleared grassland with a few scattered trees and minor pockets of remnant vegetation. The balance of the site at lower elevations is covered with dense vegetation including rainforest. The grassland area of Lot 1 is used for cattle grazing under an arrangement between Cleary Bros and the neighbouring dairy farm. The site is fenced at various locations to contain grazing cattle.

The part of Lot 2 proposed for construction of the haul road is mostly grassland. The route passes over a bushy hilltop where the “Kyawana” house stands, abandoned and dilapidated. The curtilage of the house has some remnant plantings but is largely overgrown with weeds and Orange Trumpet Vine. Much of the remainder of Lot 2 is used for quarrying, as described in Section 2.2.2.

At the present time vehicular access is available to the northern side of the quarry site from the Princes Highway via Dunsters Lane. There are two vehicular tracks, located within separate road reservations, connecting Dunsters lane to the northern side of the site. The easterly track leads to “Belmont” while the western track enters the property near “Kyawana”, providing access to the spur along the western boundary of the site.

Within Lot 1 DP 858245 there are three former stone walls, constructed as stock barriers at some point in the early history of farming on the property using the



Base Aerial and Cadastral - LPI and Shellharbour City Council 2003. Aerial Photo date 24/6/2002.

01/73 16.06.2003

* Source for house site: Connell Wagner, 2003.

FIGURE 2.3 Surrounding Land Use



abundant loose basaltic rocks found on the land. The walls have since largely collapsed and are unable to function as fences without substantial reconstruction.

Photographs 1 to 4 show various aspects of the site.

2.2.2 Surrounding Land

Surrounding land use is illustrated on *Figure 2.3* and photographs 5 and 6.

The area is historically a dairy farming district, modified in more recent times with a number of quarries and processing plants exploiting the hard rock resource lying at and beneath the surface.

The main ridge system extending from Stockyard Mountain through the Wentworth Hills has largely been cleared of vegetation and converted to grasslands for grazing. Original vegetation remains on the steeper slopes and gullies to the south east and north west of the ridge. Quarrying companies now own much of the land on this hill system, with some six active or former quarries evident in aerial photographs of the area.

Quarry land to the immediate west of the site is owned by Readymix. Readymix has previously obtained rezoning for part of the land adjoining the western boundary of Lot 1 to enable future hard rock extraction. This rezoning does not include the hill top area traversed by the proposed haul road.

Grazing and dairying is still carried out on some of the properties, although there are few residences in the area. With the “Belmont” homestead on the subject property now vacant, the nearest occupied residence to the site is “The Hill”, located some 450 metres northeast of the proposed quarry. Shellharbour City Council has advised that approval has been granted for a further house to be constructed on the same property, located some 570 metres to the east of the proposed quarry. The location of this additional house site is shown on *Figure 2.3*.

Other rural homesteads in the vicinity are also indicated on *Figure 2.3* and include “St Ives Farm”, “Deer Farm” and “Kurrawong”, located on the lower slopes to the east of the quarry extension site.

In 2001 the Roads and Traffic Authority opened the first stage of an east-west traffic relief route to bypass Albion Park Rail, north of the quarry site. This road, known as East-West Route, links the Princes Highway with Croom Road. A grade-separated intersection has been constructed where the new road meets the Princes Highway. The quarry access road intersects the new road at a roundabout-controlled intersection providing improved access to the quarry and increased safety for road users.



PHOTOGRAPH 1 Looking south along the western spur.



PHOTOGRAPH 2 Looking west along the northern site boundary towards
"Kyawana" hillcrest



PHOTOGRAPH 3 South east along the gully towards the bushland area. Farm dams and section of dry stone wall are visible.



PHOTOGRAPH 4 Looking east across the site. "Belmont" is on the Hill



PHOTOGRAPH 5 Looking south along the "Belmont" spur from Dunsters Lane. "Belmont" farm and access road are visible. The quarry site is (obscured) in the valley to the right.



PHOTOGRAPH 6 Dairy lands and existing Readymix quarry, viewed along Dunsters Lane. "Kyawana" is visible on the right.

The nearest urban development to the site is Green Meadows Estate on the northern side of the new East-West Route. This residential area is about 1.5 kilometres from the quarry site at its closest approach, but is closer, approximately 600 metres, from Cleary Bros existing processing plant.

2.3 SITE SUITABILITY

2.3.1 DIPNR Guidelines

Site selection procedures for quarries are outlined in an EIS guideline published by the (former) Department of Urban Affairs and Planning in September 1996.

The Department recommends that site selection should be based on four locational principles. These principles are listed in *Table 2.2* together with a discussion regarding the consistency of the proposal with each principle.

Table 2.2 SITE SELECTION PRINCIPLES FOR QUARRIES

Principle	Consistency of the Proposal
<ul style="list-style-type: none"> Permissibility of the proposal under the relevant planning controls 	<p>The current zoning of the site under Shellharbour LEP 2000 does not permit extractive industry. However, the current development applications have been preceded by a separate application requesting Council to alter the zoning so that quarrying is a permissible use for the land. Council has prepared a draft local environmental plan and LES for the purpose of initiating such a change;</p>
<ul style="list-style-type: none"> Avoiding environmentally sensitive areas 	<p>The proposal has been designed to avoid disturbance to environmentally sensitive areas. For example, two endangered ecological communities of vegetation on the property bordering the creek line have been excluded from the area to be quarried and will be protected. The appearance of green ridge tops from the surrounding low country will not be significantly affected. The proposal is not located within lands defined by physically sensitive features (such as wilderness or wetlands) or reserved under legislation (such as national parks). Instead it is located on grazing land;</p>

<ul style="list-style-type: none"> • Compatibility with nearby land uses 	<p>Surrounding land is used for quarrying or grazing. The proposed quarry extension maintains adequate separation from rural residences to enable noise, blasting and air quality goals to be met. Visual impact can be controlled with sight bunds and vegetation planting. Continued use of the surrounding lands for their current approved purpose will not be threatened by the quarry extension.;</p>
<ul style="list-style-type: none"> • Initial site investigations indicate fundamental suitability for quarrying 	<p>The site has been thoroughly investigated, with the result that its suitability for development as a quarry has been confirmed.</p>

The Department's guideline lists 28 matters to be considered in initial site investigations. *Table 2.3* paraphrases the matters for consideration, together with a summary statement of the performance of the site. The land proposed for the quarry extension does not significantly conflict with any of the listed matters for consideration.

Table 2.3 SITE ASSESSMENT SUMMARY

Matter for Consideration	Performance of Proposed Site
<ul style="list-style-type: none"> • sufficient land area 	<p>Lot 1 has sufficient area to accommodate the proposed quarry, with some land excluded. Lot 2 has adequate space for the haul road.</p>
<ul style="list-style-type: none"> • access and transport networks of an appropriate standard • safe entry and exit for trucks with on-site queuing 	<p>The processing plant has a dedicated access to the main road system at the new East-West Route.</p> <p>Trucks enter and exit the new East-West Route via a roundabout. There is abundant room for queuing on site.</p>
<ul style="list-style-type: none"> • an efficient site relative to the market • services able to be efficiently provided 	<p>The site is suitably located to serve the Illawarra Region</p> <p>The existing processing plant is already serviced. Potable water can be delivered to the quarry by tanker.</p>
<ul style="list-style-type: none"> • any difficulties foreseen from rainfall patterns or prevailing winds. • effect of any microclimatic conditions caused by topography, wind and rain 	<p>All of the existing quarries in the area operate within the existing climatic conditions. No difficulties are foreseen.</p> <p>There are no significant microclimatic conditions in the area that affect the suitability of the site.</p>
<ul style="list-style-type: none"> • any site constraints making water management difficult • risk of surface water pollution because of proximity to water bodies. • risk of groundwater pollution because of shallow water tables, proximity to recharge areas or vulnerable areas • susceptibility to flooding. 	<p>Management of stormwater on the site will be straight forward as the quarry will retain water.</p> <p>The quarry excavation will intercept and store runoff, to be released only when water quality goals are satisfied.</p> <p>Little risk of groundwater pollution because virtually no pollutants will be introduced to the site.</p>
<ul style="list-style-type: none"> • adequate separation from environmentally sensitive areas such reserved lands and protected zones in planning instruments. • ability to avoid native vegetation clearing 	<p>The site is not susceptible to flooding.</p> <p>There are no reserved lands in the vicinity. The site contains two endangered ecological communities. The mature contiguous stands of this vegetation are outside the area to be quarried and will be protected.</p> <p>The area to be quarried has previously been cleared for grazing and is now mostly grassland. There are some</p>

<ul style="list-style-type: none"> ability to avoid clearing vegetation of high significance effect on threatened species, populations or ecological communities or their habitats. Need for a SIS requirement for a separate application for vegetation clearing under SEPP 46 	<p>isolated remnant trees to be removed and some small patches of regrowth.</p> <p>The mature contiguous rainforest and grassy woodland communities will not be disturbed.</p> <p>Three threatened plant species, one fauna species and two endangered ecological communities are mostly outside the area to be quarried and will be protected. A SIS will not be required</p> <p>SEPP 46 has been repealed. There is no requirement for a separate clearing application under the NVC Act as that Act does not apply to clearing undertaken as part of designated development defined in the EP&A Act..</p>
<ul style="list-style-type: none"> any subsidence, slippage or seismic characteristics likely to cause difficulty in managing impacts potential sediment management problems resulting from highly erodible soils. existing soil problems such as contamination, acid sulphate or saline. 	<p>Although the site is steep, there are no unusual topographical or geological issues associated with managing the site as a quarry.</p> <p>There are no such issues. The quarry will collect all runoff from disturbed land for re-use or treatment and disposal.</p> <p>There are no issues with the existing topsoil and overburden.</p>
<ul style="list-style-type: none"> ability of the road network to accommodate traffic likely to be generated. ability of truck traffic to avoid residential areas, hospitals, schools and commercial areas ability to modify the road network to overcome any inadequacies 	<p>Quarry traffic is adequately handled by the existing road network.</p> <p>Truck access from the site is direct to the new East-West Route. This is a main road to ultimately bypass Albion Park.</p> <p>Not necessary as the existing external access is adequate.</p>
<ul style="list-style-type: none"> compatible with existing or proposed land uses, especially residential and community buildings and services and sites of outstanding natural value any difficulty with nearby land uses in sustaining compliance with dust, noise or water quality goals any health risks 	<p>The proposed quarry is compatible with the rural land, containing other quarries in the immediate vicinity. Regionally important vistas will not be affected by the proposal.</p> <p>Adequate controls for noise, blasting, air quality and water quality can be implemented on the site to ensure long term compliance with goals.</p> <p>The proposed quarry is not associated with any health risks beyond known occupational and health issues normally associated with quarrying.</p>
<ul style="list-style-type: none"> any effect on the heritage items 	<p>Existing relics such as dry stone walls and "Kyawana" will be removed. These are not heritage-listed and can be recorded. The heritage significance of nearby listed residence, "The Hill", should not be affected by the proposal.</p>
<ul style="list-style-type: none"> any visual impacts 	<p>The quarry site is located in a secluded valley setting with very little exposure to external view. Sight bunds and tree planting will assist to reduce any visual impact.</p>
<ul style="list-style-type: none"> any worsening of cumulative impacts 	<p>The proposed quarry will replace Cleary Bros existing quarry without any increase in the rate of production. Hence there should be no significant change to cumulative impacts in the area, except that a greater proportion of the land will be locally assigned to quarrying.</p>

In summary, evaluation of the proposed quarry extension site against the systematic and rigorous site selection process recommended by the (former) Department of Urban Affairs and Planning reveals that Lot 1 DP 858245 measures favourably against all of the matters for consideration relevant to a hard rock quarry.

2.4 CONSIDERATION OF ALTERNATIVES

2.4.1 *No Development*

The fundamental alternatives available to Cleary Bros are to either secure approval for further hard rock extraction capable of supplying the company's requirements into the foreseeable future or close the section of the business that supplies quarry materials. In the latter case Cleary Bros would also suffer a major setback to its concrete batching business, as the company would lose control of a substantial component of the raw material. The company would have to source aggregate for concrete from its competitors, losing any competitive advantage the company enjoys with its pricing and creating uncertainty as to long-term movements in price. The confidence to undertake further investment in the concrete batching side of the business would be seriously weakened and the business would be expected to decline.

Furthermore the company would be at a disadvantage when tendering for civil engineering projects where quarry products or batched concrete is to be supplied as part of the project. This section of the company would also have declining success.

As with most industries in competitive markets, it is important to promote investment and renewal so that more efficient production methods and improved environmental performance can be realised. If Cleary Bros were to lose the base material for its competitiveness this investment would be severely restrained.

The option of no development is not in the interests of either Cleary Bros or the general community, because it would threaten the viability of the company and reduce its ability to modernise and continually improve environmental performance.

The economic effects of the proposal are further discussed in section 5.14

2.4.2 *Alternative Materials*

Cleary Bros is not aware of any alternative material that could readily substitute for hard rock used in the company's concrete manufacture and engineering projects that would have the same beneficial properties, cost and availability as hard rock won from the Albion Park quarry.

2.4.3 *Alternative Sites*

Cleary Bros searched for suitable sites for hard rock extraction prior to purchasing the subject property. To be considered suitable, the site had to achieve a high ranking against the following criteria:

- contain a substantial quantity of high quality extractive material, capable of extraction at reasonable cost using proven techniques;
- be available for purchase by Cleary Bros;
- have satisfactory environmental characteristics both within the site and surroundings, enabling the quarry to be developed and managed without significant impacts;
- satisfy the business objective of the company to maintain and strengthen its close association with the Illawarra Region; and
- preferably be close to the company's existing processing plant with an internal road link to the quarry so that off-road vehicles can be used for rock transport;
- be accessible to the current experienced workforce to provide continuity of employment.

The company is not aware of any suitable alternative quarry site in or close to the Albion Park area. The alternative of establishing a new quarry in another part of the State has been rejected, as this could not meet the last three objectives above. Instead, Cleary Bros has decided the preferred course of action is to develop a quarry on the subject site using state of the art blasting techniques that do not rely on excessive separation to mitigate impacts on surrounding buildings and structures. The subject site meets the criteria and is the only suitable location known to the company.

2.4.4 Alternative Means of Transport

i. Transport between the Quarry and Processing Plant

Road transport is seen to be the only practicable method of transporting quarried material to the processing plant. Road construction cannot be avoided, as it is required to give access for personnel, plant and vehicles. The possibility of using conveyor transport has several drawbacks:

- high additional up-front cost in addition to the cost of constructing an access road for site development;
- the surface route between the quarry and processing plant is circuitous, remaining on the company's land and an access corridor negotiated with Readymix. Several conveyors and transfer bins would be required to follow this path. A more direct surface path is not appropriate as it would cross the ridge in an exposed location be directly visible from the low country to the north. In addition it is unlikely that Cleary Bros would gain approval from the land owners to construct such a conveyor;

- a tunnelled route beneath the ridge system would be very costly and pass beneath lands not controlled by Cleary Bros where approval is most unlikely to be given;
- it may be necessary to establish a first stage processing plant in the quarry to reduce the rock to a size suitable for conveyor transport; and
- some large dimension quarry product would not be suitable for conveyor transport, requiring road haulage to be used regardless of the presence of a conveyor.

It is Cleary Bros view that the advantages of conveyor transport are significantly outweighed by the disadvantages and consequently this alternative has been dismissed.

There is no other practical route for the haul road given that it crosses lands not in Cleary Bros ownership. The proposed route was adopted at the request of Readymix, the owner of the intervening property. In discussions, Readymix representatives pointed out that from that company's perspective, the proposed route for the haul road had the following advantages:

- there is long term security for Cleary Bros in that the road will not have to be moved later as a result of future Readymix quarrying;
- the road can be cut into the hillside with batters both sides for screening and bunds; and
- the route allows maximum advantage to be taken of existing hilltop vegetation for screening.

ii. *Transport from the Processing Plant to Market*

There are no realistic alternatives to road transport for transporting quarry products to market. Cleary Bros' quarry serves the company's concrete batching plants and other customers spread throughout the Illawarra area. The spread of customers in the region rules out any advantage for bulk transport by rail or sea.

Chapter 3

DESCRIPTION OF THE PROPOSAL

3.1 HARD ROCK RESOURCE

The rock strata within Cleary Bros' existing Albion Park quarry and occurring on the site of the proposed extension, Lot 1 DP 858245, belongs to the Bumbo Latite member of the Gerringong Volcanics. This rock occurs in two distinct flows, separated by a tuffaceous agglomerate and underlain by the Budgong Sandstone. *Appendix I* is a report of the geology of Lot 1 based on information gained from 21 drill holes sunk over two adjoining properties. That report includes cross sections showing the relative thickness and depth of the two latite flows.

The drilling programme has shown that while the property has steep topographic relief on the surface, with a 100-metre variation in elevation, the underlying strata have more gently sloping bedding planes. The base of the lower latite flow generally varies by about 30 metres across the quarry site. *Table 3.1* indicates the approximate thickness of the various strata in the area of Lot 1 proposed for quarrying.

Table 3.1 GEOLOGICAL STRATA IN PROPOSED EXTENSION

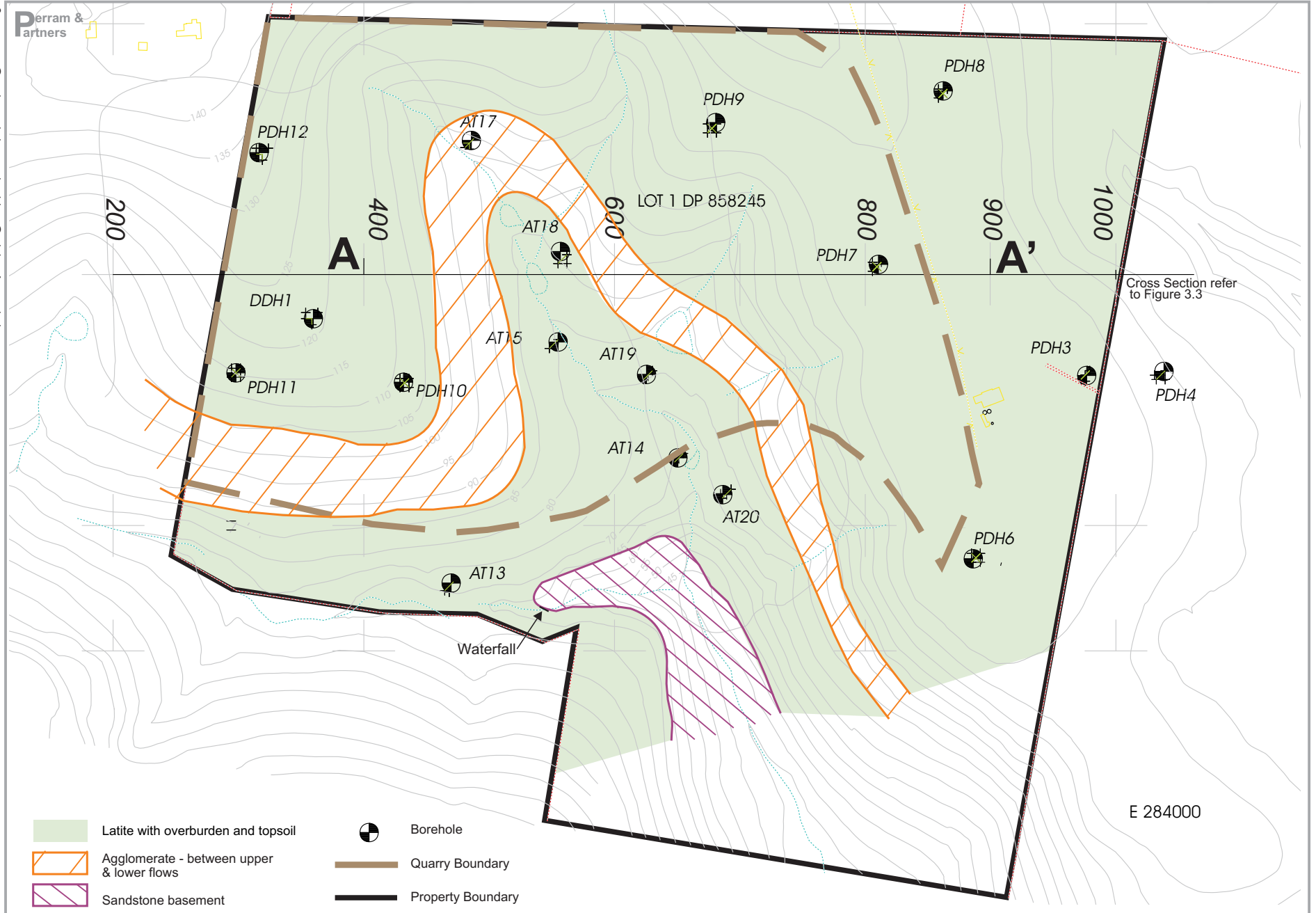
Strata	Base Elevation (m AHD)	Thickness (m)
Overburden	100 – 130	4 – 11
Upper latite flow	75 – 105	0 – 40
Tuffaceous agglomerate	60 – 90	9 – 15
Lower latite flow	40 – 70	11 – 22

AHD = Australian height datum

Figures 3.1 to 3.3 have been derived from *Appendix I* to show the existing surface with borehole locations, the inferred contours for the base of the lower flow and a long section through the quarry.

The extent of weathering is considerable over the entire quarry site with a portion of the underlying rocks being partially to completely weathered. The remaining thickness of the upper flow is a function of the extent of weathering and the natural landform. The upper flow is present in the two spurs located on the east and west sides of the quarrying area, but is absent in the central valley feature. Approximately 40 per cent of the hard rock resource beneath the quarry site is present in the upper flow and 60 per cent in the lower flow.

FIGURE 3.1 Existing Surface Geology



The resource extracted from the existing Albion Park quarry and present in the proposed extension, falls into three categories of construction material:

- high quality hard rock suitable for a wide range of uses including concrete aggregate, road base, sealing aggregate and free-draining backfill materials. This material is quarried principally from the lower flow and selected parts of the upper flow;
- lower quality hard rock suitable for producing road base. This material is quarried from limited sections of the lower flow but predominantly from the upper flow; and
- sub-standard material unsuitable for use as an aggregate but useful as a general filling material. This material comprises either weathered overburden or highly altered tuffaceous agglomerate present throughout the entire quarry between the upper and lower flows.

To date, the company has concentrated upon processing the high quality hard rock. Lower quality hard rock has only been processed to meet the market requirement. The quantity of overburden and highly altered rock removed from the quarry extension will be far in excess of the market requirements for filling materials. Much of the excess low-grade materials will be retained on site. Such material is used for constructing bund walls and for emplacement within completed quarry workings to assist in landform restoration.

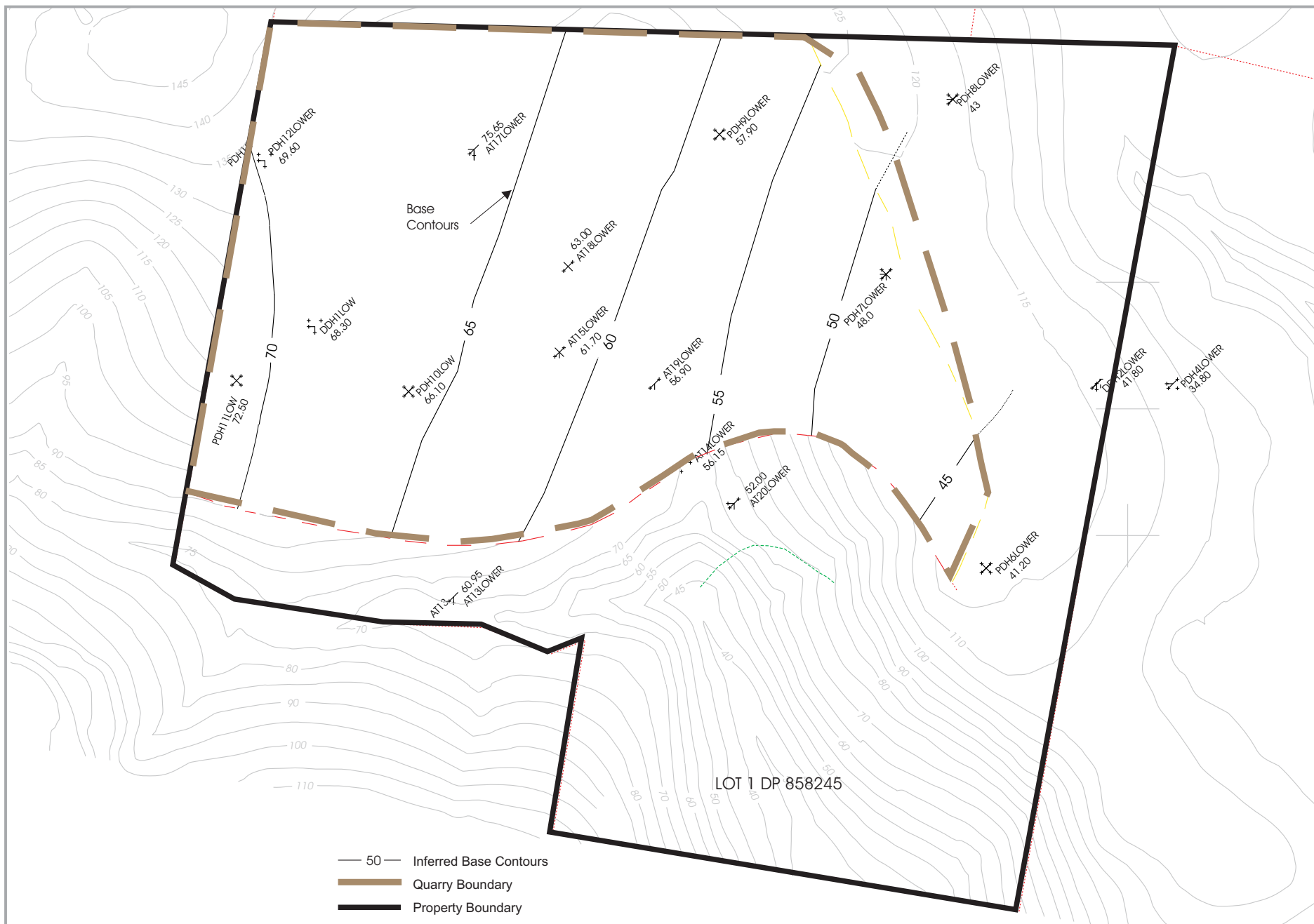
The characteristics of the material and its suitability for the intended purposes have been confirmed over many years of production from the existing quarry.

Table 3.2 lists the estimated quantity of each of the materials within the proposed extraction area.

TABLE 3.2 ESTIMATED RESOURCES

Material	Estimated Quantity (tonnes)
Overburden (all weathered material)	1,500,000
Upper flow	5,200,000
Unweathered tuffaceous agglomerate	2,000,000
Lower flow	7,800,000

FIGURE 3.2 Base of Excavation



3.2 SITE DEVELOPMENT

3.2.1 General Layout

Figure 3.4 shows the layout of the proposed quarry extension and its haul road in relation to the existing Cleary Bros and Readymix quarries. The area designated for quarrying amounts to approximately 18 hectares or about 45 per cent of Lot 1. This area has been determined with regard to the following objectives:

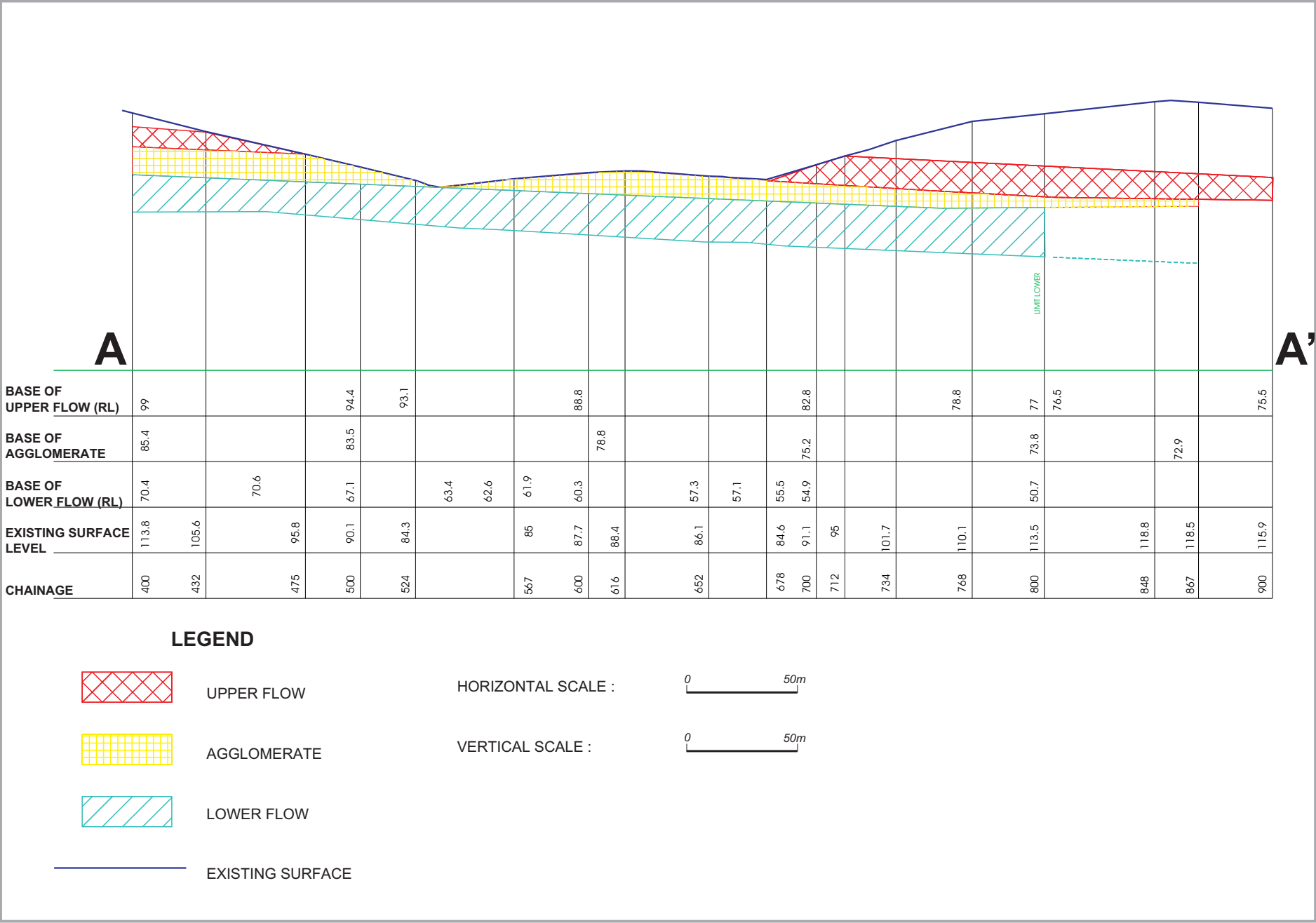
- enable extraction of as much of the hard rock resource as practicable;
- keep quarry activities well clear of the main creek line traversing the southern part of the property from west to east;
- remain clear of the continuous band of vegetation associated with the main creek system on the site;
- minimise the visibility of the workings from occupied rural land beyond the site boundaries;
- ensure the area designated for quarrying is capable of being extracted without unacceptable amenity impacts to nearby occupied residences; and
- confine extraction to within the area identified for rezoning by Shellharbour City Council.

The section of the proposed haul road on Lot 2, owned by Readymix, is about 400 metres in length. The width of disturbance in constructing the haul road with associated sight bund and screen planting could range up to 50 metres. Hence the haul road could affect up to 2.0 hectares of Lot 2.

The haul road has been located to achieve the following objectives:

- follow approximately the shortest route between Cleary Bros' existing quarry and the proposed extension;
- remain well clear of the existing Readymix quarry and its approved extension;
- avoid steep cross slopes and the need for significant side cuts;
- enable drainage from the road to flow into Cleary Bros quarries for water management; and
- meet the requirements of the property owner, Readymix Holdings.

FIGURE 3.3 Long Section



3.2.2 Preparation for Quarrying

Prior to commencing production on the site, the following preparatory works will be carried out.

i. Haul Road

The haul road will be constructed from the existing Cleary Bros quarry across Readymix property and into the new quarry site. The road will have a hardened, all weather surface suitable for use by off-road vehicles with a 14-metre wide carriageway, permitting two vehicles to pass. Roadside drains and sediment control structures will be installed as required to divert surface drainage away from the road and to collect and control runoff from the road surface.

The route is predominantly clear of vegetation except for the hilltop area surrounding the dilapidated and unoccupied “Kyawana” house. Vegetation will be cleared to the extent necessary for haul road construction to proceed and any remaining structures or building material in the path of road construction activities will be removed from the site.

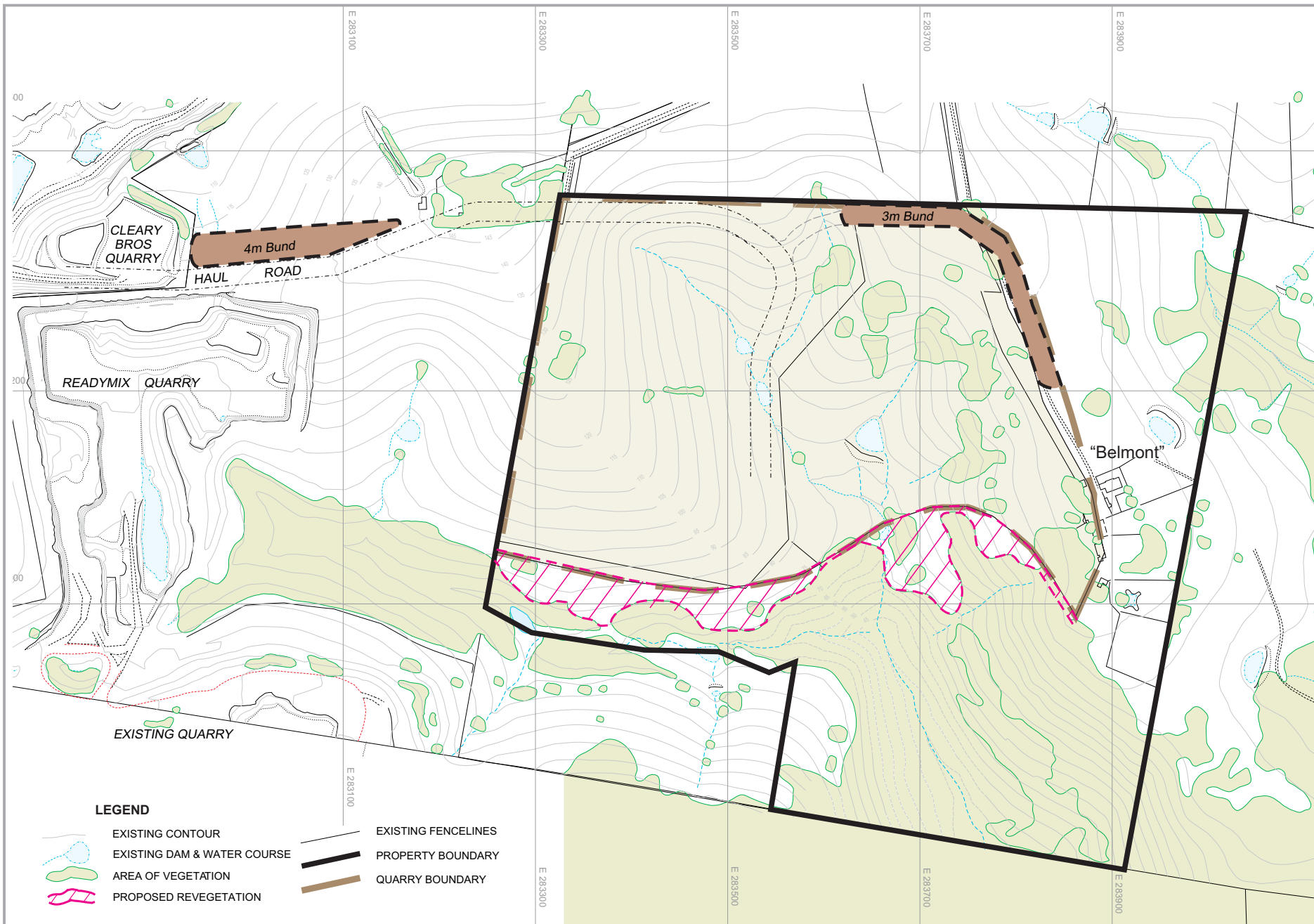
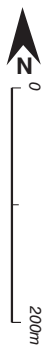
To ensure that vehicles using the haul road are screened from potential viewing locations, the road will be constructed in cut where it passes over the high ground immediately west of the quarry. Excavated material from the road cut will be used to construct a four-metre high sight bund along part of the northern side of the road as shown in *Figure 3.4*. Screen planting will be provided at various locations along the road and over the bund to assist in limiting views of the haul road or of vehicles using it.

All access to the quarry site for construction purposes will be obtained via the haul road. It is not proposed to use Dunsters Lane for any construction activity, although the road will provide occasional access for further investigatory or survey work prior to haul road construction.

ii. Fencing

The quarry will be fenced with a two-metre high chain wire fence to deter people and animals from gaining access. Lockable gates will be provided at points in the fencing to suit operational requirements. Stock proof fencing will be installed or upgraded to enclose the haul road and associated landscaped areas. Gates will be provided in the haul road fencing to enable cattle to be moved under supervision to the Readymix paddock on the southern side.

FIGURE 3.4 Proposed Quarry Extension and Haul Road



While the active quarrying area will be fenced at all times, it is not necessary for the balance of the quarry site to be fenced until needed for quarrying. Initial fencing will be periodically adjusted and extended as the quarry expands across the site. In this manner, undisturbed parts of the property can be made available for grazing until required for extraction.

Permanent stock fencing will be erected from the outset however, to delineate the rainforest revegetation area to the south of the quarry and to prevent stock and motor vehicles from entering this area.

iii. Parking

During construction and operation of the quarry, the workforce will park at the existing processing plant and be transported to the worksite by quarry vehicles. There is no requirement for provision to be made for employee parking at the quarry.

iv. Fuel

For the existing quarry operation, refuelling is undertaken on site by mobile tanker, normally stationed at the processing plant. This method will also be used in the quarry extension. Hence there will not be a need to construct a fuel storage facility in the quarry extension.

v. Amenities

Staff amenities are located at the processing plant. A portable toilet and small tank for drinking water will be positioned at a suitable location within the quarry area. The toilet will be serviced by a wastewater contractor.

vi. Explosives Magazine

Explosives will not be stored at the quarry. When required for blasting, explosives will be brought to the quarry by experts trained in their transport, handling and use.

vii. Erosion and Sediment Controls

Prior to commencing the initial excavation for the quarry, erosion and sediment controls will be put in place to protect work sites and downstream areas. Details of sediment control structures and their location will be provided in a soil and water management plan included in the quarry environmental management and rehabilitation plan.

All areas of soil disturbance will be treated with erosion and sediment controls including the initial quarry excavation, earth bunds, haul road and any benched areas for structures and facilities associated with the work.

viii. Clearing

There is very little clearing to be done in preparation for quarrying. The first area to be quarried is mostly grassed pasture with occasional trees. The trees will be felled and removed for disposal off site as green waste.

The grass covering will be removed from the excavation area as part of topsoil stripping.

ix. Berm construction

The initial overburden removed from the quarry site will be used to construct an earthen berm or bund wall along part of the northern and eastern sides as shown on *Figure 3.4*. This berm will be approximately three metres high and 350 metres long. The width of the footprint of the berm will be about 21 metres, allowing for a three-metre-wide crest and batters sloping at a gradient of one in three.

As an initial step, the existing access road to “Belmont” will be relocated immediately east of the existing power line. This will enable the berm to be constructed over the current location of the road.

Topsoil will be removed from the area affected by the berm prior to placement of any excavated material. When the structure has been formed, the topsoil will be replaced together with additional topsoil from the quarry site. All locations disturbed by this work, including temporary stockpiles and the relocated access, will be subject to erosion and sediment controls.

x. Revegetation and Screen Planting

From commencement of site activities the fenced rainforest revegetation area, located to the south of the quarry will be progressively enhanced with plantings of indigenous plants. As recommended in the ecological assessment (see section 5.10), seedlings will be grown from seeds and cuttings derived from native plants already growing on the site. Seed collection will commence soon after development consent is granted to enable seedlings to be available for early commencement of revegetation work. Revegetation areas are shown on *Figure 3.4*.

Initial screen planting will be carried during site preparation. In addition to planting associated with the haul road, the earth berm along the northern and eastern sides of

the property will be planted with trees and shrubs and further planting will be placed in the road reserve leading to "Belmont".

xi. Water Storage

Rainfall runoff is to be collected for dust suppression and for irrigating planted areas. For the initial workings, water will be collected from diversion drains and held in temporary surface storages and existing farm dams. When the quarry excavation has progressed sufficiently, water will collect at the lowest point of the quarry, from where it will be extracted for use.

xii. Services

Cabled services are unlikely to be required in the quarry extension, as there is no electrical equipment on site and mobile telephones or two way radios are used for communications. However, the relevant service providers can be requested to extend existing electricity and telephone services from "Belmont" to the quarry should the need arise. A vehicle will supply potable water for staff usage to a storage tank at the quarry.

xiii. Monitoring Equipment

Additional monitoring equipment will be set up prior to commencement of quarrying to collect relevant data for assessing conditions on surrounding land during operation of the quarry. These devices include dust gauges, blast monitors, creek flow meters, boreholes and a weather station and will supplement existing monitoring devices associated with current quarrying activity in the area.

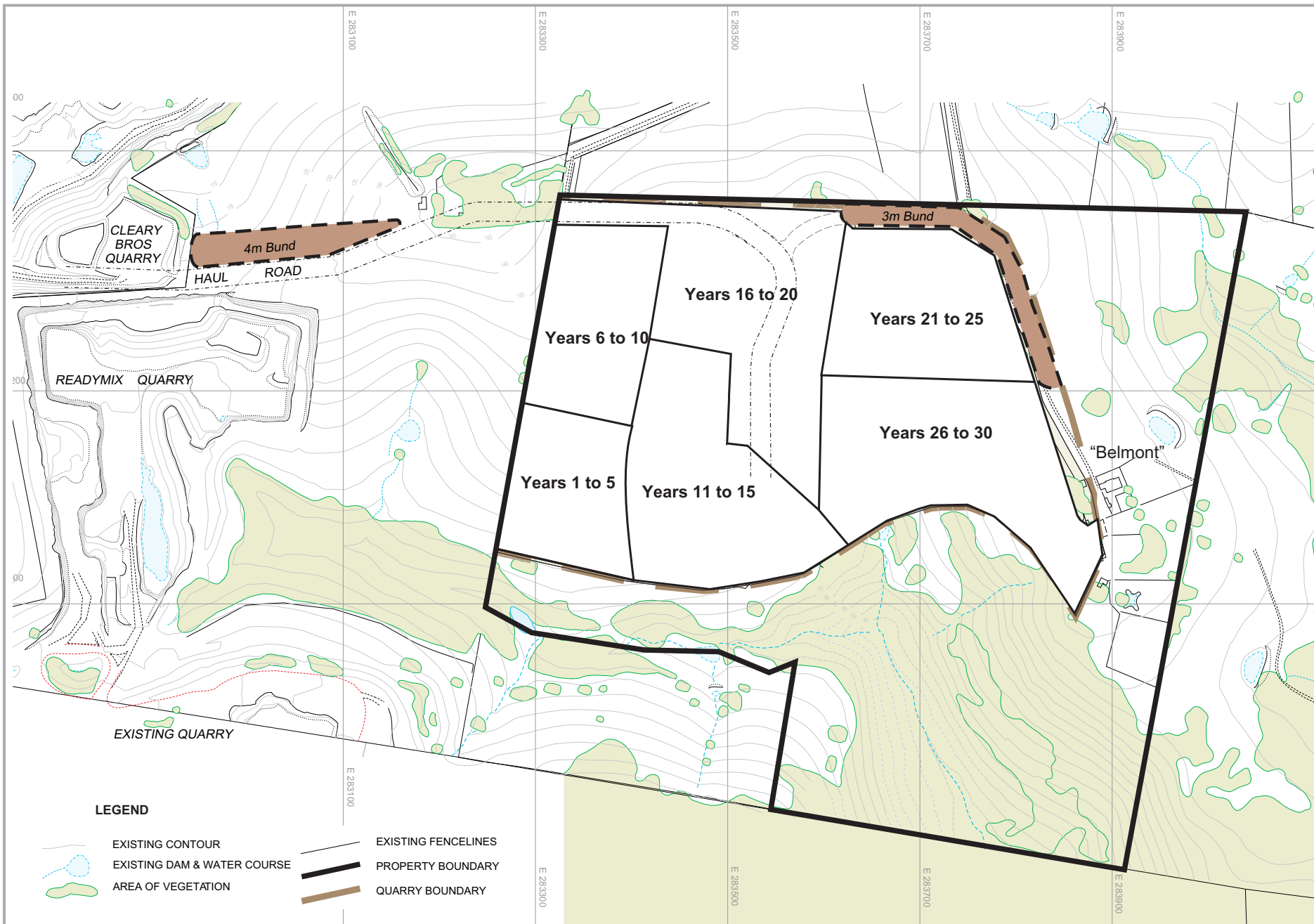
A wind recorder will be set up at the quarry extension to provide hourly wind speed, direction and variability data to assist with environmental management and monitoring of the operation. The wind recorder will be sited with expert advice at a suitable location to comply with Australian Standard AS 2923, 1987.

Monitoring will commence at the new recording sites soon after development consent is granted to obtain additional records of pre-quarry conditions.

3.2.3 Development Programme

If development consent is received by the mid 2004, site development works will commence immediately so that the quarry is be ready to commence commercial production before the end of 2004.

FIGURE 3.5 Staging Plans



Development work for the quarry will take place within the same hours of working as apply to the quarrying operation. Refer to section 3.3.8 for hours of operation.

3.3 HARD ROCK EXTRACTION

3.3.1 *Scale of Operation*

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, but 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.

3.3.2 *Staging*

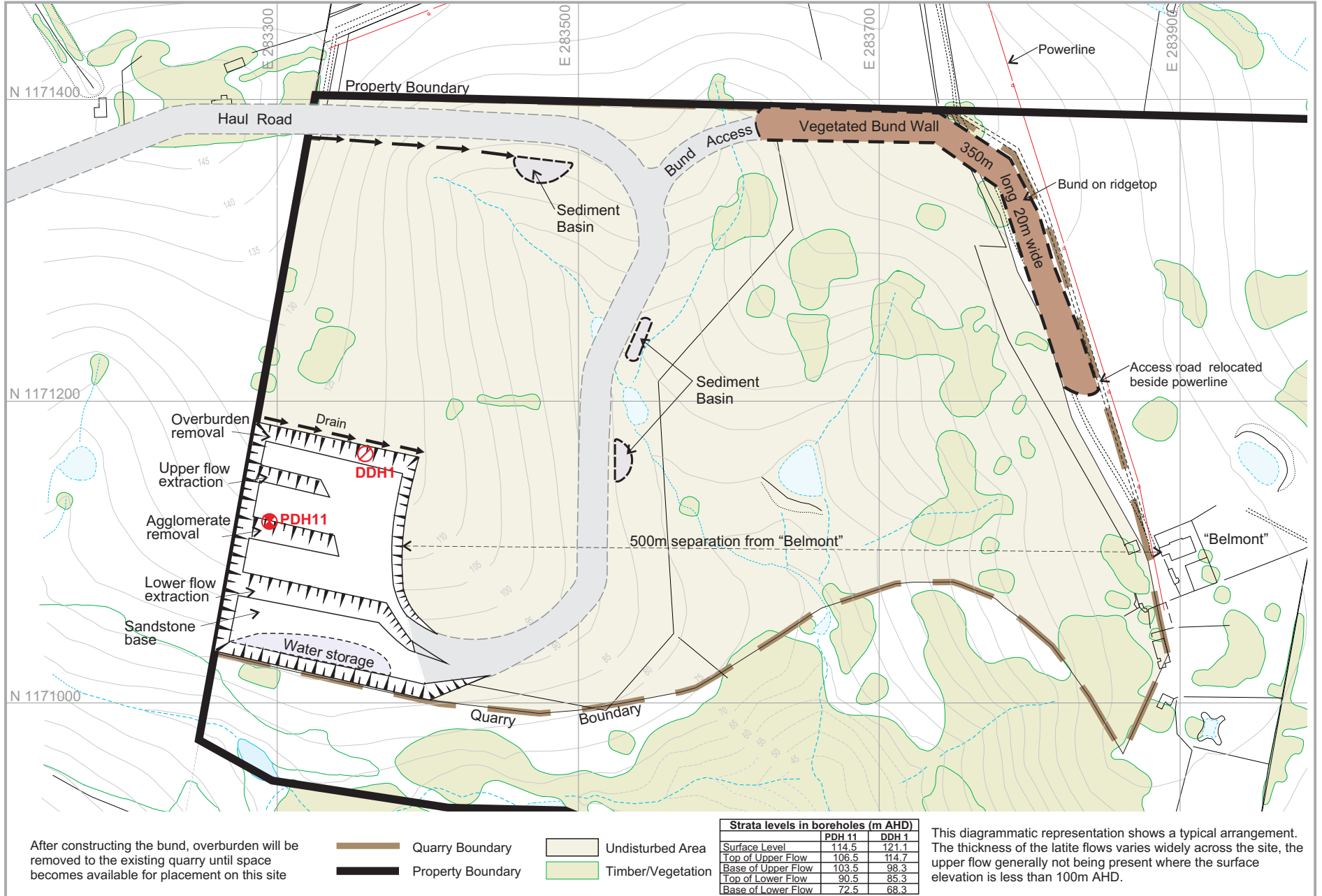
For the purpose of planning, the quarry site has been divided into six stages, each representing a five-year period of extraction. *Figure 3.5* shows the sequence of stages. Typical arrangements for benches, internal access, overburden stockpiles and water storages are shown on the six staging plans, *Figures 3.6 to 3.11*. These figures are indicative only and are not intended to depict the actual layout at any time or the height of quarry batters or benches.

The staging sequence has been developed having regard to the following objectives:

- at any one time, disturb only as much land as necessary for quarrying to proceed;
- maintain a separation of 500 metres between quarry workings and the "Belmont" homestead for the first two stages, or ten years of the quarry life for noise attenuation purposes (no longer a relevant issue as the house has been vacated);
- avoid severing natural drainage lines until their catchment has been quarried to minimise the inflow of clean surface water to the excavation;
- achieve operational requirements for access, water storage, overburden emplacement and environmental management of the site.

The portion of the haul road within the quarry site will need to be relocated after about 15 years so that the excavation can be extended onto land occupied by the initial road. The relocated haul road will descend from the quarry rim to the base

FIGURE 3.6
Conceptual Quarrying Arrangement
Years 1 to 5



following a declining bench, prepared along the western batter and thence across the overburden emplacement.

3.3.3 Method of Extraction

Scrapers will be used to remove topsoil and overburden wherever possible, the surface being pre-ripped by bulldozer if required. The scrapers will normally transport overburden directly to the final emplacement area. If overburden is to be removed off site as a product, it will be loaded to trucks using an excavator or front end loader.

Topsoil will be separately collected and stored for reuse in rehabilitation works in the quarry extension and in the existing Cleary Bros quarry. Topsoil emplacements will be grassed for stability where the material is to remain undisturbed for longer than one month.

The hard rock resource will be periodically fractured by blasting and then progressively loaded to dump trucks using an excavator or front end loader. If necessary, large rocks will be broken up using a hydraulic rock breaker. The tuffaceous agglomerate between the two latite flows is expected to also require blasting to enable its removal.

Material will be removed from a working face up to 12 metres high. Each working face will progressively lower the floor of the quarry to a new temporary bench level. There may be several working faces in evidence at any time, although only one face is likely to be actively worked on any particular day.

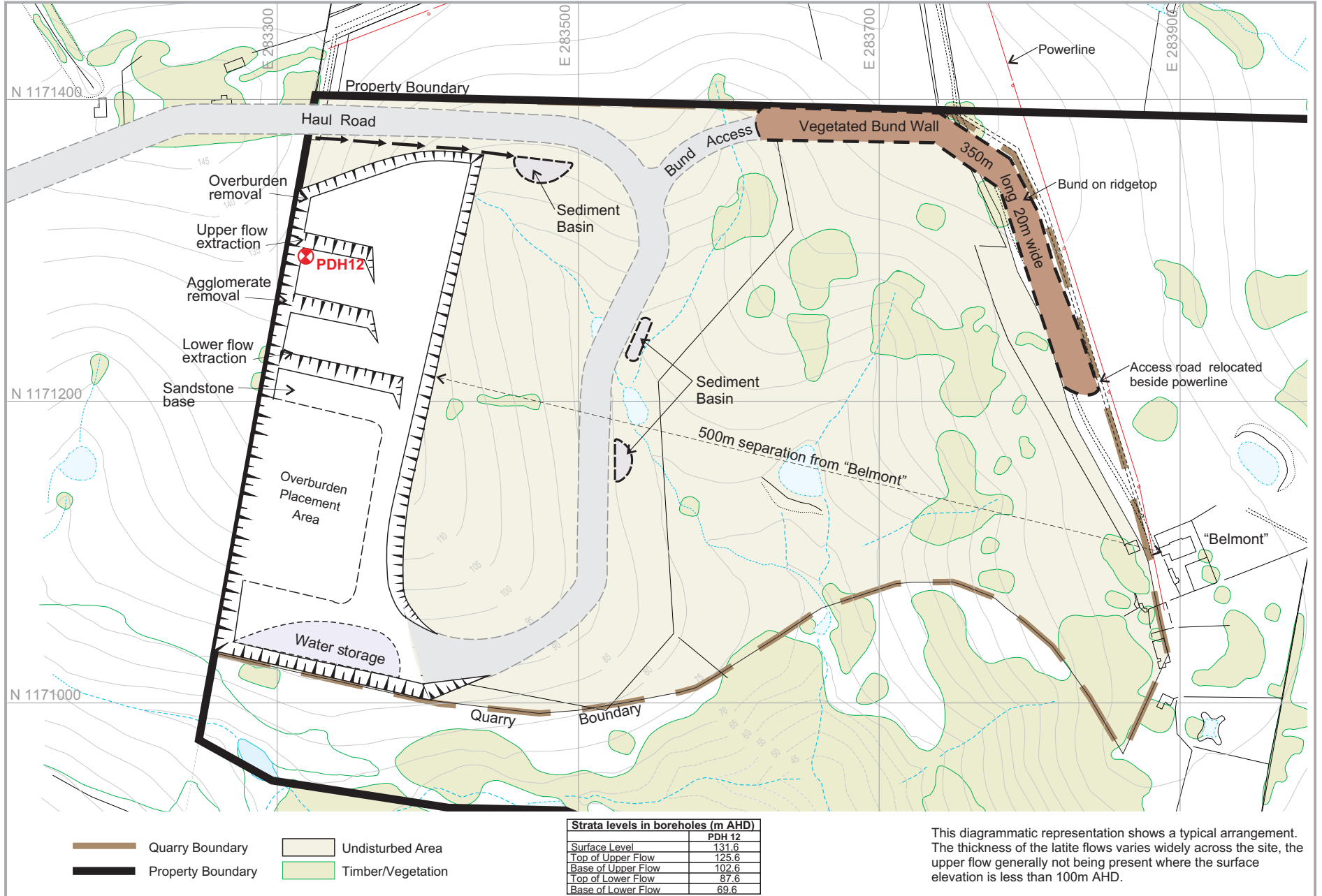
The final gradient of the quarry walls and the number and location of permanent terraces will be determined to meet stability and safety requirements set down in the quarry environmental management and rehabilitation plan.

3.3.4 Overburden Management

During the initial period of excavation, overburden will be used to construct the earth berm around the north-eastern side of the quarry. Subsequent overburden will be transported from the quarry extension to Cleary Bros existing Albion Park quarry for permanent emplacement. This will continue until an emplacement area is available on the quarry floor of the extension area where overburden and waste rock can be permanently positioned, avoiding the need for double handling.

As overburden emplacement continues, the filled land will be progressively shaped to suit the final landform.

FIGURE 3.7
Conceptual Quarrying Arrangement
Years 6 to 10



3.3.5 *Blasting*

Blasting will be carried out in accordance with “site laws” developed from monitored trial blasts at the existing Cleary Bros quarry. Site laws predict ground vibration and air blast as a function of distance for specified blast design parameters including the height of the working face, arrangement of blastholes, sequence of detonation and maximum instantaneous charge. By observing site laws, the vibration and air blast impacts at surrounding occupied residences can be controlled to within EPA criteria.

A blasting operation involves drilling a number of blastholes in the bench above the working face. The holes have a diameter of about 75 millimetres and extend to below the level of the lower bench. Holes are packed with a series of “decks”, being alternately explosive charges and non-explosive solid “stemming” material. Each column of charge within a blasthole has a separate detonator. The detonators are timed to fire in a particular sequence calculated to minimise blasting impacts in the direction of occupied property.

Blasts have been conducted at the existing Cleary Bros quarry some 30 to 40 times per year. A similar frequency of blasts is anticipated in working the quarry extension.

Further discussion of site laws and assessment of blasting impact is included in Section 5.7.

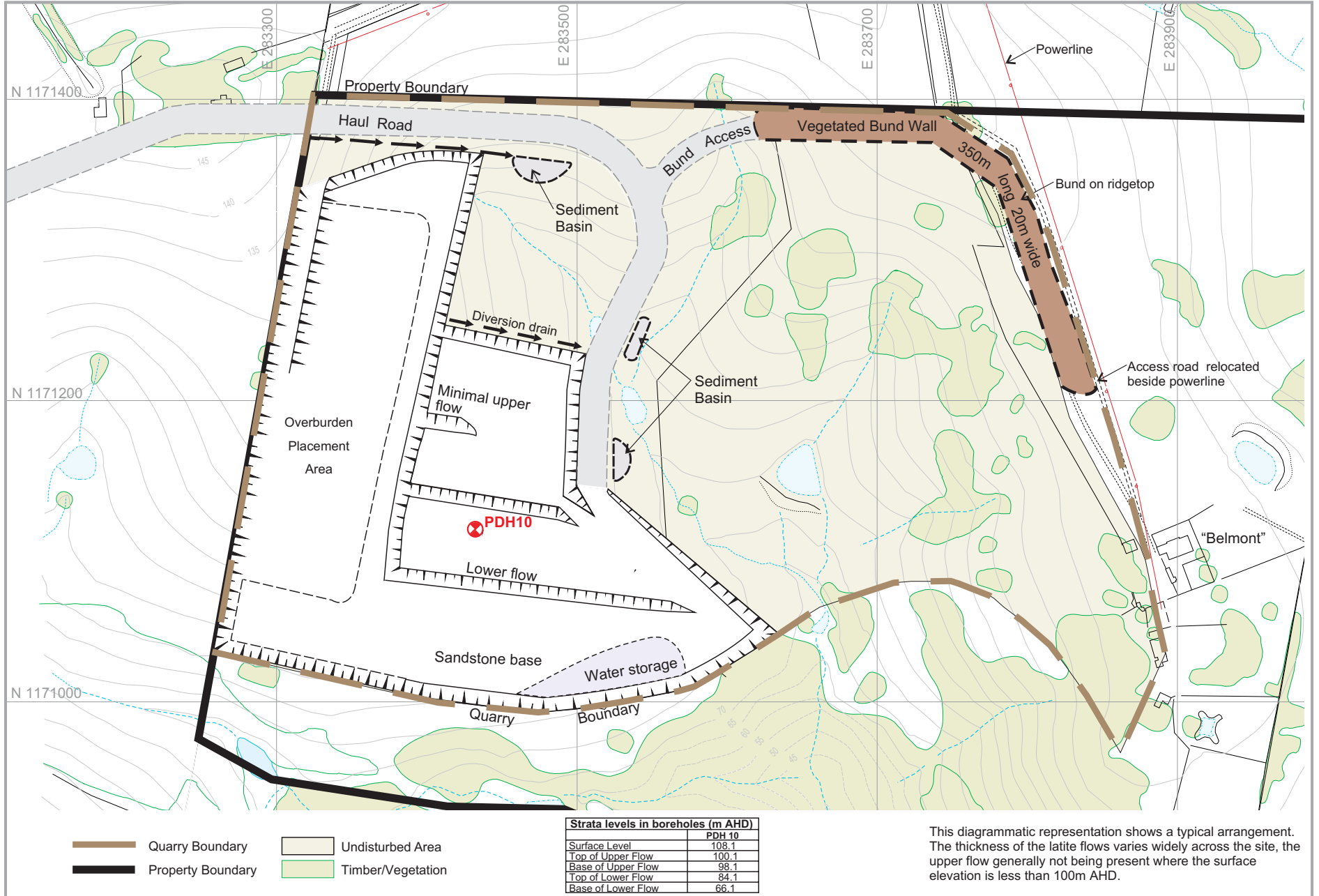
3.3.6 *Processing and Transport*

Excavated production material will be transported from the quarry to the existing processing plant using off-road haul trucks. These vehicles will remain permanently on the circuit between the two operational centres. On occasions, customers may require large pieces of rock for a particular project, in which case a Cleary Bros road haulage vehicle would be brought to the quarry for direct loading. It is not anticipated there would be a need for customer’s vehicles to receive product directly from the quarry, without the material having passed through the processing plant.

Raw material extracted from the quarry extension will be processed through the existing processing plant in the same manner and at the same rate as if those materials had been sourced from the existing extraction area. There is no proposal to expand the processing capacity, increase the volume of materials processed at the plant or alter its operation in any way as a result of the quarry extension. The processing plant operates under an existing development approval.

Processed quarry products are stockpiled at the processing plant for loading and delivery. Cleary Bros dispatches product from the processing plant either by

FIGURE 3.8
Conceptual Quarrying Arrangement
Years 11 to 15



delivery in the company's trucks to customers' worksites or by loading vehicles at the processing plant for self-haul customers.

3.3.7 Plant and Equipment

Table 3.3 lists the quarrying equipment currently used by Cleary Bros at its Albion Park quarry. These items of plant, or replacement items of similar size, will be adequate to continue the operation into the extension area. The equipment listed in Table 3.3 is not necessarily in continuous operation within the quarry.

Table 3.3 QUARRYING EQUIPMENT

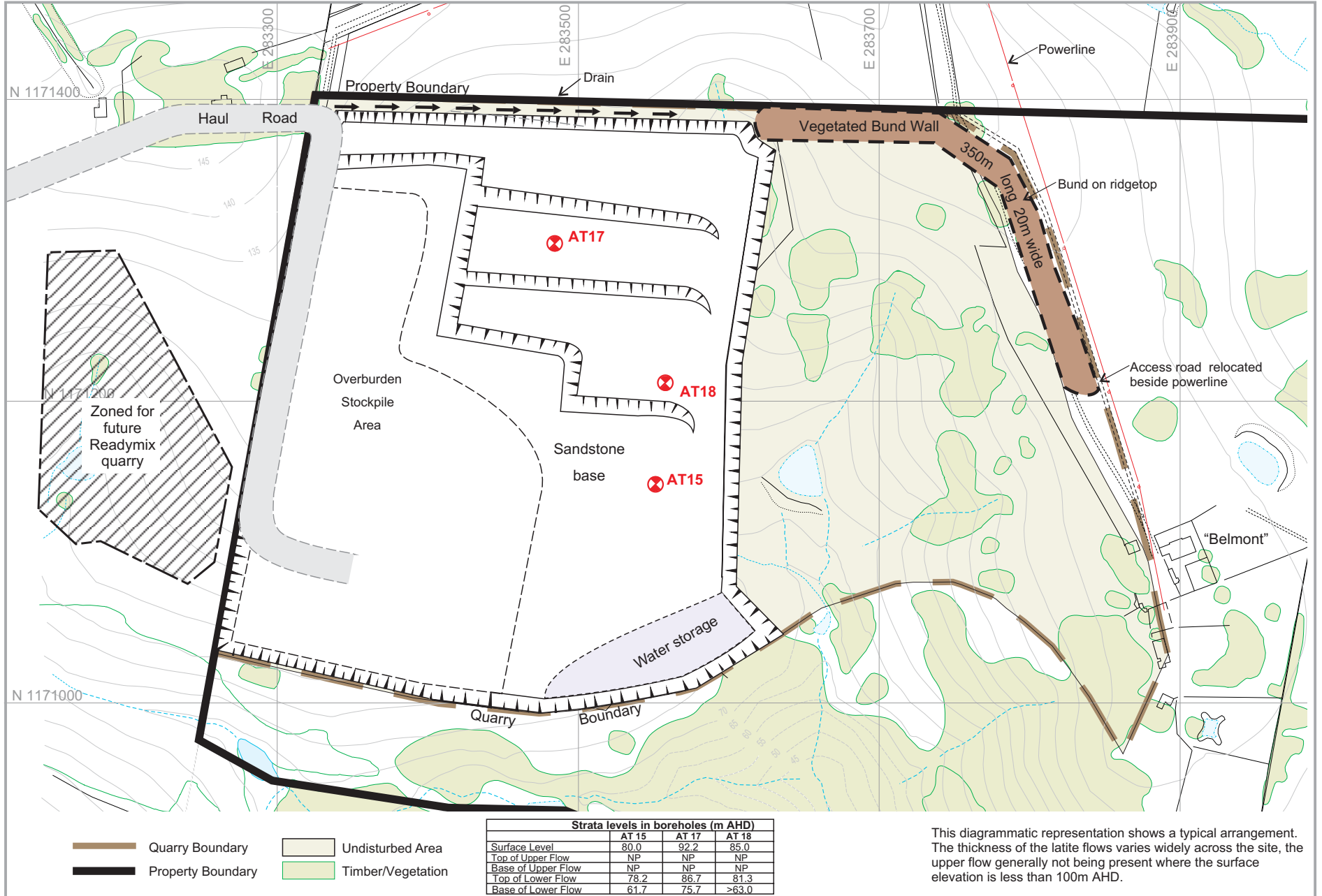
Item	Number	Function
Bulldozer (D8 or D9)*	1	Overburden ripping
Excavator (CAT 235 or 245)	1	Loading haul trucks, bund construction, overburden removal, general earthworks
Off-road haul trucks (CAT 769 or 773)	2	Raw materials transport on-site
Air-track drill (Ingersol Rand LC 500)	1	Blast-hole drilling
Scraper (CAT 627 or 637)*	1	Removing loose overburden
Excavator (CAT 235) with hydraulic rock-pick*	1	Reducing oversize rock
Front-end loaders (CAT 992 and 980C)	1	Loading haul trucks
Water truck	1	Dust suppression
Grader (CAT 12G or 14G)	1	Road maintenance

* intermittent use only

3.3.8 Hours of Working

It is proposed to operate the quarry extension within the existing approved hours for Cleary Bros Albion Park quarry. These hours are specified in conditions of development consent and summarised in Table 3.4. Work is not permitted on Sundays or public holidays.

FIGURE 3.9
Conceptual Quarrying Arrangement
Years 16 to 20



This diagrammatic representation shows a typical arrangement. The thickness of the latite flows varies widely across the site, the upper flow generally not being present where the surface elevation is less than 100m AHD.

Table 3.4 HOURS OF QUARRY OPERATION

Activity	Hours	Days
Drilling	7.00 am to 5.30 pm	Monday to Friday
	7.00 am to 1.00 pm	Saturday
Blasting	8.30 am to 5.00 pm	Monday to Friday
Loading and hauling rock; topsoil and overburden stripping; bund wall and haul road construction; routine maintenance.	7.00 am to 5.30 pm	Monday to Friday
	7.00 am to 1.00 pm	Saturday
Other activities associated with site development, operation and rehabilitation	7.00 am to 5.00 pm	Monday to Friday

3.3.9 Workforce

At the present time there are approximately 12 personnel employed by Cleary Bros on site to quarry and process hard rock at the Albion Park complex. When drivers are added, some 30 to 40 people are directly involved in supplying products from the quarry. The proposal will maintain continuous employment for all of these personnel with the existing quarry workforce transferring their activities to the proposed quarry extension. Continuation of quarrying does not involve any long-term change to employee numbers on the site. Additional employees or contract services may be required in the short term when the company is developing the new quarry for production, while at the same time continuing to extract hard rock from the existing quarry.

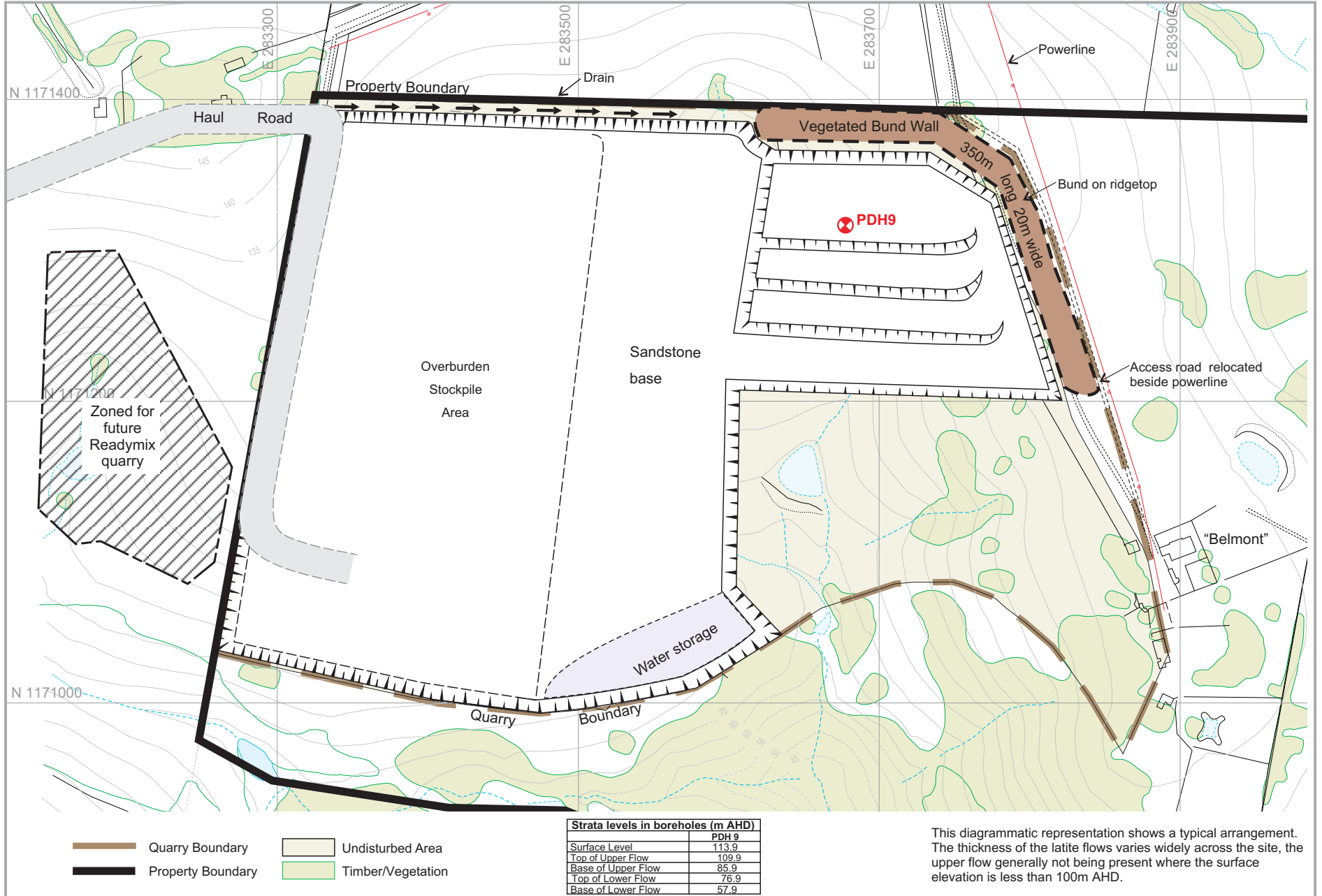
A significant proportion of the company's workforce external to the site is reliant upon continued production from the Albion park quarry. This matter is discussed in section 5.14.

3.3.10 Safety

The existing Albion Park Quarry operates under the safety requirements of the Department of Mineral Resources which administers the *Mines Inspection Act, 1901* and *Mines Inspection General Rule, 2000*. The Act stipulates requirements for the occupational health and safety of employees and the general safety and working conditions around the quarry and processing plant. These requirements will also apply to the proposed quarry extension.

The Company has incorporated the statutory requirements into a documented due-diligence safety management system applying to all activities at the Albion Park quarry.

FIGURE 3.10 Conceptual Quarrying Arrangement
Years 21 to 25



3.3.11 Waste Management

The unweathered tuffaceous agglomerate extracted from between the upper and lower flows will be the principal waste material originating from the new extraction area. Overburden and tuffaceous agglomerate will be used as an aid in progressive rehabilitation of the quarry, as described in Section 3.5.

Other wastes generated from the quarry extension would be very minor in volume and include:

- food and general waste contributed by personnel at the quarry amounting to small quantities of putrescible materials packaging and beverage containers;
- waste from on-site plant and equipment servicing, including replaced components, oily rags, packaging and lubricants.

Waste from personnel collected in a waste receptacle at the quarry will be transported to the general waste bin at the processing plant.

Major plant servicing and scheduled maintenance will normally be carried out at the workshop in the processing plant area. Some minor maintenance and running repairs may be carried out within the quarry, in which case maintenance personnel will remove all waste materials, including waste oil and grease to the workshop for disposal within the workshop waste management system.

In order to reduce waste generation on the site, staff will be encouraged to reduce as far as practicable taking materials into the quarry that will later require removal as waste.

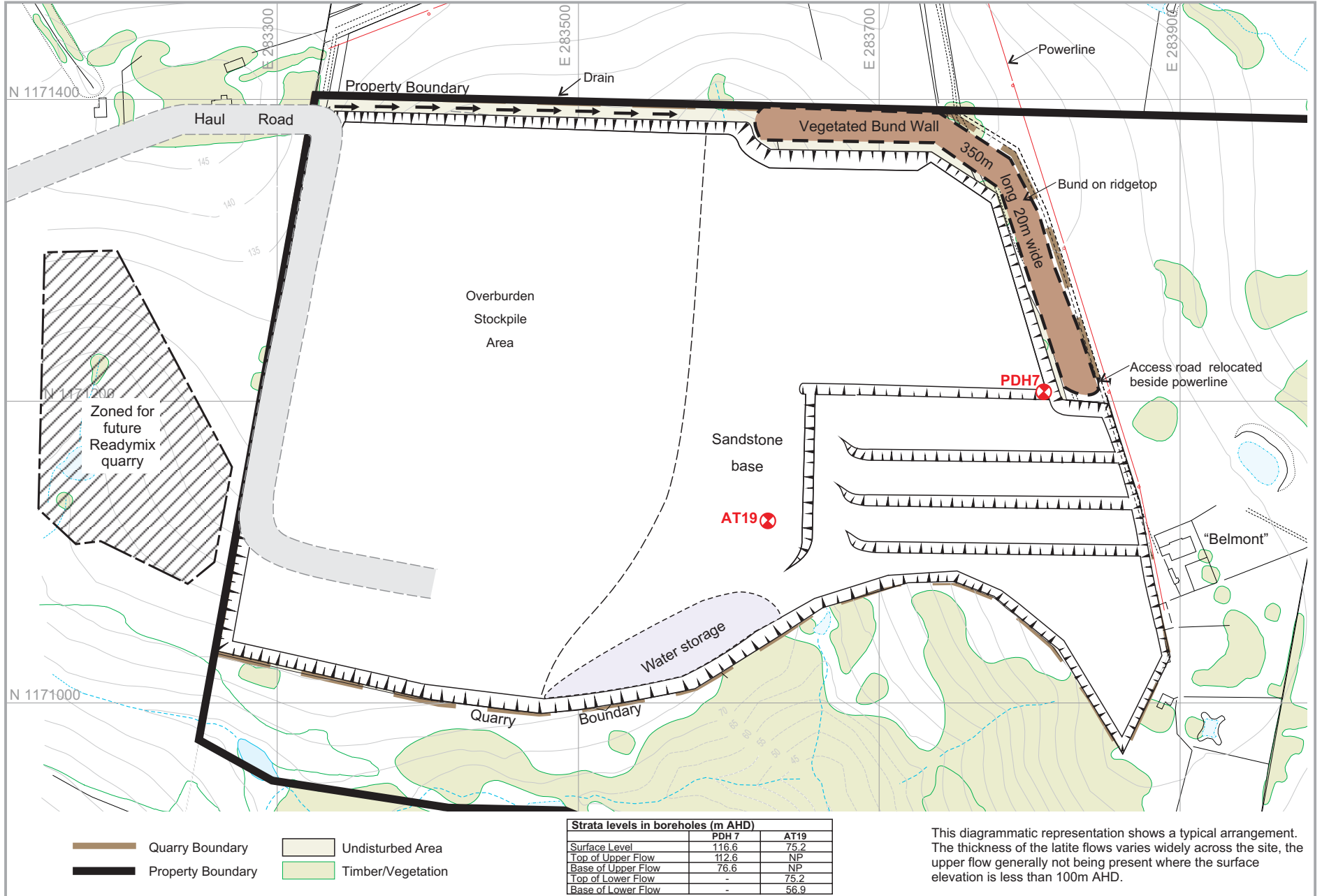
3.4 WATER MANAGEMENT

Water will be managed at the site to achieve the following objectives:

- prevent deterioration of water quality in waterways and groundwater;
- ensure sufficient water is available for operational requirements;
- minimise water consumption and evaporation; and
- provide riparian input to the creek system passing through the site.

These objectives will be met through a strategy of collecting and managing rainwater within the quarry. Being near the coast, the area benefits from good rainfall, averaging about 1,270 millimetres per year. The site will be managed to return as much clean water from the quarry to the creek system as practicable, while obtaining sufficient water for site operations.

FIGURE 3.11
Conceptual Quarrying Arrangement
Years 26 to 30



3.4.1 Water Demand

Water will be required for potable use by the workforce. An average consumption of 200 litres per person per day is normally allowed for potable use at quarries. As at present, almost all of the potable water requirement will be consumed at the processing plant, where quarry staff will return during meal breaks and wet weather. A small tank for drinking water will be maintained within the quarry itself, but the quantity of water consumed would be negligible.

Operational water will be consumed in dust suppression and irrigation of plantings and other rehabilitation works. Dust suppression quantities are based on a daily application of 150 per cent of the average daily evaporation rate (4.9 millimetres) over a haul route up to about 800 metres in length (11,200 square metres). Irrigation rates are based on an average daily application rate of 82,000 litres for an average of 238 non-rain days per year. Irrigation will only be required during periods following planting or seeding for rehabilitation, stabilisation or screening.

There is also a need to retain water for fire fighting purposes. Fire-fighting water is not routinely consumed, but sufficient water must be stored for use in the event of grass or bush fires on the property.

Table 3.5 summarises the various uses for water on the site and the anticipated annual requirement.

Table 3.5 WATER DEMANDS

Use	Source	Annual Requirement (megalitres)
Potable (in the quarry)	Delivery to small on-site tank	negligible
Dust Suppression	Collected rainfall runoff	19.5
Irrigation	Collected rainfall runoff	1.2
Fire fighting	Collected rainfall runoff	nil

3.4.2 Water Supply

In supplying the water needs for the proposed quarry extension, the company can take advantage of existing storages associated with the processing plant and quarry as well as new storages to be created in the planned quarry extension.

Potable water will be transported to the new quarry site as needed and stored in a potable water tank.

Rainfall runoff will be collected in the disturbed quarry area to provide water for dust suppression, fire fighting and irrigation of rehabilitation works. One or more depressions formed at the southern end of the excavation will be set aside for water storage as indicated in Figures 3.6 to 3.11. Water will be drawn from the pondage as required for irrigation or dust suppression. Additional water may be obtained from storages serving the existing Albion Park quarry. This arrangement would enable the water truck suppressing dust on the haul road to collect water at either end of the route.

3.4.3 *Surface Water Management*

Quarry operations will be designed to have regard to the following principles for surface water management:

- minimise the area of land disturbed at any one time;
- divert clean runoff around the disturbed area;
- collect rainfall runoff within the quarry and retain this water in a designated storage area;
- implement a program of irregular release of clean water to the creek system from the quarry storage, with pre-treatment if necessary;
- direct rainfall runoff from other disturbed areas, such as the haul road, to settling basins sized to contain runoff from a six-hour-duration, once-in-ten-year storm.

A soil and water management plan will be prepared prior to commencement of each stage of quarry expansion and included in successive updates of the environmental management and rehabilitation plan for the quarry. These plans will follow the standard format set out in the publication by the Department of Housing (1998) or its successor and will be updated from time to time as work progresses. Water management controls will be installed and maintained in compliance with the plans.

In accordance with the recommendations of the flora and fauna study (see section 5.10), Cleary Bros will release stored water from the quarry to the natural creek system in a non-regular manner to assist in maintaining existing downstream riparian conditions. The magnitude of scheduled releases will be determined having regard to monitoring data obtained from notched weirs and boreholes to be set up following receipt of development consent. Useful background data will be obtained during the initial years of quarrying when much of the site is undisturbed.

There may also be a need to release water should the volume of storage become excessive following prolonged rainfall or when temporary storages need to be emptied for the progress of quarry operations.

Any water release to the natural creek system will be subject to water quality meeting standards for discharge specified in the licence to be issued by the Environment Protection Authority. Whenever a release is proposed, water quality will be tested and if necessary the stored water will be treated to ensure turbidity, concentration of solids and any other relevant parameters are below licence limits. Normally an application of gypsum would be sufficient to settle particulate matter. Should there be a film of oil or other hydrocarbon, it will be collected by vacuuming and removed from the site by a licensed liquid waste contractor.

Permanent quarry storages will be at the lowest point of the quarry floor, normally requiring operation of a pump to effect a release. The environmental management and rehabilitation plan will detail water quality protocols to be followed by quarry staff prior to activating the pump.

3.5 DURATION OF QUARRYING

3.5.1 Life of the Quarry

Based on current resource estimates and production rates, Cleary Bros estimates that it will extract the available hard rock from the proposed quarry extension within 30 years.

After the hard rock has been removed, the Company would continue to market overburden and tuffaceous agglomerate as filling materials within the Illawarra area. These materials would be sourced from a section of the overburden emplacement.

3.5.2 Possible Future Extension

At some future time, prior to exhausting the hard rock resource within the proposed quarry extension, Cleary Bros may submit an application for a further expansion of the extractive area to the east. The extension would essentially incorporate the balance of the cleared ridge feature occupying the eastern side of Lot 1 and part of the adjoining allotment (Lot 7), also owned by the company.

The rezoning application submitted by the company in 1998 identified this extended area as a second stage of the quarry. At the request of Shellharbour City Council it was decided to defer this second stage area from the rezoning and the current development applications. A further rezoning would be required for such an extension to be approved.

3.6 REHABILITATION

3.6.1 Objectives

Cleary Bros operates the existing Albion Park quarry with regard to short-term and long-term rehabilitation objectives. In the short term the Company has managed the site to prevent environmental degradation that would compromise later rehabilitation of the property. This has included establishing vegetation cover to stabilise earthworks, screening mounds, drainage lines and other disturbed areas.

In the longer term, the Company's objectives are to:

- work with Shellharbour City Council to identify the most suitable future use for the land so that during and following cessation of quarrying, the site can be configured as far as practicable to best suit that identified use;
- until that use is defined:
 - provide a low maintenance, free draining, stable and safe landform which maximises the area of usable land within the confines of the completed quarry;
 - as far as practicable, blend with the surrounding land fabric any part of the site visible from external locations; and
 - revegetate the land with native trees and shrub species and where appropriate with pasture species, comparable with the pre-existing vegetation communities.

3.6.2 Quarry Backfill

At the completion of quarrying, the lowest part of the quarry rim will have an elevation of approximately 70 metres AHD, corresponding to the location where the existing creek flows from the extraction area (refer *Figure 3.1*). Almost all of the quarry will be extracted to a depth below this level (refer to *Figure 3.2*). At its lowest point, in the south-east corner, the floor of the extraction area will be some 25 metres below the lowest point of the rim. Hence to achieve the preferred free-draining configuration, the quarry floor will need to be raised by filling.

The quarry floor will be progressively raised during and beyond the quarrying phase by placing overburden in extracted areas, supplemented by clean fill imported to the site. Clean fill could be accepted when there is sufficient space to receive external material. Final levels for filling are discussed in section 3.6.3 below.

Clean fill (virgin excavated natural material – VENM) would be brought to the site from future excavation projects in Cleary Bros' trucks for the purpose of raising the floor of the quarry to agreed final levels. It is anticipated that importation would

occur spasmodically when there is a project underway for which Cleary Bros has a contract to remove excavated material. Where practicable, the company would transport fill to the quarry as backloads in the trucks used for delivering quarry material. Another possible source of fill would be overburden from any future approved extension to the quarry. The hours for importing fill would be the same as the hours of working for normal quarry operations and deliveries.

3.6.3 *Final Landform*

Figure 3.12 depicts a possible final landform for the quarry extension at the completion of the project. The features of the landform are as follows:

- a gently sloping quarry floor, backfilled and contoured to a maximum slope of one in seven to promote free drainage while creating a usable surface;
- on three sides around the periphery, a finished slope of about one in four with a series of terraces each about five metres wide to break up the slope;
- a revegetated earth berm along part of the northern and eastern sides of the finished landform.

Depending on the agreed future use for the land, the company could configure the base of the quarry to create several near-horizontal areas separated by low batters. This configuration would be suitable for building development.

Readymix has previously obtained rezoning on the adjoining Lot 2 to favour hard rock extraction almost to the boundary with Lot 1. Should Readymix obtain development consent and proceed to quarry this land, Cleary Bros will negotiate with Readymix to link the excavations at the common boundary. This would avoid creating a narrow strip of elevated land between them. In preliminary discussions however, Readymix representatives cautioned that the company may have overburden to dispose of in which case the ground profile may be returned close to that currently existing.

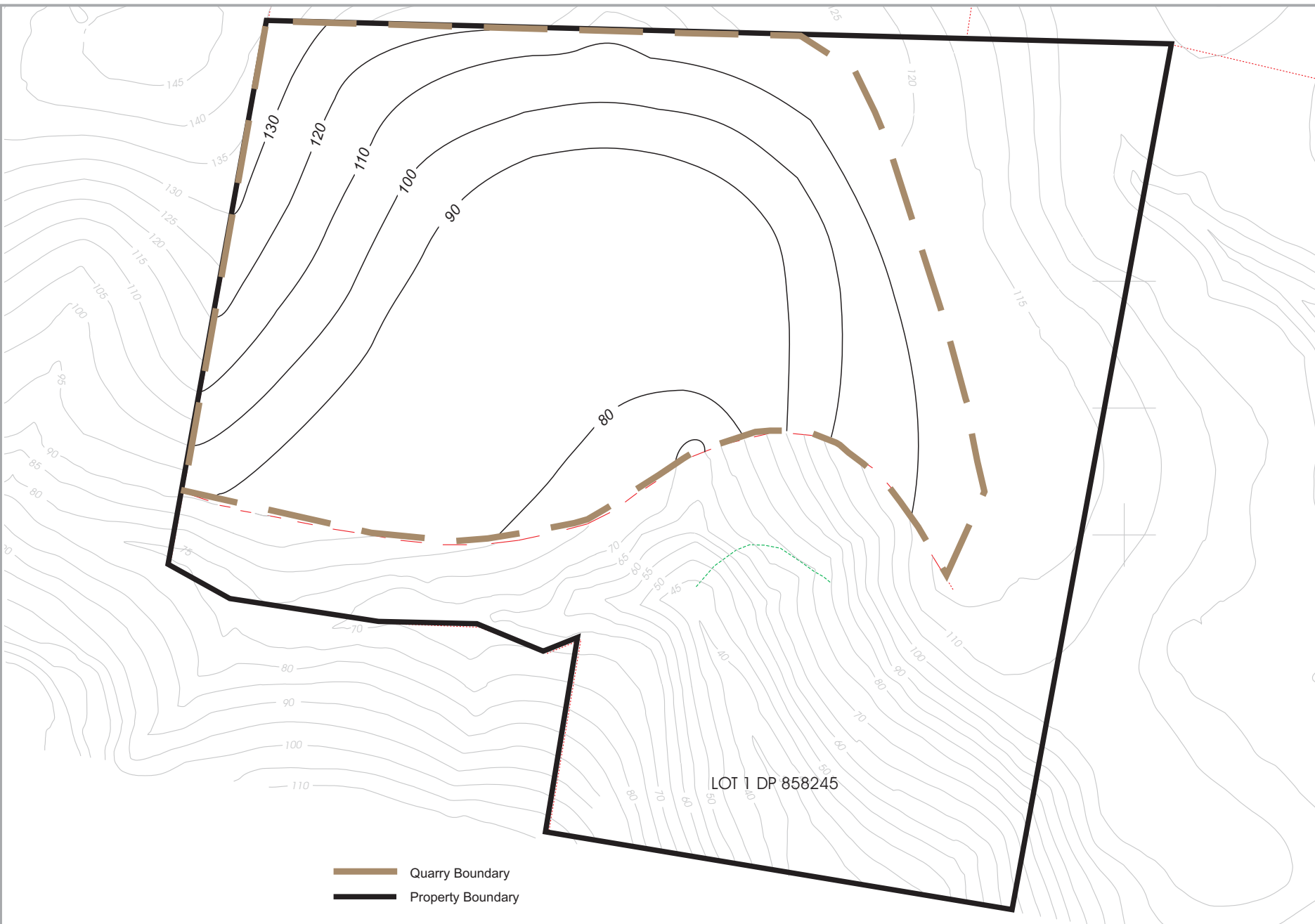
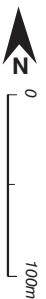
3.6.4 *Future Land Use*

The post-quarrying use for the land will be determined in consultation with Shellharbour City Council at a time closer to when the land will become available. Should the development applications be approved, the cessation of quarrying will be several decades away, so any decision or intention stated now would be indicative only and subject to review in light of circumstances prevailing 30 years hence.

Notwithstanding the obvious need to defer final decision-making as to future land use, it is possible to identify the following land uses (or a combination of two or more of them) as potentially suitable for the site:

Assumes western boundary not quarried by CSR Limited.

FIGURE 3.12 Possible Final Land Form



- return to rural use;
- rural industry or intensive agriculture;
- bushland restoration; or
- industrial development.

3.6.5 *Rehabilitation Methods*

Rehabilitation methods will be tailored to suit particular sections of the quarry and the proposed final landform.

i. Quarry Floor

Should a permanently vegetated base not be required for the future land use, it is proposed to leave contoured overburden and clean fill material on the quarry floor. Rehabilitation activities would then be limited to temporary grassing and ensuring the floor is free draining to sumps located at the lowermost point of each level, and then to final sediment controls at the main outlet.

Should a land use be determined that required a vegetated base, the company would place a suitable bedding and drainage layer over the contoured surface to enable revegetation to be carried out.

ii. Batter Slopes

Available stockpiled topsoil would be spread over the final batter slopes of the overburden emplacements and the surface roughened prior to seeding. Roughening restricts downslope runoff and provides areas of water accumulation and infiltration to assist vegetation to become established.

iii. General Site

Disturbed areas will be progressively rehabilitated once they are no longer being used. These areas would then be well defined to prevent inadvertent vehicle passage. At the completion of quarrying, all internal roads and hardstand areas not likely to be required for the future land use would be ripped, any additional drainage controls installed and a covering of topsoil spread and seeded with a mixture of pasture, shrub and tree species.

Security fencing would be maintained at least until exposed quarry walls are battered to form safe slopes.

3.7 ENVIRONMENTAL MANAGEMENT

3.7.1 Overview

Following receipt of development consent and the various licences and approvals, an environmental management and rehabilitation plan (EM&RP) will be prepared for the quarry extension. This will be developed from the EM&RP applying to the existing Albion Park quarry. The EM&RP will form part of the construction and operational documentation for the facility. It will restate the environmental objectives for the site and consolidate all of the commitments and requirements contained in this EIS, the development consent and subsequent approvals.

In addition, the EM&RP will detail the environmental monitoring to be undertaken on the site, nominating the location for monitoring devices, the responsibility for collecting data, responding to the findings and making information available to regulatory bodies.

The EM&RP is not a statutory document. Instead it is a working manual able to be amended when necessary by an agreed process to take account of changing circumstances, within the framework of the development consent and other approvals. Initially the EM&RP will refer to construction as well as operation of the quarry. Subsequent revision may delete the construction component when it is no longer relevant.

3.7.2 Outline of Environmental Management & Rehabilitation Plan

The draft *EIS Guideline – Extractive Industries / Quarries*, published by the (former) Department of Urban Affairs and Planning, recommends that an outline of the environmental management and rehabilitation plan be provided in the EIS. The following outline summarises the proposed contents of the EM&RP.

i. Introduction

The introductory sections will explain the purpose and objectives of the EM&RP and define its status with respect to legal instruments. Descriptive site information will be included to the extent necessary to understand the management objectives. The method by which the EM&RP or any part of it may be updated in the future will be outlined.

ii. *Development*

Environmental management of the quarry development work will be included in the initial version of the EM&RP, but can be deleted from later updates of the document if it is no longer relevant. Specific requirements will be cross-referenced to the source document, for example the development consent, EIS or any licence or permit. A soil and water management plan for initial quarry works will be incorporated in the EM&RP, providing design detail for controls described in this EIS.

iii. *Operation and Maintenance*

All operating procedures related to the environmental performance of the quarry will be set down, again based on the controls described in this EIS. Cross-referencing will be included where applicable so that operators can identify the source document requiring the procedure to be followed. Other operating procedures which are adopted for practical or economic purposes will not necessarily be included.

Specific environmental management procedures will be included as outlined below.

a. *Water Quality*

Operational protocols for the water management system will refer to the network of drains, sediment basins, storages, pumps, pipes and valves designed for the quarry and essential maintenance. Procedures for maintaining sediment controls and treating water prior to release will be included.

b. *Noise*

The noise goals for the facility will be explained together with the manner in which they have been derived from background noise readings. The sensitive noise receptors will be nominated and shown on a plan of the surroundings. Allowable noise emissions from individual items of equipment and any operating restrictions with regard to simultaneous operation of plant or hours of operation will be detailed. The EM&RP will specify the locations for noise monitoring and indicate any changes to occur as the working area moves across the site.

c. *Blasting*

Blasting site laws will be stated in the EMP for the guidance of the quarry manager and the blasting subcontractor. It is possible that technological improvements during the life of the quarry may permit modification of the site laws. If this occurs the relevant section of the EM&RP will be updated and reissued in accordance with the defined procedure.

d. Dust

Dust controls are to be implemented on a daily basis throughout the life of the quarry. These will be outlined in the EM&RP, based on safeguards described in this EIS.

e. General Site Management

The EM&RP will explain decisions regarding retention of vegetation on the property and additional planting carried out at the time of development. In future years, quarry managers will need a readily available reference for previous investigations of the ecology of the site so that ill-informed decisions are not made. Threatened species on the property and their location will be noted together with a warning that additional species may be declared to be threatened over the passage of time.

f. Traffic and Miscellaneous

The EMP will contain details of any requirements related to traffic management and other environmental issues emerging from the approvals process. Traffic management is principally related to the processing plant. If required the quarry EM&RP can be extended to incorporate a management plan for the processing plant operation.

iv. Rehabilitation

Progressive rehabilitation plans will be provided in the EM&RP, updated from time to time as new areas become available for rehabilitation work. These plans will include details of surface preparation, topsoil management, seed species and maintenance program, including weed control and replacing failed vegetation. The principles outlined in the EIS will guide plan preparation.

v. Contingency Plans

Procedures for contingencies, such as fire, intense rainfall, landslip, extended power loss, fuel spill, failure of pumps or other misfortunes, will be set down in the EM&RP.

vi. Complaints procedure

The EM&RP will outline a procedure for maintaining good relations with the community including a process for recording and responding to complaints.

vii. Staff Training

Environmental performance of the quarry is dependent to a large extent on competent operation. Requirements for training staff with responsibility for environmental management both for normal operation and for emergencies will be included, together with a mechanism for recording that the training has been given.

viii. Environmental Monitoring

A monitoring program will be designed to measure the critical parameters demonstrating that the facility is meeting its environmental goals. Principal parameters, including noise, blasting, dust, water discharge and water quality will be monitored at a frequency specified in the program and at particular defined monitoring points. Meteorological data will be collected continuously.

The reason for monitoring will be explained in each case together with the acceptable range for monitoring results and action to be taken if results fall outside that range. The manner in which monitoring information is to be reported will also be set down. There will be a feed back system from monitoring results to the personnel responsible for environmental management of the site and a link to external authorities in accordance with the reporting requirements of the development consent and/or licence.

Production statistics of relevance to environmental monitoring such as product tonnages, blasting records and weekly activity will be recorded and included in an annual monitoring report.

Chapter 4

PLANNING CONTEXT

4.1 OVERVIEW

The development approval process for an extractive industry is prescribed by the Environmental Planning and Assessment (EP&A) Act, 1979 in conjunction with various planning instruments made under the Act. The Threatened Species Conservation Act, 1995 and the (Commonwealth) Environment Protection Biodiversity Conservation Act, 1999 are also potentially relevant to the proposal.

Planning instruments applying to the proposed development include:

- Shellharbour Local Environmental Plan, 2000;
- Illawarra Regional Environmental Plan No 1, 1986; and
- State Environmental Planning Policy No 11 – *Traffic Generating Development*;

In addition, other plans, guidelines and reports are applicable to the proposal, as follows:

- draft Shellharbour Rural LEP;
- Shellharbour Rural Lands Study;
- Working Party Report - *Blue Metal Quarrying in the Shellharbour and Kiama Municipalities* (1992); and
- Cleary Bros Quarry, Croom, Proposed Rezoning LES

This section discusses the application of the relevant legislation, planning instruments and guidelines to the proposed development and lists any requirements for the development applications or matters for consideration by the consent authority. Further details of planning requirements and assessment of compliance are addressed in *Appendix F*.

4.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT

Matters to be considered by the consent authority when determining a development application are set down in section 79C(1) of the EP&A Act and Clause 92 of the *Environmental Planning and Assessment Regulation, 2000*. A list of these matters and assessment of the proposal is provided in *Appendix F*.

A proposal is designated development if it is specified as such in the EP&A Regulation or in an environmental planning instrument applying to the land where the development is proposed to be carried out. Specific provisions exist in the EP&A Act for dealing with designated development, including a requirement that an environmental impact statement accompany the development application.

The proposed quarry expansion is designated development because it is included among the types of development contained in Schedule 3 of the EP&A Regulation. In particular, the proposal falls within the category of

“Extractive industries (being industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process extractive materials by methods including washing, crushing, sawing or separating):

(a) that obtain or process for sale, or reuse, more than 30,000 cubic metres of extractive material per year, or

(b) disturb or will disturb a total surface area of more than 2 hectares of land”

As indicated in Section 1.4, in addition to being designated development, the proposal is integrated development for which the Environment Protection Authority and Department of Infrastructure Planning and Natural Resources are approval bodies. The proposal is also State significant development under the EP&A Act.

The separate development application for the section of haul road on Readymix property is neither designated development nor integrated development. However it falls within the ambit of State significant development because it is part of an overall project that is State significant development.

4.3 THREATENED SPECIES CONSERVATION ACT

The Threatened Species Conservation Act provides the process for preparing a species impact statement where a development proposal will significantly affect threatened species, populations or ecological communities, or their habitats. Planning aspects of the Act are administered through the EP&A Act. Section 5A of the EP&A Act sets out an eight point test to determine whether there will be a significant impact and hence a requirement for a species impact statement.

Appendix O is a flora and fauna assessment of the site from which it is concluded that the proposal is not likely to significantly affect threatened species, populations or ecological communities, or their habitats. Hence there is no requirement for a species impact statement to be prepared for this project.

4.4 ENVIRONMENT PROTECTION BIODIVERSITY CONSERVATION ACT, 1999

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), is an Australian Government Act requiring approval from the Commonwealth Minister for the Environment for a “controlled action”, being a project or development that would have a significant effect on:

- a matter of national environmental significance;
- the environment of Commonwealth land; or
- the environment generally, where the action is undertaken by the Commonwealth.

The Act currently identifies six matters of national environmental significance:

- world heritage areas;
- wetlands protected by international treaty (the Ramsar convention);
- nationally listed threatened species and ecological communities;
- nationally listed migratory species;
- nuclear actions; and
- the environment of Commonwealth marine areas.

Where there is a need for approval under the EPBC Act, this is separate to approvals required under New South Wales State law. PlanningNSW and Environment Australia have established procedures to minimise duplication when both State and Commonwealth approvals are required.

The matters of national environmental significance potentially relevant to the proposal are *nationally listed threatened species and ecological communities* and *nationally listed migratory species*. These matters of national significance have been addressed in *Appendix O*, where it is concluded that they will not be significantly affected by the proposed quarry extension.

Consequently it is considered that the proposal is not a controlled action. On this basis no approval is required under Commonwealth law for the proposed quarry extension to proceed and the matter does not need to be referred to the Commonwealth Minister for the Environment.

4.5 ENVIRONMENTAL PLANNING INSTRUMENTS

4.5.1 Shellharbour Local Environment Plan, 2000

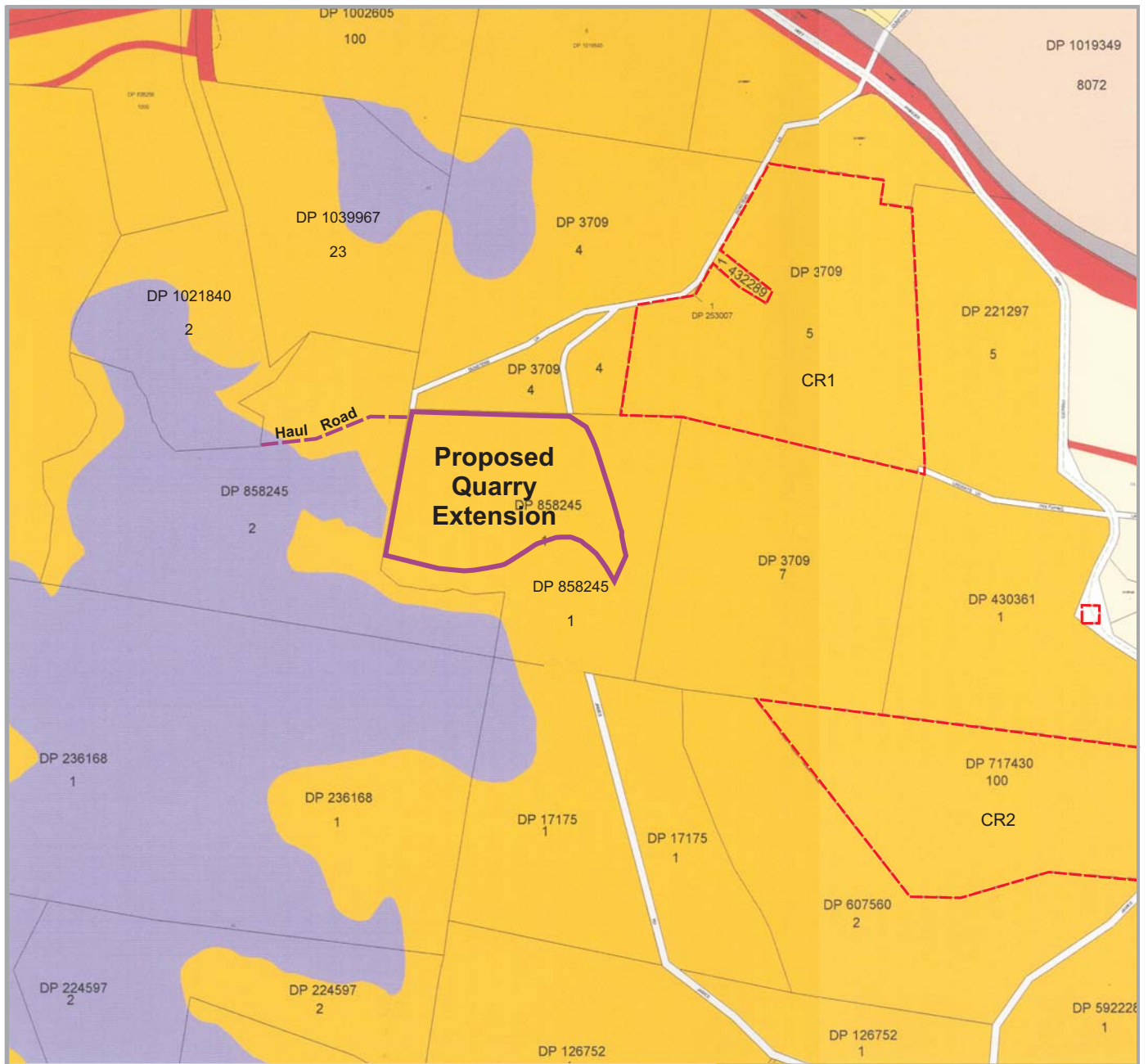
The aim of Shellharbour LEP, 2000 is “to provide a framework for land use management, urban growth and change to achieve the following objectives:

- (a) to ensure that land uses in the local government area of Shellharbour City are compatible with each other and are suitably located,
- (b) to ensure that adequate provision is made to meet the needs of an increasing population,
- (c) to ensure that various areas of land within the local government area of Shellharbour City which are environmentally sensitive, and which enhance the visual amenity of the area, are protected and suitably managed,
- (d) to enable public land, owned or controlled by the Council of the City of Shellharbour under the Local Government Act 1993, to be classified or reclassified as operational land,
- (e) to identify and manage areas of the environmental and cultural heritage of the local government area,
- (f) to ensure that development addresses pollution concerns and does not result in a decline in water quality.”

Figure 4.1 shows the existing zoning of the land subject to the current development proposal and the zoning of surrounding land. Lot 1 DP 858245, the quarry site, is zoned 7(d) – *Environmental protection (Scenic)*. Lot 2, the land affected by the haul road, is in part zoned 7(d) and in part 4(c) – *Extractive Industrial*.

Neither the proposed quarry, nor its haul road is permissible development within the 7(d) zoning. It is necessary for the zoning of the subject land to be altered in order for the development to be capable of complying with the LEP. Shellharbour City Council has set in motion the process for changing the zoning of the land affected by the proposal from 7(d) to 4(c). The Council has arranged for a local environmental study (LES) to be prepared, with costs met by Cleary Bros. It is understood the LES will be placed on public exhibition together with a draft LEP at the same time as this EIS is exhibited. Following the exhibition period, Council will consider the rezoning proposal. If Council resolves to proceed with the rezoning, the matter will be submitted to the Department of Infrastructure Planning and Natural Resources. At the same time, the Department will consider the development applications. When these considerations are complete, both the rezoning proposal and development applications will be submitted to the Minister for Infrastructure and Planning for determination.

The desirability or otherwise for rezoning the land is the subject of the LES and is not further considered in this EIS. For the balance of this discussion of Shellharbour LEP



Source: Shellharbour City Council 2003

FIGURE 4.1 Current Zoning



2000 it is assumed that the land affected by the proposal will be rezoned to 4(c) – *Extractive Industrial* prior to the development applications being determined.

The objective of the 4(c) zone is to identify those areas specifically allocated for extractive purposes. Development for the purposes of extractive industries is permissible in the 4(c) zone with the consent of the consent authority

Clause 10(3) of the LEP requires the consent authority to take into account the objectives of a zone before granting development consent for development within that zone. The objectives of the 4(c) zone are considered in *Appendix F*.

Schedule 3 of the LEP lists two heritage items in located on properties near Lot 1, the subject site:

- Item CR1 – “The Hill”, part Lot 5 DP 3709, nominated as having State significance and located immediately north-east of Lot 1. While “The Hill” is nominated in the LEP as being of State significance, it is not listed on the State Heritage Register and its management is the responsibility of Shellharbour Council. The allotment containing the heritage item does not share a common boundary with the section of Lot 1 proposed to be rezoned and developed as a quarry; and
- Item CR2 – “Kurrawong”, Lot 100 DP 717430, nominated as having local significance and located to the south-east of Lot 1. This property also does not share a common boundary with the quarry extension site.

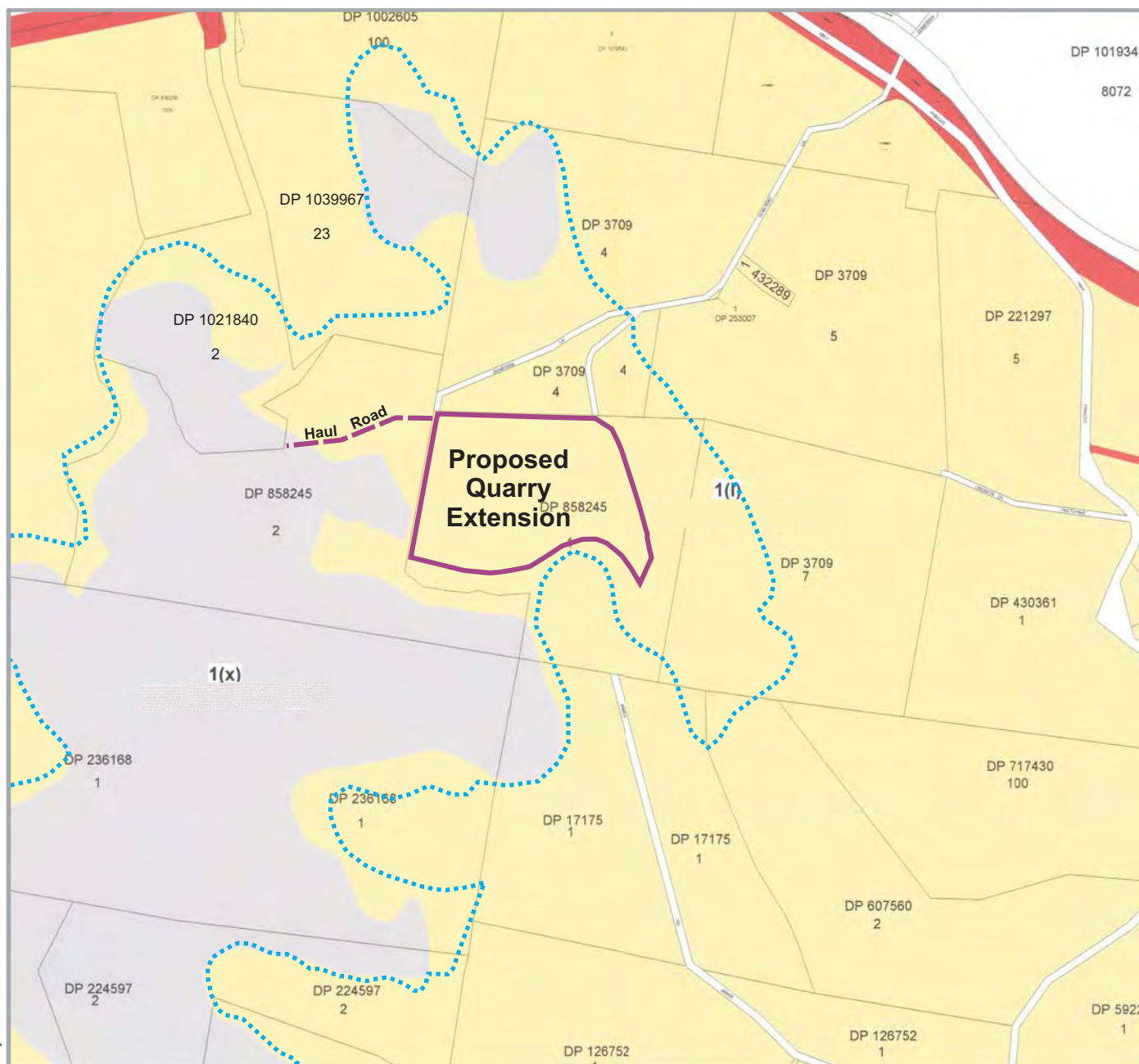
The location of these heritage items is shown on *Figure 4.1*.

Clause 75 of the LEP refers to development in the vicinity of a heritage item. This clause requires the consent authority to take into consideration the likely effect of the proposed quarry extension on the heritage significance of “The Hill” and its setting, when determining the development applications. This matter is considered in section 5.13. The quarry extension is not in the vicinity of the house, “Kurrawong”, which is located over one kilometre from the site.

4.5.2 Draft Shellharbour Rural LEP 2001

Up to the time of writing, the draft Shellharbour Rural Local Environmental Plan has been placed on public exhibition, Council has considered submissions and the amended draft LEP has been referred to the Department of Infrastructure Planning and Natural Resources (former Planning NSW) for consideration and gazettal by the Minister.

Under the provisions of the draft LEP, the following aspects of Shellharbour LEP 2000 will be amended:



Source: Shellharbour City Council 2003

1(x) - Extractive Industrial

1(l) - Rural Landscape

9b - Arterial Roads Reservation

Boundary of land containing State and regionally significant mineral resources

FIGURE 4.2 Proposed Zoning, Draft Rural LEP



- planning provisions and controls for rural lands and heritage conservation in Shellharbour City; and
- definitions and other provisions of the existing LEP including an objective to implement the principles of ecologically sustainable development.

The existing 4(c) – *Extractive Industrial Zone* will be removed and replaced with a 1(x) – *Extractive Industry Zone*. Should the draft LEP come into force before the current development applications and rezoning application are considered by the Minister, the 1(x) zone will be the appropriate zoning for land affected by the proposed quarry extension and ancillary works.

The draft LEP will change the current zoning of the site from 7(d) – *Environmental Protection (Scenic)* to 1(l) – *Rural Landscape*, without alteration to the physical position of zone boundaries. *Figure 4.2* shows the zoning of the site and surroundings as it would appear should the draft Rural LEP be gazetted in its current form. This figure also shows the boundary of lands identified as containing State and regionally significant extractive resources. It may be observed that the land so identified does not coincide with the land proposed to be zoned 1(x) – *Extractive Industry Zone*. This matter is further discussed in section 4.6.3 below.

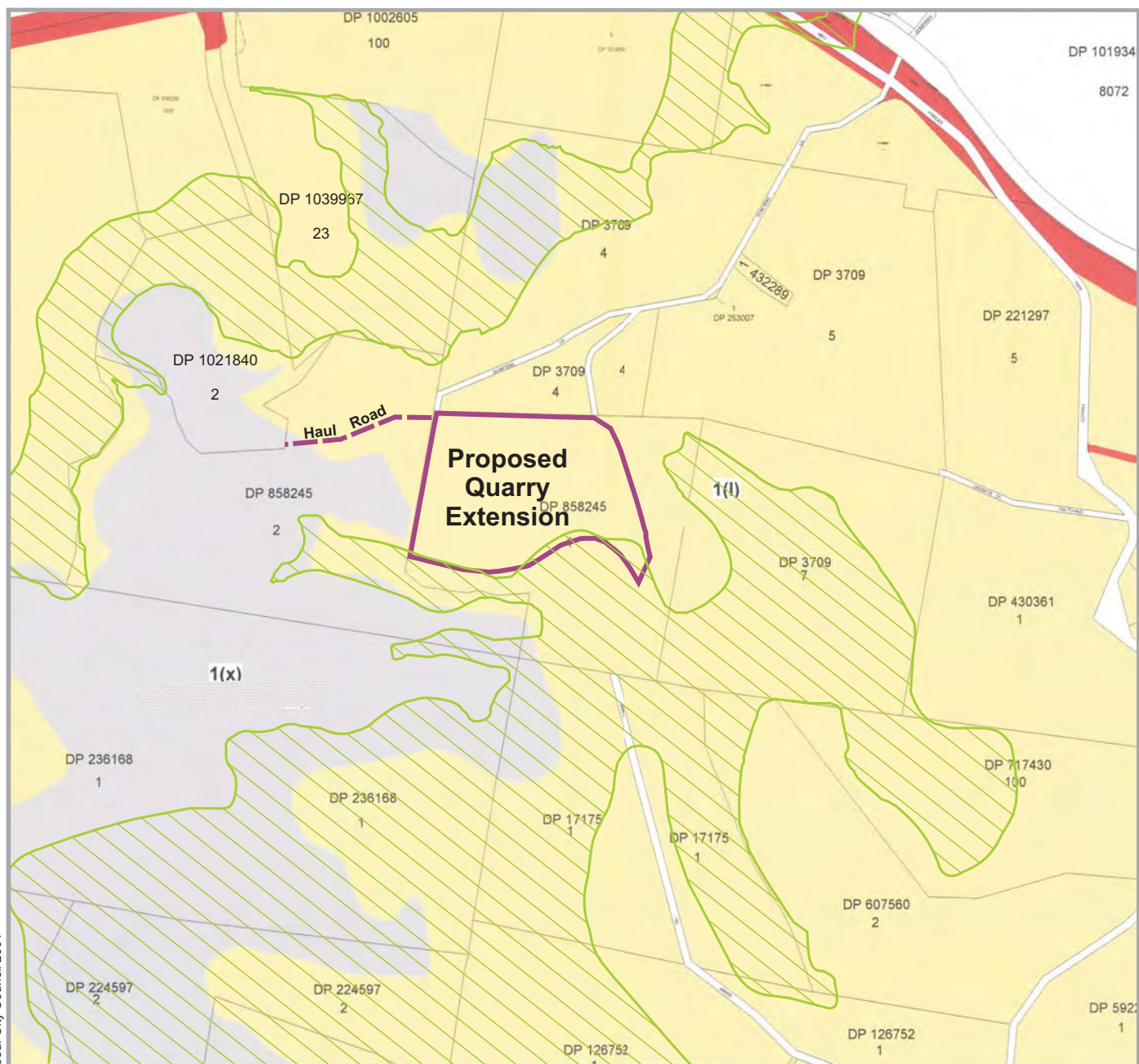
“Areas of High Conservation Value” are defined in the draft Rural LEP for which special provisions apply, aimed at encouraging and promoting vegetation management including wildlife and riparian corridors. *Figure 4.3* shows the location land identified as areas of high conservation value in the vicinity of the proposed quarry extension. A small area of the identified land falls within the subject site.

Matters for consideration by the consent authority when determining applications for development in the rural lands are also to be amended. *Appendix F* considers the amended matters for consideration including those related to areas of high conservation value and provides a response to each item for the assistance of the consent authority.

4.5.3 Illawarra Regional Environmental Plan No 1, 1986

The Illawarra REP is primarily an advisory document aimed at maximising opportunities for people of the region to meet their wide-ranging needs, particularly in relation to access to land resources. The plan is aimed at:

- identifying regional planning issues applicable to development and local planning within the region;
- advising Government and public authorities who manage land, exercise functions and set funding priorities within the region; and
- establishing parameters and controls for development, particularly as they relate to environmental quality and social well-being.



Source: Shellharbour City Council 2003



Area of High Conservation Value

FIGURE 4.3 Area of High Conservation Value,
Draft Rural LEP



Part II of the REP sets down provisions relating to rural lands. Within this part, Clause 14 is relevant to the proposal, referring to land identified on the REP mapping as supporting rainforest vegetation species and adjacent land. As a result of subsequent detailed mapping, Shellharbour Council considers that rainforest vegetation on Lot 1 is included within the land referred to by Clause 14 of the REP.

Where a consent authority receives an application to clear vegetation, remove trees or carry out other development on land to which Clause 14 applies, the consent authority must consult with the Director-General of the National Parks and Wildlife Service before determining the matter. The consent authority is not permitted to grant consent unless it is satisfied that:

- the clearing, tree removal or development will not have a detrimental effect on the rainforest or rainforest species ; or
- any detrimental effect on the rainforest or rainforest species can be justified by other factors.

The effect of the proposal on rainforest vegetation is discussed in Section 5.10.

Clause 31 of the REP requires the consent authority to consult and take into account the views of *the Commissioner of the Soil Conservation Service* when considering an application for development that in its opinion involves significant tree clearing or vegetation clearance on land with greater than 20 per cent slopes. The steepest natural slope on the eastern side of the quarry site reaches about 28 per cent. In compliance with the REP, the consent authority will consult the Department of Infrastructure Planning and Natural Resources, as successor to the former Soil Conservation Service.

Part III of the REP relates to extractive materials. The proposal is consistent with the objectives of the plan relating to extractive materials, which include:

- managing extractive resources to meet community needs while minimising environmental impacts;
- ensuring that when development proposals affecting land containing extractive resources are assessed, consideration is given to the consequences of rendering the resources unavailable;
- ensuring that extractive materials transport has minimal impact on the community and that bulk transport bypasses urban areas where possible.

Clause 35 is relevant to the proposal, requiring the consent authority to consider attaching to appropriate development consents a condition requiring transport of extractive materials by means other than road haulage.

Part XV of the REP contains provisions relating to environmental heritage and defines a relic. Schedule 1 of the REP lists “The Hill” as an item of the environmental heritage. The REP defines a relic as being any deposit, object, or material evidence of the settlement of the land prior to 1 January 1900. There are three dilapidated stone walls on Lot 1 that may have been constructed in that era, however these are not included as items of the environmental heritage because they are not listed in Schedule 1 of the REP (some other stone walls in the Kiama district are so listed).

Clause 126 requires that development consent be obtained before items of the environmental heritage may be disturbed. There is no intention to disturb any items of the environmental heritage as listed in the REP.

Clause 128 refers to development in the vicinity of an item of the environmental heritage. Lot 1 is in the vicinity of “The Hill”. Before granting consent to the current application, the consent authority is required to make an assessment of the effect of the proposed quarry extension on the “The Hill” and its setting. The assessment is to consider any effect on the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of “The Hill”.

The effect of the proposed quarry extension on heritage items and relics is discussed in Section 5.13.

4.5.4 SEPP No 11 - Traffic Generating Developments

State Environmental Planning Policy No 11 is intended to ensure that the Roads and Traffic Authority is made aware of any development application for traffic generating development and given an opportunity to make representations before the application is determined by a consent authority.

The proposed quarry extension is a development of the type referred to in Schedule 1 of SEPP 11 because it is within the meaning of item (m) “extractive industry or mining”.

Clause 7 of SEPP 11 requires the consent authority to forward a copy of the development applications to the Roads and Traffic Authority within seven days of their receipt. The application may not be determined until the Roads and Traffic Authority submits a representation, advises that it will not submit a representation, or 21 days elapse from the date of referral of the application.

The requirement for consultation exists notwithstanding that the proposal will not significantly alter the number of vehicles accessing Cleary Bros existing processing plant nor the traffic arrangements associated with that plant.

4.6 OTHER PLANS AND REPORTS

4.6.1 *Blue Metal Working Party Report*

A working party was convened in 1989 to examine blue metal quarrying in the Shellharbour and Kiama local government areas, with representatives from government agencies, councils and the quarrying industry. Under its terms of reference, the working party was requested to:

- review the extent of hard rock deposits and their potential for extraction;
- examine means of protecting hard rock resources from development incompatible with future extraction;
- determine an appropriate buffer zone around the potentially winnable deposits (the resource) and recommend potential land uses for the buffer zone;
- recommend to the (then) Minister for Planning and Director of Planning appropriate controls to protect the resource and buffer zones.

The report of the working party was published in 1992 with three fundamental recommendations:

- (i) The Illawarra REP mapping should be amended as shown in the report to identify all hard rock resources potentially suitable for extraction together with a suitable buffer zone. Specified planning controls should apply within the resource and buffer areas.
- (ii) All building work should require development consent in the resource and buffer areas and the requirement for concurrence from the (then) Director of Planning should apply over both areas with applications also referred to the Department of Mineral Resources and the EPA for comment.
- (iii) Shellharbour and Kiama councils should be requested to take complimentary action to ensure that land purchasers and applicants for development consent are informed of the resource and buffer areas and to consider designating the resource and buffer areas on LEP maps. The councils should consider the impact of development proposals on future quarrying and should attach conditions to any application for quarrying to pursue environmental protection objectives, as detailed in the recommendation.

Figure 4.4 shows the proposed amendment to Illawarra REP mapping in the Shellharbour area as recommended by the Blue Metal Working Party (Item (i) above).

The recommendations of the working party do not appear to have been implemented to date. In particular, the Illawarra REP has not been amended as recommended and the Shellharbour LEP 2000 maps do not show the additional resource and buffer areas.

The preface to the working party report states that the (then) Director of Planning had endorsed the general thrust of the report's recommendations. However, the Rural Strategy document subsequently prepared in 1998 by Shellharbour City Council (see below) refers to "*Council's non-acceptance of the Blue Metal Working Party Report recommendations*".

4.6.2 Ministerial Direction

In December 1994 the (then) Minister for Planning issued to all councils a Direction under Section 117(2) of the Environmental Planning and Assessment Act (Direction No G28). In relation to extractive industries, the Direction applies when a council is preparing a draft LEP that would have the effect of:

- prohibiting extractive industry from land where extractive industry is currently permitted; or
- restricting extraction of deposits identified by the Department of Mineral Resources (DMR) by changing the permissible use of land to permit a use potentially incompatible with extractive industry.

The Direction requires the council in preparing the draft LEP to consult the DMR. If the Council receives an objection by way of response, it must submit that objection to the Department of Planning together with a statement of its reasons for wishing to proceed with the draft LEP.

The Direction applies to the extractive deposits on Lot 1 and surrounding lands, as identified by the DMR. A copy of Planning Circular No C26, containing the Minister's Direction, is included in *Appendix D*.

4.6.3 Shellharbour Rural Lands Study

Since the mid 1990s Shellharbour City Council has been reviewing the planning framework applying to non-urban lands within Shellharbour local government area. As described in section 4.5, the draft Shellharbour Rural Local Environmental Plan 2001 has been exhibited together with a local environmental study (LES), referred to as the Rural Lands Study.

The Rural Lands Study exhibited by Council comprises the following documents, prepared over a period of several years:

- *Baseline Studies* (1996);

- *Rural Strategy* (1998);
- *Rural Planning Workshops Outcomes Report* (1999);
- *Nature Conservation Study* (June 2000); and
- *Supplementary Information to the Baseline Studies* (July 2000).

Mapping incorporated in the Rural Lands Study incorporates information regarding the site of the proposed quarry extension. Vegetation along the creek line on Lot 1 is identified as being “complex subtropical rainforest”. The combination of vegetation and slope in this area results in the bushland on the property being assigned a “high” relative bushfire hazard class (derived from Council’s Bushfire Risk Management Plan). The study also acknowledges the extent of blue metal resource on the property, derived from the Blue Metal Working Party Report.

The Rural Lands Study reproduces agricultural land quality information prepared by the Department of Agriculture in 1986 showing that the quarry extension site is partly Class 3 and partly Class 4 agricultural land. The Class 3 land is located on the two spur features within the site and in the valley bottom, while the steeper slopes between these features are classified Class 4.

Stability information in the Rural Lands Study was drawn from available information including a study prepared by the Department of Mines in 1977. The spur features of the quarry extension site are shown as “inherently stable”, while the slopes and valley floor are shown as “potentially unstable” and an area on the steepest slope below “Belmont” is shown as “unstable”.

The visual assessment in the Rural Lands Study identifies the Wentworth Hills area in the Dunmore Visual Sub-Region as “upper rural hills”. Visual sensitivity of land in the vicinity of the site derives from its ability to be viewed from the Princes Highway and Illawarra Railway and from the presence of “The Hill”, described as being an important cultural landscape. Small-scale mapping in the study shows management levels recommended to maintain the visual image of Shellharbour City. The ridge top lands and exposed eastern slopes of the Wentworth Hills are shown as “very high priority”, while concealed areas in valleys (including most of Lot 1) are generally not rated.

The more recent supplementary information to the Rural Lands Study, issued in July 2000, outlines a two-step planning approach to lands identified as containing State and regionally significant extractive resources. This planning approach acknowledges the full extent of extractive resources in the draft Rural LEP and sets in place a review of the areas covered by the s117 Ministerial direction to more accurately reflect those lands which are likely to be extracted. A draft development control plan for mineral extraction is also proposed.

Hatching is shown on the draft LEP map where known mineral resources of significance are proposed to be zoned 1(l), prohibiting their extraction. The boundary of this area is shown on *Figure 4.2*. The Rural Lands Study explains that following gazettal of the Rural LEP, Council intends to review the hatched areas to determine where future extraction is likely to occur. Issues to be considered in this review include the known resource boundaries, land ownership, scenic landscape elements, heritage values, vegetation mapping, and other environmental factors. This review would involve government agencies, quarrying companies and the community. An amendment would then be made to the gazetted LEP to reflect the revised mineral extraction boundaries.

The current development application submitted by Cleary Bros for Lot 1 and the associated LES prepared for Council have brought forward the review in respect of this property.

4.6.4 Cleary Bros Quarry, Proposed Rezoning LES

Since late 2000, Shellharbour City Council has been preparing a local environmental study (LES) to examine the proposed rezoning of land associated with the quarry extension described in this EIS. Under Council's supervision, Connell Wagner has prepared the LES with Council's direct costs referred to Cleary Bros for reimbursement. On two occasions during this period Council has made available draft copies of the LES in progress, dated February 2002 (Revision 1) and March 2003 (Revision 3), to Cleary Bros for review. Comments on each version were forwarded to Council for consideration in ongoing preparation of the local environmental study.

It has been agreed with Council and the Department of Infrastructure Planning and Natural Resources (DIPNR) that the LES and EIS should be concurrently exhibited. Both documents are being finalised at the same time for that purpose. Timing constraints in having both documents printed to achieve concurrent exhibition do not allow the final version of the local environmental study to be obtained, reviewed and commented upon in this EIS. Cleary Bros will review the LES during the formal exhibition period and forward a submission to Council and DIPNR if there are any issues to be raised.

Chapter 5

ENVIRONMENTAL ASSESSMENT

5.1 TOPOGRAPHY

5.1.1 *Description*

The proposed quarry is located on the side of a ridge system extending north-east from Stockyard Mountain and forming the watershed dividing the Lake Illawarra catchment from the catchment of the Minnamurra River. Between Jamberoo Road and the Princes Highway the ridge system is known as the Wentworth Hills and maintains an altitude of between 120 and 160 metres. *Figure 5.1* has been reproduced from the Central Mapping Authority's Albion Park 1:25,000 map to show the topography of the general locality.

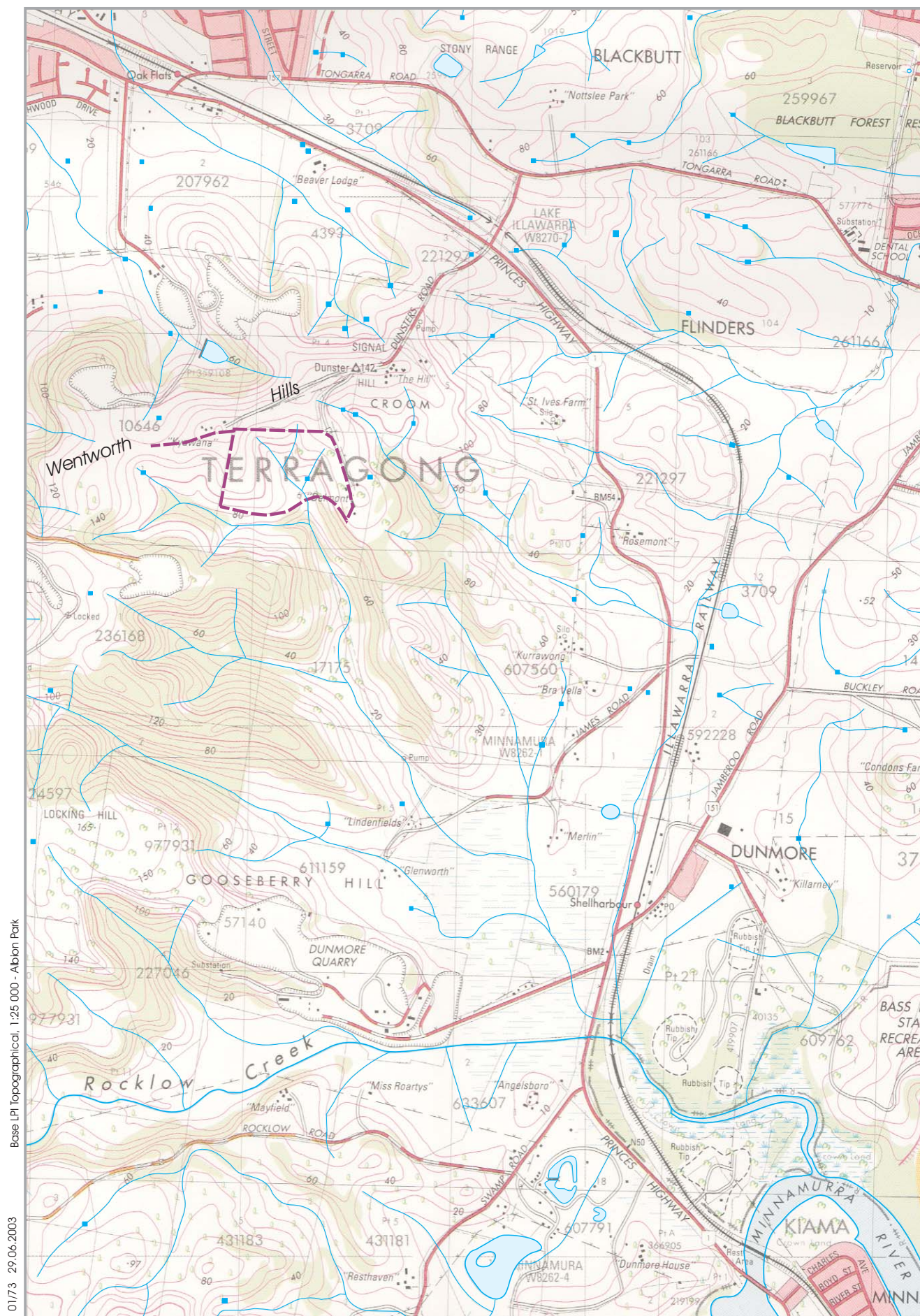
The Wentworth Hills contains steep slopes, particularly on the southern side of the central ridge. The steepest natural slopes fall away at up to 40 per cent before flattening out to gradients of 10 to 15 per cent towards the lowlands. Generally the steeper land has not been cleared, retaining remnants of the former natural vegetation of the area.

Extractive industries have modified the topography at many locations on both sides of the central ridge. The location of active and former quarries is shown marked up on *Figure 2.3*.

The steep topography appears to have hindered former agricultural uses of the land, evidenced by the failure to clear the dense remnant vegetation on the steeper slopes. Access to the extractive industry sites has generally avoided the steeper slopes, following more suitably graded routes into the ridge system.

5.1.2 *Assessment of Impact*

The quarry site is located in a natural amphitheatre, a minor element in the overall landform of the Wentworth Hills. While the quarry will have the characteristics of an open excavation during the extraction period, the ultimate landform will still be that of an amphitheatre facing south. The depression will become more uniformly steep around the sides leading to a more gently sloping floor. The quarry sides will be left in a stable condition, avoiding any safety concerns for subsequent land uses undertaken on the quarry floor. While any near-vertical component remains, access to the rim will remain fenced for public safety. The drainage pattern of the site will



Base IPI Topographical, 1:25 000 - Albion Park

01/73 29.06.2003

FIGURE 5.1 Regional Topography and Drainage



be altered within the quarry area, but following completion of rehabilitation, the site will free drain via a formed outlet to the same natural watercourse as at present.

The topography of the site has been considered in the design of the quarry extension, particularly with regard to managing rainfall runoff and providing vehicular access to the quarry floor. The quarry design includes solutions to constraints presented by site topography.

As indicated in section 3.6, should Cleary Bros and Readymix receive approval for quarrying to near the common property boundary, Cleary Bros will negotiate with Readymix with a view to creating the most practical topographic feature in that location. A continuous graded landform across both properties is likely to be more practical for any future use of the land than a narrow strip of unquarried land.

5.2 GEOLOGY AND SOILS

5.2.1 *Description*

The geology of the region has been documented by Packham (1969) and is discussed in *Appendix I and Appendix J*. The rock strata belong to the Bumbo Latite member, a component of the widespread Gerringong Volcanics. These rocks are underlain by a sandstone referred to as the Budgong Sandstone. The Bumbo Latite member, commonly referred to as “basalt” has a high relative resistance to erosion, forming the cap for much of the ridge system extending from Stockyard Mountain to Bass Point.

In the vicinity of the Albion Park quarry, the Bumbo Latite member occurs as two distinct flows separated by a tuffaceous agglomerate. The lower of the two flows is essentially an andesite or latite that is comparatively free of secondary mineralisation. The upper flow is variously recorded as an andesite, trachyandesite or latite. The intervening tuffaceous agglomerate is highly altered with substantial secondary mineralisation.

Soil terrain maps prepared by the former Soil Conservation Service of NSW show that soils in the area of the Albion Park quarry, fall into the Bombo Soil Landscape (Hazelton 1992). The dominant soil type comprises a friable reddish brown sandy clay loam topsoil over a subsoil comprising a reddish brown sandy clay or a reddish brown light medium clay. The soils are deep, well structured and freely draining but with low fertility. They are strongly acidic with a low to moderate cation exchange capacity and exhibit a moderate to high erodibility.

5.2.2 *Assessment of Impact*

The purpose of an extractive industry is to remove geological resources of economic value. Of necessity this will alter the geology of the site, but from an environmental perspective the altered geology in isolation, is of little consequence other than for groundwater movement (see section 5.4). The geological sequence will be altered by removal of the Bumbo Latite and by mixed placement of tuffaceous agglomerate, weathered overburden and imported clean fill to partly fill the resulting void.

Site geology influences the economics of extraction in that a significant quantity of non-commercial material has to be moved to gain access to the resource. The company has factored this constraint into the commercial evaluation when assessing the viability of the project.

The project has been designed to minimise soil disturbance outside the excavation area. Development beyond the excavation is confined to the haul road, earthen bunds and diversion drains. The major structures will be constructed from the outset and stabilised to minimise subsequent soil loss. Peripheral drainage works will be extended as the quarry progresses, but again the work will be of short duration and quickly stabilised.

Soil loss will be minimised by carefully managing topsoil throughout the life of the quarry. Topsoil recovery will occur prior to construction from the land affected by earth berms, the haul road and at the site of every significant excavation. Recovered topsoil will be stored on site or in the existing quarry and grassed until it is required for re-use. Wherever disturbed land is to be revegetated, available topsoil from the site will be placed over the prepared subsurface material to improve the growing medium.

Quarrying will present very little risk of soil contamination because fuel and other potential contaminants will not be stored at the quarry.

In summary, Cleary Bros will implement the following safeguards to manage soils and minimise soil loss:

- always restrict soil disturbance to the minimum area necessary for work to proceed;
- quickly restore and stabilise any soil disturbance outside the quarry rim or inside the rim if the area is not ready for working and there is erosion risk;
- recover topsoil as a first step when disturbing new areas and stockpile in low, uncompacted berms for re-use;
- grass and stabilise topsoil stockpiles to minimise losses by wind and water erosion;

- stabilise final quarry surfaces with vegetation and/or binder sprays as soon as possible to minimise soil loss;
- maintain vegetation on finished surfaces to limit subsequent erosion; and
- store fuel and other potential contaminants outside the quarry.

5.3 CLIMATE

The Shellharbour district is characterised by undulating lowlands between the coast and the Illawarra escarpment. The area enjoys a temperate climate, moderated by its closeness to the Pacific Ocean. In the Shellharbour area, the Illawarra coastal lowlands reach their maximum width as the escarpment moves inland to Macquarie Pass. This has created a varied rainfall pattern, with the highest rainfall in New South Wales being recorded in a band generally along the escarpment. By contrast the precipitation rate rapidly declines across the lowlands from the escarpment towards Lake Illawarra, which lies in a rain shadow. The annual precipitation at the Albion Park quarry is similar to that recorded in coastal areas of Sydney.

There are two meteorological stations in proximity to the site:

- Port Kembla Signal Station (068053), some 14 kilometres to the north east; and
- Kiama Bowling Club (068038), some nine kilometres to the south east.

Table 5.1 presents temperature, rainfall, humidity and wind speed averages sourced from the Bureau of Meteorology station No 068038 at Kiama Bowling Club. This station is closer to the site and has 97 years of available rainfall data, compared to 27 years at Port Kembla.

Temperature

The Illawarra area experiences a mild maritime climate with relatively little temperature variation on a monthly basis. Average monthly maximum temperature ranges from 16.8 °C in July to 25 °C in January, although temperatures in excess of 40 °C have occurred in the warmer months. The average monthly minimum temperature ranges from 8.4 °C in July to 17.7 °C in February. Temperatures as low as 3 °C have been recorded in the winter months.

Rainfall

Rainfall intensity and frequency is used in designing erosion and sediment controls and assessing the ability of the quarry to collect sufficient water for operational needs.

Table 5.1 TEMPERATURE, RAINFALL, HUMIDITY AND WIND AVERAGES

Item	J	F	M	A	M	J	J	A	S	O	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)													

Notes: 1. Data from Bureau of Meteorology Station No 068038, Kiama Bowling Club
2. Monthly rainfall entries rounded to three significant figures.

There is noticeable variation in average monthly rainfall. July is the driest month with an average of 87.6 millimetres while the wettest month, February, averages 144.9 millimetres. The monthly average number of raindays shows a similar pattern with an average of about 12 raindays in January, February and March and eight to nine days in July, August and September. This demonstrates that there are more wet periods and higher rainfall intensity in the summer months. The annual average rainfall is 1,261 millimetres.

Humidity

Mean monthly humidity is highest in late summer and lowest in late winter and early spring.

Evaporation

The evaporation rate determines the quantity of water to be used on the haul road for dust suppression. Evaporation data are not recorded at meteorological stations near to the site. The nearest coastal meteorological stations where evaporation is

recorded are at Sydney Airport and Nowra RAN Air Station. The mean daily evaporation for these stations is 4.9 and 4.8 millimetres respectively. Evaporation at Sydney Airport ranges from 7.1 millimetres per day in January to 2.5 millimetres per day in June.

Wind

Wind at the quarry site influences dust generation, dispersion and settling and noise propagation. It can also influence the frequency of temperature inversions.

The average monthly wind speed varies by about 20 per cent throughout the year. Afternoon winds are generally stronger than morning winds. The highest average 3 pm speeds occur from late winter through to mid summer, averaging above 11 kilometres per hour. Average 3 pm wind speeds in the autumn and early winter, are in the range 9 to 10 kilometres per hour.

The air quality assessment, *Appendix M*, includes a wind rose showing annual wind data from Albion Park Meteorological Station. Predominant winds are from the west, occurring some 30 per cent of the time, being more than twice as common as winds from any other direction. Winds from the south, north-east and north are the next most frequent. Westerly winds also show a higher proportion of strong winds. North easterlies and southerlies blow with approximately equal strengths, whereas northerly winds are generally light breezes. Calm conditions occur for less than five per cent of the time.

5.4 HYDROLOGY AND FLOODING

5.4.1 Site Drainage

Rainfall runoff from the quarry site drains to the south-east via a watercourse that joins an unnamed creek flowing along the southern boundary of the property, outside the area proposed for quarrying. This creek also drains part of the adjoining Readymix property. As shown on *Figure 5.1*, the unnamed creek descends from the hilly country in a south-easterly direction to a swampy plain near the Princes Highway, where it joins Rocklow Creek. This creek flows east to join with the Minnamurra River, about 1.5 kilometres before the river enters the sea at Minnamurra.

Figure 5.2 shows the drainage pattern in the vicinity of the site. As may be discerned from the figure, the subject property is at the top of the catchment of the creek system. There is very little water catchment draining into the quarry site, amounting to about four hectares on the ridge top immediately to the north of the property.

01/73 18.06.2003 Base Aerial and Cadastral - LPI and Shellharbour City Council 2003. Aerial Photo date 24/6/2002.

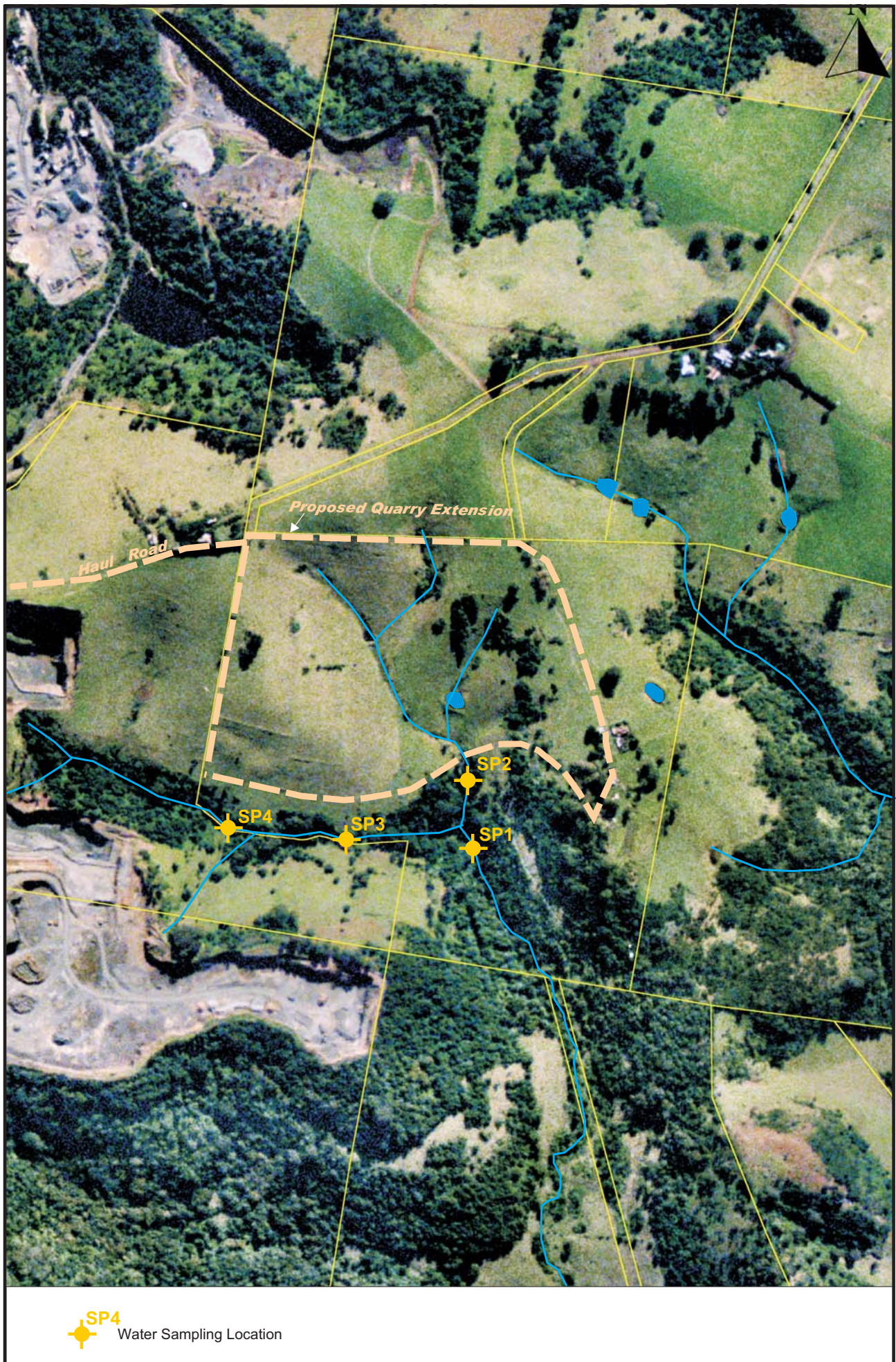


FIGURE 5.2 Site Drainage



Golder Associates studied the hydrogeology of the site for the 1998 rezoning application. The report is included as *Appendix J*. In relation to surface water, Golder concluded, as is common, that the source of flow in the principal creek is rainfall runoff from the catchment with long-term flow from groundwater seepage. Having regard to the steep slopes and previous land clearing, Golder opined that runoff is likely to be rapid with little persistence of flow to watercourses except from groundwater discharge. Original clearing of the property in an earlier century would have altered the natural hydrology of the creek, accelerating runoff and reducing persistent flows.

Golder ascertained by local inquiry that in the past the easterly flowing creek is known to have stopped flowing on occasions. At the time of inspection Golder estimated a flow of 5 to 10 litres per minute over the small waterfall on the property, tracing the major source to be a tributary to the west on Readymix property where a similar flow was estimated.

5.4.2 Groundwater

Golder Associates observed that the site appeared to have typical groundwater recharge and discharge characteristics for hilly country where rainwater infiltrates on hilltops and valley slopes, to partially reappear as springs and seepages in deeply incised creek lines.

Evidence indicates that the dominant jointing in the latite is near to vertical, with the result that this rock has a low horizontal permeability, except in possible fractured zones. Consistent with this observation, groundwater seepage is visibly occurring through the lower permeability agglomerate layer and along the contact between the volcanic rock sequence and the underlying sandstone. Seepage from the agglomerate layer is largely being collected in existing farm dams and hence is unlikely to provide a significant contribution to creek flow. There may also be some lateral movement of groundwater into the site from the immediate west, following the easterly sloping dip in bedding planes.

5.4.3 Flooding

The site is not susceptible to flooding. After extraction has proceeded for a short time the quarry excavation will have ample capacity to collect and hold all stormwater falling within the disturbed area.

5.4.4 Assessment of Impact

As the quarry progresses, it will intercept an increasing proportion of the runoff from the land designated for quarrying. Runoff water will collect in defined areas in the

base of the excavation where it will be retained for use in quarry management or be treated and released to the natural drainage system.

Water removed from the quarry will be pumped over the rim and released directly into the truncated tributary of the creek system, with appropriate energy dissipation to prevent erosion. The point of release will ensure that the full remaining length of the truncated creek will receive water flows.

To maximise the benefit to downstream ecosystems, water release will be undertaken in accordance with the recommendations of the flora and fauna assessment prepared by Kevin Mills & Associates Pty Ltd (refer *Appendix O*). Large releases will be timed to mirror local rainfall events rather than a uniformly spaced series of minor releases.

Golder opines that rainfall infiltration may increase when overburden is removed and water begins to pond on the quarry floor, with the result that groundwater flow to the creek may not be significantly affected by initial workings. When the latite is extracted to the underlying sandstone however, the seepage path along the interface will be affected, possibly requiring a low level release of water from the quarry to compensate. There is also potential for changes to creek hydrology from the activities of Readymix in the adjacent land to the west within the catchment. For this reason changes in the flow regime in the creek at its entry to Cleary Bros site will be monitored and further advice sought regarding an appropriate release regime.

Golder recommends surface water and groundwater monitoring to assess creek flows over time and the contribution from groundwater flowing through Cleary Bros property. V-notch weirs with pressure transducers and data loggers have been suggested for at least three locations along the creek, to commence prior to quarry development. Two groundwater monitoring bores have been suggested for locations between the proposed quarry and the creek, with each bore developed to provide groundwater flow information from various levels in the strata. The results of monitoring will provide information to enable a water release program to be developed and refined to more accurately compensate for the effect of the quarry on natural flows in the creek.

Following receipt of development consent and in consultation with hydrologists, Cleary Bros will implement a monitoring program for surface water and groundwater flow. Water release protocols will be developed from the existing flow information received and included in the environmental management and quarry rehabilitation plan. These protocols will be implemented throughout the life of the quarry and beyond, until the land is returned to a self-draining condition.

5.5 WATER QUALITY

5.5.1 Existing Water Quality

The existing drainage system within the property is shown on *Figure 5.2*. The unnamed creek that flows from the property currently receives surface inflow from grazing land, bushland and a section of the existing Readymix quarry. The hydrogeological study by Golder Associates (*Appendix J*) indicates that Readymix discharges collected runoff from its quarry to the creek from time to time after settlement of fines. In that report Golder noted that spoil emplacements associated with the Readymix quarry were observed at the head of a gully on the southern side of the unnamed creek.

In May 2003 Golder revisited the site to collect water samples from four locations on the two principal watercourses within the property. Samples were collected after a period of light to moderate rain from four locations shown on *Figure 5.2*. One sampling point was located on the tributary watercourse that drains the quarry site, while the other three were located on the larger creek that flows from west to east through the property. Of the latter three locations, one was below the confluence of watercourses, one was above the confluence and the third was near the point where the creek enters the property. Sampling locations were sited having regard to accessibility as dense vegetation and deep rock gullies are present in some areas.

Collected samples were field tested and then analysed at a NATA certified laboratory for the following parameters:

- pH;
- turbidity;
- total suspended solids; and
- total dissolved heavy metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc and mercury)

The results of the analyses are presented in *Table 5.2*

The results of the metals analysis were compared with ANZECC 2000 *Guidelines for Aquatic Ecosystems* (Freshwater 95% trigger) revealing that copper and zinc concentrations were elevated in all water samples. Golder suggests that these concentrations probably represent background levels because of the volcanic rocks in the catchment. The pH analysis showed that all samples fell within acceptable limits in accordance with ANZECC 2000 *Fresh and Marine Water Quality Guidelines* (Upland Rivers).

Table 5.2 WATER QUALITY SAMPLING RESULTS

Sample location	Results from Laboratory Analysis										
	TSS mg/L	pH	Turb. ntu	As µg/L	Cd µg/L	Cr µg/L	Cu µg/L	Ni µg/L	Pb µg/L	Zn µg/L	Hg µg/L
SP1 tributary creek	1.0	7.3	12	< 1	< 0.2	< 1	15	< 1	< 1	< 10	< 1
SP2 main creek downstream	2.0	7.3	14	< 1	< 0.2	< 1	17	< 1	< 1	20	< 1
SP3 main creek midstream	19.0	7.8	42	< 1	< 0.2	< 1	36	< 5	2	20	< 5
SP4 main creek upstream	54.0	7.9	55	< 1	< 0.2	< 1	39	< 5	2	10	< 5
Applicable ANZECC Guideline		6.5-8.0		13.0	0.2	1.0	1.4	11.0	3.4	8.0	0.6

TSS = Total Suspended Solids

Turb. = turbidity

ntu = nephelometric turbidity units

µg/L = micrograms per litre.

Total suspended solids and turbidity were found to be higher in the main creek than in the tributary flowing from the quarry site. The highest levels were recorded at the sampling point closest to where the creek enters the property. The results show that turbidity and total suspended solids decrease as the creek progresses through the property to subsequent sampling points.

The water quality investigation report from Golder Associates is included as *Appendix K*.

5.5.2 Assessment of Impact

The quality of water released from the proposed quarry extension will not have a significant impact on existing water quality because it will meet the requirements of the environment protection licence issued by the EPA. The current licence for the existing quarry (refer *Appendix G*) requires compliance with section 120 of the Protection of the Environment Operations Act 1997 except as expressly provided by specific conditions of the licence. *Table 5.3* lists the specific concentration limits included in the licence for water discharge associated with the existing quarry.

Table 5.3 WATER DISCHARGE LIMITS - EXISTING QUARRY

Pollutant	Unit	Concentration Limit
Oil and Grease	mg/L	30
Total Suspended Solids	mg/L	50
Biochemical Oxygen Demand	mg/L	150

Surface water quality on the property and further downstream will be maintained by implementing a number of operating safeguards, including:

- install erosion and sediment controls for all earthworks undertaken outside the rim of the quarry. Such works include haul road construction, stormwater diversion drains, bund wall construction and relocation of the access to "Belmont". Details of proposed erosion and sediment controls will be included in a soil and water management plan incorporated in the quarry's environmental management and rehabilitation plan;
- implement temporary erosion and sediment controls within the quarry rim for initial quarry workings until there is certainty that the excavation is capable of collecting and retaining any rainfall runoff from disturbed areas;
- refuel and service quarry plant away from water storages to lessen the risk of a pollution incident from any spillage;
- respond quickly in accordance with documented emergency clean up procedures in the event of a fuel spill;
- ensure that pollutant concentration criteria are met whenever accumulated water in the main quarry storages is released to natural drainage. If necessary a flocculant will be added to stored water to assist precipitation of fines. If a floating oily layer is ever present it will be skimmed off and removed from site for disposal;
- remove nutrients if necessary from water to be released to the creek system;
- regularly collect and remove all waste and litter occurring on the site;
- maintain landscaping of restored areas to avoid deterioration of grass, tree or shrub cover; and
- limit the quantity of fertiliser used during rehabilitation works to minimise the likelihood of elevated nutrient levels in surface water.

Wheel cleaning facilities are not required at the quarry extension. Off-road quarry vehicles will traverse the route to and from the processing plant. Any other vehicles visiting the quarry will pass through the existing quarry and processing plant prior to exiting the site.

The proposal will have virtually no impact upon the quality of groundwater as very few potentially polluting substances will be introduced to the quarry. Minor oil drips from quarry plant and trucks would constitute an almost negligible source of surface contamination. The residue from explosives will largely be carried off with extracted rock. Controlled use of fertiliser will limit infiltration of introduced nutrients.

5.6 NOISE

A noise assessment of the proposed quarry extension was carried out by Richard Heggie Associates Pty Ltd and is included as *Appendix L*. The brief for the assessment was to measure background noise in the area, determine noise level criteria for the proposed development based on EPA guidelines, predict the noise levels to be generated by the quarry extension at sensitive receptors and recommend attenuation measures, if needed, to achieve the noise goals. Noise from the existing processing plant was also assessed.

At the time the noise assessment was undertaken, the former owner of “Belmont” was in residence at the house with a right to remain there indefinitely. Accordingly, the noise assessment makes reference to noise levels at “Belmont” and appropriate mitigation measures. Those mitigation measures are no longer relevant as the former owner has vacated “Belmont” and will not return. The residence will either remain vacant for the duration of quarrying or be re-occupied on Cleary Bros’ terms. The following discussion includes a summary of the noise assessment, omitting findings for “Belmont”, which are no longer relevant.

5.6.1 Background Noise

Existing ambient noise levels were measured in February 2001 at three nearby residential locations shown in *Appendix L*. Measurements were recorded by continuous noise loggers, remaining in place for a minimum of seven days. A manually operated sound level meter was also used to assist in identifying the sources contributing to ambient noise.

Noise measurements were examined with and without the quarry or processing plant in operation. Ambient noise levels when the existing operation is idle are the relevant background levels for noise impact assessment. At the residence about 500 metres north of the proposed quarry extension, “The Hill”, the daytime rating background level (L_{90}) was determined to be 34 dB(A). Residences in Greenmeadows Estate, the closest residential area to the processing plant, have a daytime rating background level of 38 dB(A).

A third residential sampling location beyond influence from the quarry was found to have a higher background level due to influences from traffic noise on the Princes Highway. Consequently data from that location were not used in the assessment.

5.6.2 Noise Criteria

i. Operational Noise Criteria

The *Industrial Noise Policy* (1999) published by the EPA recommends criteria for intrusiveness and amenity from stationary sources (plant noise). The **intrusiveness criterion** essentially means that the equivalent continuous noise level (L_{Aeq}) should not exceed the rating background level (L_{90}) by more than 5 decibels.

The **amenity criterion** is based on an “acceptable” noise level for different types of land use. The acceptable level has been empirically determined from surveys of people living with noise. The recommended maximum L_{Aeq} noise from new noise sources is determined so as not to cause the noise level from all sources in the locality to exceed the acceptable level. For this reason, the amenity criterion can be set up to 10 decibels below the acceptable level.

Richard Heggie Associates applied the methods described in the *Industrial Noise Policy* to determine noise level criteria for plant noise from the proposed quarry extension as summarised in Table 5.4.

Table 5.4 DAYTIME* PLANT NOISE CRITERIA (dB(A))

Receptor	Intrusiveness Criterion (L_{Aeq} 15 min)	Amenity Criterion (L_{Aeq})
“The Hill”	39	55
Greenmeadows Estate	43	55

* Daytime is 7 am to 6 pm

ii. Construction Noise Criteria

The *Environmental Noise Control Manual* published by the EPA (1995) recommends limits for construction noise, depending upon the duration of construction work. Site preparation works for the quarry extension include some noisy activities, such as constructing the access road and earth berms. Other activities such as fencing and bushland enhancement are unlikely to generate significant noise.

The nearest residence has been considered for setting construction noise criteria, summarised in Table 5.5.

Table 5.5 CONSTRUCTION NOISE GOALS (dB(A))

Construction Period	Construction Noise Goal (L _{A10}) at "The Hill"
4 weeks and under	54
4 weeks to 26 weeks	44
Greater than 26 weeks	39

iii. *Traffic Noise Criteria*

The range of daily traffic volumes will not significantly alter as a result of the quarry extension, despite the addition of some backfill traffic in the later years. The noise assessment considers existing traffic noise, based on criteria recommended in *Environmental Criteria for Road Traffic Noise* (EPA 1999). Traffic from the site reaches the main road system via the new East-West Route, referred to as a "collector road". The daytime criterion for road traffic noise from a collector road is a L_{Aeq (1 hour)} of 60 dB(A). Where this level is already exceeded the criterion is that traffic from the development should not result in an increase existing noise levels of more than two decibels.

5.6.3 Noise Sources

The noise assessment considers all noise-generating equipment on the site, based on measurements of existing equipment in use at the quarry and processing plant. Sound power levels of the various items of equipment in use are given in Table 5.6.

Table 5.6 SITE NOISE SOURCES

Noise Source	Sound Power Level (dB(A))
Processing Plant	
Primary Crusher	112
Secondary Crushers and Screens	116
Pug mill	115
Mobile Equipment	
CAT 773 dump truck	114
CAT 627 scraper	111
CAT 235 face shovel	117
CAT 992 loader	118
Rock drill	118
Water cart	109

CAT D8L dozer	116
235C hammer excavator	112
CAT 980C loader	114

Some of the items of plant listed in *Table 5.6* operate intermittently.

5.6.4 Assessment of Impact

i. Operational Noise

Richard Heggie Associates used the “ENM” noise-modelling program to predict noise levels resulting from quarry and processing plant operation. *Figure 5.3* shows predicted noise contours for Year 20 of quarrying assuming neutral atmospheric conditions. Noise modelling took into account the attenuating effect of the earth berm to be constructed at the north-eastern corner of the quarry.

Table 5.7 summarises the predicted noise levels for calm weather conditions at two assessment locations during Years 10, 20 and 30

Table 5.7 NOISE IMPACT ASSESSMENT – CALM WEATHER

Receptor	Design Goals (dB(A))		Predicted Noise Level $L_{Aeq}(15 \text{ minute})$		
	Intrusiveness	Amenity	Year 10	Year 20	Year 30
	Criterion	Criterion	dB(A)	dB(A)	dB(A)
	$L_{Aeq}(15\text{minute})$	$L_{Aeq}(\text{period})$			
“The Hill”	39	55	33	38	34
Greenmeadows Estate	43	55	41	41	41

The assessment shows that the operation will remain within the noise goals at “The Hill” and at the Greenmeadows Estate.

Richard Heggie Associates examined wind data for the area to determine if wind blows from the noise source to the receivers with such consistency to be considered a feature of the area. The incidence of winds in the direction to exacerbate noise was found to be well below the threshold to be considered a feature.

ii. Construction Noise

The construction activities perceived to be noisiest at the nearest residence will occur when the earth berm is being constructed around the north-eastern corner of the site. Modelling of construction noise was carried out on the basis of a dump truck or

01/73 27.06.2003 Base Aerial and Cadastral - LIC and Shellharbour City Council 2003. Aerial Photo date 24/6/2002.

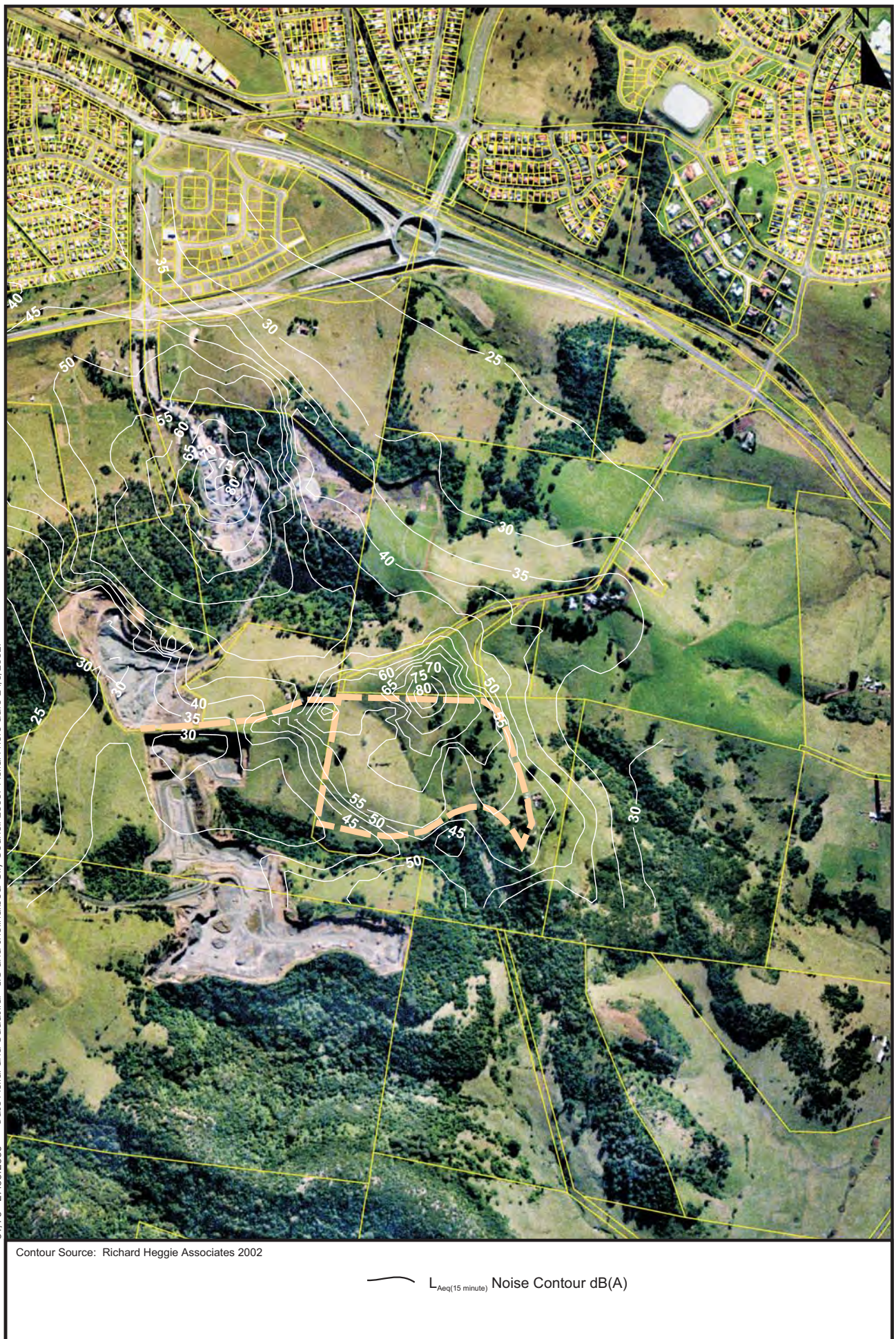
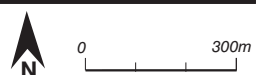


FIGURE 5.3 Predicted Noise Contours - Year 20



scraper being used to deliver overburden for the berm with a bulldozer on site for shaping the deposited material. The results of calculations are summarised in Table 5.8.

Table 5.8 PREDICTED NOISE FROM BERM CONSTRUCTION

Receptor	Berm Construction period	Noise Goal	Predicted Noise Level
"The Hill"	up to 4 weeks	54	51
	4 to 26 weeks	44	51

While Cleary Bros will construct the berm as quickly as possible within the allowable working hours, it is likely that the construction period will exceed four weeks, resulting in construction noise goals being exceeded. To minimise construction noise, a construction noise management plan will be developed in conjunction with the residents prior to work commencing, to include:

- undertaking the work as quickly as possible to shorten the period of disturbance;
- selecting plant and equipment to achieve specified sound power levels;
- operating and maintaining plant and equipment to minimise noise;
- limiting construction to the approved hours of 7 am to 5.30 pm Monday to Friday and 7 am to 1 pm Saturday; and
- monitoring construction noise to confirm objectives in the management plan are being met.

Noise from construction activity on the site will be controlled to a practical minimum consistent with the need to undertake the work.

iii. Traffic Noise

The noise level at the nearest residence in Greenmeadows Estate generated by quarry traffic on the East-West Route, characterised as $L_{Aeq(1hour)}$, is calculated to be 42 dB(A). This is well below the daytime noise goal of 60 dB(A) and will not cause the total traffic noise to exceed this criterion. Should it ever be needed, there is potential for traffic growth from the quarry without breaching the EPA criterion.

iv. Cumulative Noise Impact

Richard Heggie Associates carried out an indicative cumulative noise impact assessment to predict worst-case noise emissions from existing Readymix and future Cleary Bros quarry operations. The results showed cumulative amenity levels

($L_{Aeq(15\text{minute})}$) of 36 and 43 dB(A) respectively at “The Hill” and Greenmeadows Estate. These figures are well within the acceptable amenity criterion of 55 dB(A).

5.7 BLASTING

Richard Heggie Associates Pty Ltd has undertaken a blasting assessment for the proposed quarry extension, included together with the noise assessment in *Appendix L*. The blasting assessment summarises the results of an extensive study into the impact of blasting at the existing Cleary Bros quarry and makes blast emission predictions for the proposed extension. As for the noise assessment, references to “Belmont” are no longer relevant as the house has been vacated.

5.7.1 Blast Emission Limits

To control annoyance from ground vibration and airblast overpressure at occupied residences, the Environment Protection Authority recommends the blast emission limits shown in *Table 5.9*, with the rider that a criterion may be exceeded, but this should not occur for more than five per cent of the total number blasts in any 12-month period. These criteria apply at the nearest occupied residence.

Table 5.9 RECOMMENDED BLAST EMISSION LIMITS

Descriptor	Criterion
Peak vector sum ground vibration velocity	5 millimetres per second
Peak linear airblast overpressure	115 decibels (linear)

The licence for the existing quarry incorporates the above criteria and restricts blasting to between 8.30 am and 5.00 pm Monday to Friday.

5.7.2 Performance of Existing Quarry

Blast monitoring at the existing quarry has demonstrated that airblast overpressure is the limiting parameter for blast design at this location. In more than three years of accurate blast monitoring at the existing quarry, there have been no exceedences of the EPA criteria. In fact, of 113 blasts only one has caused an airblast overpressure exceeding the lesser value of 110 dB(lin).

Based on information obtained from blast monitoring at the existing quarry, blast designs have been modified to minimise the airblast overpressure at the nearest residence to that quarry, “The Hill”. This has been achieved by progressively re-

orienting the blast face so that the detonator sequence is initiated in the opposite direction to the residence.

5.7.3 Blast Design for the Quarry Extension

Blast design is a multi-variable exercise intended to minimise the number of blasts required, provide optimum height of quarry benches and control the impacts on nearby residences. A number of trial blasts have been undertaken at the existing quarry using “deck charges” where the borehole is filled with two columns of explosive separated by inert material. The upper and lower charges have separate detonators and are fired sequentially.

The trial blasts using deck charges were monitored at a distance of 500 metres to simulate the effect when blasting at this distance from the nearest residence. The results of monitoring have enabled “site laws” to be plotted for the quarry. The site laws give the level of airblast overpressure and ground vibration as a function of distance from the blast. Using the site laws, the maximum instantaneous charge (MIC) can be calculated to achieve compliance with EPA criteria for any separation distance.

It has been determined that with blasts designed as described by Richard Heggie Associates, the allowable MIC to meet the EPA criteria for a blast at 500 metres from a sensitive receptor is 36 kilograms. Higher MICs apply when blasting at greater distances.

5.7.4 Assessment of Impact

“The Hill” is the closest residence to the proposed quarry extension. In later stages of the quarry (Years 21 to 25) the north east section of the quarry will be extracted, being at the closest point, less than 500 metres from “The Hill”.

The report prepared by Richard Heggie Associates concludes that the airblast overpressure and peak vector sum ground vibration velocity can be maintained within EPA criteria to within about 500 metres of the nearby residence by using the following techniques:

- incorporating deck charges in the front row of blastholes;
- initiating the blast in the opposite direction to the nearest receptor;
- limiting the maximum instantaneous charge in accordance with the site laws developed by Richard Heggie Associates.

These techniques will be employed from the outset for blasting in the quarry extension. The initial quarry workings will be at the farthest point from the

residence giving an opportunity to monitor blasting effects and adjust blast designs as extraction advances closer.

Based on the results of monitoring in the early years of quarrying in the extension area, blasts can be specifically designed for extraction of the north-east corner of the quarry in Years 21 to 25 to ensure that EPA criteria continue to be met at “The Hill” when extraction moves within 500 metres. This may be achieved, for example, by further limiting the MIC when blasting in the north-east corner.

With the agreement of the owners of “The Hill”, a property condition survey will be undertaken on “The Hill” and all associated buildings and structures prior to commencement of the quarry extension. This will provide baseline information for assessment and repair of any deterioration that may be attributable to quarry blasting. Cleary Bros undertakes to meet the cost of repairs to any property damage confirmed to have been caused by the quarry workings.

5.8 AIR QUALITY

Air quality issues associated with the proposed facility include potential dust emissions during operation and dust during construction. A further consideration is the level of vehicle emissions including greenhouse gas emissions.

An air quality assessment for the proposed quarry extension has been prepared by Richard Heggie Associates and is included as *Appendix M*. The assessment:

- considers air quality criteria applicable to the industry;
- estimates likely fugitive emissions based on activities to be carried out at the site and equipment used;
- predicts dust fallout and particulate concentrations using a dispersion model; and
- considers the likely impact of dust fallout, particulate concentrations and vehicle exhaust emissions from the site on its surroundings.

The following sections discuss air quality and include a summary of the assessment, omitting references to “Belmont”, which is no longer occupied.

5.8.1 Air Quality Criteria

The New South Wales Government’s *Action for Air* (1998) establishes interim goals for controlling emission of air quality pollutants. The pollutants of particular relevance to quarry emissions include particulate matter of size less than 10 microns, referred to as PM_{10} and *total suspended particulates*, referring to all airborne particles of

size less than 50 microns. In addition there are longer-standing standards applied by the EPA for nuisance impacts, measured by the annual average deposition of dust.

The air quality goals for the quarry extension, derived from these standards, are summarised in *Table 5.10*.

Table 5.10 AIR QUALITY GOALS

Pollutant	Goal
PM ₁₀	A 24 hour maximum of 50 µg/m ³ with five exceedences allowed per year
TSP	An average annual maximum of 90 µg/m ³
Dust	Nuisance impact on residences expected when annual average dust deposition level exceeds 4 g/m ² /month (assumes existing ambient of about 2 g/m ² /month)

PM₁₀ = particulate matter less than 10 microns

TSP = total suspended particulates

µg/m³ = micrograms per cubic metre

g/m²/month = grams per square metre per month

5.8.2 Existing Air Quality

Existing air quality in the area would be affected by emissions from various existing quarry operations and from traffic, particularly on the Princes Highway and east – west link. The site is in an elevated location, close to the coast and hence would be considered well ventilated for dispersion of airborne pollutants.

Dust deposition monitoring is carried out by Cleary Bros at three locations in the vicinity of the existing quarry and processing plant as shown on *Figure 5.4*. Richard Heggie Associates has examined monitoring results for 1999 with the averages being as shown in *Table 5.11*.

Table 5.11 AVERAGE MONTHLY DUST DEPOSITION (1999)

Monitoring Site	Average Monthly Dust Deposition (g/m ² /month)
APD 1	1.6
APD 2	2.5
APD 3	1.2

From these results Heggie has estimated existing average dust deposition level at the nearest residence. The deposition level is expected to be at or below one gram per square metre per month at “The Hill”.

The current dust deposition rate in the area would be influenced to an extent by the existing Cleary Bros quarry. When the proposed quarry extension commences, the existing quarry will be phased out. Hence the measured dust deposition summarised in *Table 5.11* may overstate the actual background conditions when the quarry extension commences.

5.8.3 Air Quality Predictions

i. Dust Sources

The principal dust sources at the quarry and processing plant will be fugitive emissions associated with:

- general excavation works within the quarry involving heavy machinery;
- material processing in the processing plant and in particular, crushing;
- the effect of wind on areas of exposed material within the quarry and processing plant;
- the effect of wind on stockpiles and roadways;
- stockpiling material or removing material from stockpiles;
- heavy vehicle movement within the site and on the quarry haul road; and
- heavy vehicles proceeding to and from the site.

Richard Heggie Associates has consulted published standards to develop a schedule of emission factors for various types of equipment and the effect of wind blowing across exposed surfaces. Using this information an emission inventory has been prepared for the quarry operation, based on the expected operating schedule of the various items of plant and the progression of the quarry through its 30-year life.

ii. Meteorology

Dispersion modelling ideally incorporates wind data obtained from the site of the development or nearby. This is rarely possible for a development on a new site, as the extent of available wind data in New South Wales is very limited.

Wind data from the Albion Park Aerodrome have been used for dispersion modelling. *Appendix M* includes an annual wind rose generated from the aerodrome data.

iii. *Modelling*

Richard Heggie Associates has used the ISCST3 modelling software sourced from the United States EPA to predict dust, total suspended particulates and PM₁₀ for the quarry extension. Modelling has predicted air quality at the nearest occupied residence, “The Hill”, simulating quarry operations at five-year steps through its life (Years 5, 10, 15, 20, 25 & 30). One year of operations was modelled at each of the five yearly nodes. To calculate the 24-hour PM₁₀ concentrations, the analysis was set to permit five exceedences over the year, to correspond with the criterion.

The predicted air quality impacts at “The Hill” from the quarry extension are summarised in *Table 5.12*. Contour plots of the model predictions are included in *Appendix M*. Dust deposition contours for the “worst” year of quarrying, Year 25, are reproduced on *Figure 5.4*.

Table 5.12 MODELLING RESULTS

Pollutant	Criterion	Predicted levels at “The Hill”	
24 hour PM ₁₀ (µg/m ³)	50	Years 5 to 30:	less than 25
Annual average TSP (µg/m ³)	90	Years 5 to 30:	less than 30
Annual average dust (g/m ² /mth)	2	Years 5 to 15, 20, 30:	less than 1.
		Year 25:	slightly over 1

PM₁₀ = particulate matter less than 10 microns

TSP = total suspended particulates

µg/m³ = micrograms per cubic metre

The modelling results show that air quality criteria will be met for all modelled years of the quarry operation.

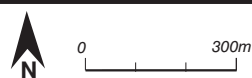
iv. *Vehicle Emissions*

The principal polluting gases to be emitted from the exhausts of diesel vehicles used in the quarry extension will include carbon monoxide, oxides of nitrogen, oxides of sulphur and volatile organic carbons. Owing to the small number of vehicles in use and the separation from potential receptors, the impact of pollutants from this source is considered to be negligible.

Quarry operations will also contribute to greenhouse gas emissions, consisting of most of the gases referred to above together with carbon dioxide and methane. These



FIGURE 5.4 Predicted Dust Contours - Year 25



gases result from fuel combustion in the diesel engines, evaporation of fuel constituents and post-combustion reactions. Again given the limited number of mobile plant items used in quarrying operations, the greenhouse gas contribution is considered minimal and essential for the resource to won.

5.8.4 *Dust and Particulate Controls*

Mitigation measures to be implemented to control dust emissions from the quarry extension are consistent with practices at the existing quarry and have been proven to be effective:

- confining vehicle movements to a single access path within the quarry;
- water spraying over the haul road and vehicle path;
- ceasing dust generating activity during particularly strong winds which defy dust control by watering;
- employing a wheel shaker or wheel wash at the entrance to the site to remove material from the wheels of departing trucks;
- cleaning any deposited material from the sealed access road to the processing plant as often as necessary; and
- minimising the drop height for trucks unloading overburden.

An additional dust monitor will be set up beyond the north-east corner of the quarry to provide additional information of dust deposition in that area. The approximate location is shown on *Figure 5.4*.

5.9 TRANSPORT

5.9.1 *Introduction*

Transport consultant Masson Wilson Twiney was commissioned to investigate the transport aspects of the proposed quarry extension. This investigation analysed traffic impacts from the existing operation and predicted likely outcomes with the proposed extension in operation. The assessment is based on the understanding that the proposal is an extension to an existing operation and will not itself generate additional truck movements to convey products from the quarry. Consideration was given to additional truck movements in later years as clean fill is brought to the quarry for the purpose of backfill. Such additional trucks are considered unlikely to significantly alter the existing range in daily vehicle movements associated with the site. The traffic report is included as *Appendix N*.

It is not practicable to transport quarry products from the site by any means other than road transport. Other transport modes, such as rail or water transport, are

unsuitable because of the varied destinations for the products, most of which are only accessible by road and the short haul distance involved to the quarry's customers who are located in the Illawarra Region.

The proposal does not generate a requirement for additional parking.

5.9.2 Existing Conditions

The existing Cleary Bros quarry is connected by a private haul road to the processing plant. Vehicular access from the processing plant and quarry to the main road system is via an access road leading to a roundabout-controlled intersection with the new East-West Route. The first stage of this latter road was opened in 2001 connecting the Princes Highway with Croom Road. East-West Route joins the Princes Highway at a grade-separated intersection combined with the intersection of the highway and New Lake Entrance Road, as shown in *Figure 5.5*.

The consultant investigated existing traffic conditions in the area by reference to:

- main road traffic levels published by the RTA;
- company records of traffic to and from the quarry processing plant; and
- recorded vehicle numbers and classifications from a counter placed across the access road to the plant.

The Princes Highway carries an average of about 36,000 vehicles per day, with a pattern characteristic of holiday traffic superimposed upon normal weekday activities. Shellharbour Council counted traffic on East-West Route in 2002 and found that it carried approximately 5,500 vehicles per day.

The most recent survey of traffic on the access road to the processing plant took place over a week in March 2001, with the following relevant findings:

- the average weekday flow to and from the site was 1060 vehicles;
- weekday flows varied within the range 839 to 1368 vehicles;
- The peak daily flow occurred in the period 6 am to 8 am when 50 – 70 vehicles used the road per hour;
- heavy vehicles accounted for 60 per cent of the traffic flow on the access road;
- 64 per cent of quarry traffic was reported to be to or from the east.

Masson Wilson Twiney refers to a traffic assessment undertaken by Connell Wagner (2003) as part of the local environmental study for the proposed rezoning of the quarry site. Connell Wagner undertook an intersection analysis of the roundabout-controlled intersection of the quarry access road and East-West Route, assuming 11,000 vehicles per day on the latter following its further extension (almost double



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FIGURE 5.5 Existing Road Access

Truck Routes



0

1km

current traffic). The results showed that the intersection performed with satisfactory level of service with acceptable delays and spare capacity.

5.9.3 *Assessment of Transport Impact*

The proposed quarry extension will not significantly alter the traffic or transport conditions associated with Cleary Bros' existing processing plant. Masson Wilson Twiney considers that the existing road network readily absorbs processing plant traffic.

The proposal will introduce a need to progressively backfill the quarry, however traffic associated with this activity is considered unlikely to significantly alter the existing range in daily vehicle movements associated with the site.

Masson Wilson Twiney advised that an assessment of road pavement deterioration from heavy vehicles is best undertaken by the owner of the roads concerned, in this case the RTA, who can apply established formulae based on historic cost data.

The Roads and Traffic Authority has a proposal to relocate the Princes Highway in the Albion Park area, referred to as the "Yallah – Oak Flats deviation". This proposal will utilise the recently opened East-west Route as part of a freeway standard bypass of Albion Park. The RTA currently expects to construct the deviation in 15 to 20 years time. When the work is undertaken the existing roundabout at the intersection of East-West Route and the quarry access road will be removed and replaced by an overpass giving access to the Cleary Bros and Readymix quarries from the (Old) Princes Highway (pers. comm. Ivo Pacitto, RTA 5/6/03). Trucks will then travel a short distance south on the old highway to the existing grade separated interchange at New Lake Entrance Road, where they will be able to access the freeway for travel in either direction.

5.10 FLORA AND FAUNA

The flora and fauna of the quarry site and surroundings has been investigated by Kevin Mills and Associates Pty Ltd. This study extended over all of Lot 1 and the adjoining Lot 7 to the east, amounting to some 83 hectares together with the haul road route across Lot 2. This land was surveyed for vegetation communities, fauna habitats, threatened species, threatened ecological communities and koala habitat. The report from the investigation is included in *Appendix O* and includes eight part tests of the significance of the likely impact from the quarry expansion on several threatened species and endangered ecological communities. Principal findings and recommendations from the investigation are summarised below.

5.10.1 Vegetation Communities

Mills reports that while the quarry site is mostly cleared there are significant areas of native vegetation, mainly rainforest, elsewhere on the property. Remaining bushland is mostly present on steep slopes and along gullies. The gentler slopes and level ridge tops have been almost fully cleared for grazing. There are five vegetation communities present on the surveyed land, summarised in *Table 5.13* and shown on *Figure 5.6*.

Table 5.13 VEGETATION COMMUNITIES

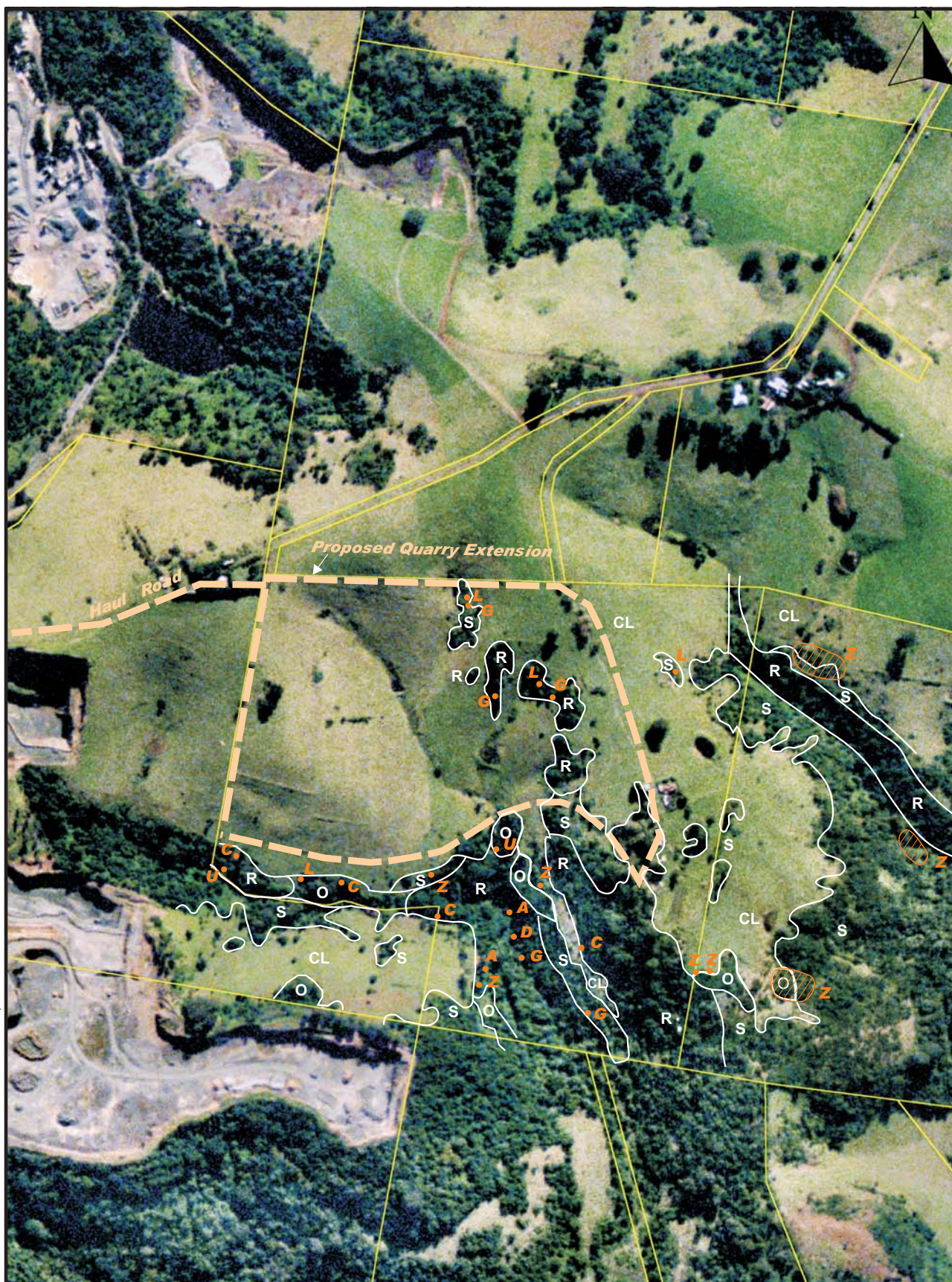
Vegetation Type	Location
1. Rainforest (Closed Forest)	Mainly occurs within the valleys and gullies surrounding the quarry site. Small isolated patches of regrowth occur on the eastern slopes of the area to be quarried.
2. Open Forest	Most of the former eucalypt forest has been cleared. Scattered remnants occur in and near the property. Some locations now support dense regrowth of Black Wattle.
3. Lantana Shrubland	Shrubland, dominated by lantana, occurs mostly on the edges of forested areas.
4. Sedgeland/Rushland	The farm dams within the quarry site support small patches of wetland plants.
5. Grassland	Most of the land to be affected by quarrying is grassland, dominated by introduced plants.

Mills has described each of the vegetation communities in terms of its structure (height, age, plant density at various levels), location on the property and floristics (principal species present). A plant species list is included in the report with 221 native plant species having been identified on the property.

5.10.2 Vegetation of Conservation Significance

There are three areas of vegetation on the property considered to be of conservation significance:

- subtropical rainforest, of which less than 10 per cent of remaining stands in the Illawarra area is in reserves. “Illawarra Subtropical Rainforest” has been listed as an endangered ecological community in the *Threatened Species Conservation Act, 1995*;
- patches of melaleuca shrubland occurring within the black wattle regrowth areas. This grouping is a significant visual feature and contains populations of a nationally vulnerable plant;



Source: Kevin Mills & Associates

Vegetation Communities

- R - Rainforest (closed forest)
- O - Open forest (eucalypt)
- S - Shrubland (Lantana, Acacia, Pittosporum)
- CL - Cleared land

Threatened Species

- C - *Cynanchum elegans*
- D - *Daphnandra* sp.
- Z - *Zieria granulata*

Regionally Rare Species

- A - *Actephila Lindleyi*
- G - *Geijera latifolia*
- L - *Alchornea ilicifolia*
- U - *Austromyrtus acmenoides*

FIGURE 5.6 Vegetation Communities



- a stand of eucalypts falling within the ambit of the “Illawarra Lowlands Grassy Woodlands” classification, which is listed as an endangered ecological community in the *Threatened Species Conservation Act, 1995*.

Apart from some small isolated patches of regrowth rainforest, these areas of vegetation on the property are outside of the area proposed for quarrying and are capable of being preserved as part of the project.

In addition there are several plant species of conservation importance on the property. Three of these species, a vine, a tree and a shrub, are listed in the *Threatened Species Conservation Act 1995* as either endangered or vulnerable. They are also listed as endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*:

- *Cynanchum elegans* – White Cynanchum
- *Daphnandra sp. aff micrantha* (“johnsonii”) – Illawarra Socketwood
- *Zieria granulata* – Illawarra Zieria

None of these species has been found in the area proposed for quarrying. A further nine species considered by Mills to be regionally uncommon were discovered on the property or have been recorded from previous surveys in the area. A few specimens of two of these plant species were found in the proposed quarry area. The location of these finds has been reproduced from Mills’ report on *Figure 5.6*.

Eight part tests in respect of the threatened species and endangered ecological communities are discussed in section 5.10.4.

5.10.3 Fauna

The fauna survey focussed more specifically on the area to be disturbed for quarrying and its immediate surrounds. Fauna habitats in this area and the types of fauna supported are summarised in *Table 5.14*.

Table 5.14 FAUNA HABITATS

Habitat Type	Fauna Supported
Cleared grassland	Introduced species and hardier native birds.
Small patches of regrowth vegetation including rainforest and lantana	Expected to support some fauna species but not rainforest-dependent species in particular.
Small wetlands at the farm dams	Frogs, wetland birds
Isolated fig trees	Various birds and the Grey-headed flying fox

The survey found evidence of 58 animal species: four mammals, 49 birds, three reptiles and two frogs. A species list is included in *Appendix O*. No evidence of threatened fauna species was discovered during the survey, but six species are known to occur in the locality. Mills considered the likelihood that each species could utilise the property and came to a view that only one species, the Grey-headed Flying-fox, a large bat, was potentially affected by the proposed quarry extension.

5.10.4 Eight Part Tests

Eight part tests in accordance with section 5A of the Environmental Planning and Assessment Act have been included in *Appendix O* for three threatened plant species (*Cynanchum elegans*, *Daphnandra* sp. aff. *micrantha* and *Zieria granulata*), one threatened fauna species (the Grey-headed Flying-fox) and two endangered ecological communities (Illawarra Lowlands Grassy Woodlands and Illawarra Subtropical Rainforest).

For the three threatened plant species, Mills observes that no specimens have been discovered within the quarry site. The closest specimens identified on the property are along the edge of the regrowth vegetation following the creek line to the south of the proposed quarry. Mills has recommended that this area be fenced and incorporated into a revegetation area, which would protect the plants. On the basis of the findings of the eight part test, Mills concludes that the quarry extension is not likely to have a significant impact on the three threatened plant species.

The Grey-headed Flying-fox is expected to visit the site in summer to feed on the fruits of fig trees and other rainforest species. Mills observes that thousands of fig trees dot the Illawarra landscape and the large bats can often be seen feeding on them at night. There are seven figs within the proposed quarry area, mostly located on the eastern side where they would not need to be removed for quarrying until towards the end of the 30-year quarry life. Mills concluded that removal of this small number of food trees, will not put the species at risk of extinction or remove a significant area of known habitat. The most important area of habitat on the site for this species is the large area of rainforest to the south of the quarry site. Having regard to this assessment and his recommendation to plant figs in the revegetation area, Mills concluded that the proposed quarry extension is not likely to have a significant impact on the Grey-headed Flying-fox.

The small area of eucalypts on the property, recognised as a remnant of the Illawarra Lowlands Grassy Woodlands, is outside the boundary of the proposed quarry extension. This vegetation community is included within the proposed revegetation area where plantings will utilise species from the same community. Mills concluded that the proposed quarry extension is not likely to have a significant impact on the remnant of the Illawarra Lowlands Grassy Woodlands.

The property contains a significant area of subtropical rainforest along the creekline to the south of the quarry area. There are also several small regrowth stands of rainforest within the area to be quarried. Mills believes that the loss of even the smaller patches is of concern because so little rainforest remains in the district. Provided a major revegetation program is implemented on the land adjacent to the quarry however, Mills believes that the loss of the small regrowth patches will not be significant in the long term.

On the basis of the findings of the eight part tests, Mills concluded that a species impact statement is not necessary for the proposal.

5.10.5 Consideration of Other Relevant Acts and Policies

Mills has considered *State Environmental Planning Policy No 44 – Koala Habitat Protection* and determined that it does not apply to the proposal because no koala food trees occur within the development area.

Similarly, requirements for a separate consent under the *Native Vegetation Conservation Act 1997* do not apply because the proposal is designated development.

The project has been assessed to determine whether reference to the Commonwealth Minister for Environment is required in accordance with the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*. The only areas of potential involvement are “listed threatened species and ecological communities” and “listed migratory species”. Mills considers that the proposed quarry extension will not have a significant impact on endangered species, vulnerable species, threatened ecological communities or migratory species. Hence reference to the Commonwealth Minister is not required.

5.10.6 Vegetation and Habitat Assessment

There are three aspects of the quarry proposal where mitigation measures have been recommended to minimise impacts on flora and fauna:

- ☐ rainforest conservation;
- ☐ fig tree replacement;
- ☐ riparian flows in the creek system.

A substantial revegetation scheme is required to expand the area of rainforest in the buffer zone along the southern edge of the quarry area. This recommendation is based on the quarry boundary as defined in Mills’ report, which is the same boundary proposed in this EIS.

To maintain the diversity of food sources on the property for the Grey-headed Flying-fox, Mills has recommended that plantings in the revegetation area include fig trees and that this should be established from the commencement of the project.

The quarry will alter the pattern of runoff and seepage from the property into the creek along the southern side of the site. Mills has observed that the impact of the quarry on the watercourse vegetation is difficult to predict. In that case an approach based on the precautionary principle has been recommended, where water releases from the quarry are variable to mirror local rainfall events as far as practicable rather than have a continuous release of water. In addition water quality testing is required to ensure the released water is not polluted and in particular, is low in nutrients. Monitoring will be required to assess any gradual changes in riparian conditions and instigate corrective action.

5.10.7 Environmental Safeguards

The recommendations proposed by Mills in *Appendix O* have been adopted into the proposal and are incorporated in the following list of flora/fauna safeguards:

- the land between the southern edge of the quarry and the creek will be maintained as a buffer zone;
- an ecologist will peg a revegetation area within the buffer zone which will then be fenced to prevent inadvertent penetration by vehicles;
- the fence will be installed as a preparatory measure, prior to commencing any excavation or other quarry work;
- as soon as the fence is in place, grazing stock will be removed from the revegetation area and planting will commence;
- planting and ongoing management of the revegetation area will be detailed in the quarry environmental management and rehabilitation plan (EM&RP) and implemented in accordance with the plan;
- all species used for the revegetation program will be selected from the list of local indigenous plants provided in the report by Kevin Mills & Associates;
- all plants for the revegetation program will be sourced from local plants to maintain the genetic integrity of the local species.
- prior to clearing the patches of native vegetation on the quarry site, seeds, cuttings and other propagation material will be gathered for use in the revegetation program;
- weed control and other maintenance in the revegetation area will be carried out for the duration of the quarry life and rehabilitation in accordance with the EM&RP;

- the revegetation area will be inspected annually by a suitably qualified person with a report prepared for incorporation in the quarry's annual environmental report;
- water will be released from the quarry site on a varied basis, mirroring local rainfall as far as possible;
- the riparian environment along the creek line will be monitored annually to assess the need for any revision of the water release program, with a report prepared for incorporation in the quarry's annual environmental report.

5.11 LANDSCAPE AND VISUAL CHARACTERISTICS

5.11.1 *Existing Landscape*

Viewed from the east or north, the existing landscape of the Wentworth Hills in the vicinity of the quarry site features elevated grassy hill slopes with some patches of remnant tree cover present in the gullies and on steeper land. Good rainfall and basaltic soil result in the hills usually having a lush, green appearance. The hilly country falls steeply to flatter, swampy lowlands in the Dunmore/Minnamurra area. Farmhouses are widely scattered, a few sited on ridge tops but most on lower slopes. These dwellings have associated outbuildings and a concentration of mature trees, grown from plantings within the house curtilage. This green hilly area is part way between the coast and the timbered Illawarra escarpment, both of which provide backdrops to various views obtainable in the area.

There is little opportunity for the general public to view the vicinity of the quarry site from the south or west as nearby higher ridges in these directions largely curtail views. From accessible ridge top locations and within the properties controlled by quarrying companies however, the extent of quarrying activities behind the façade of green hills becomes apparent. Shellharbour City Council and the quarrying companies have carefully maintained the green presentation when viewed from publicly accessible land external to the hills to avoid the appearance of hillsides altered by extractive industries.

Photographs 7 to 10 show various aspects of the area, all viewed in the direction of the quarry site. The bulk of the quarry site is not visible in distant views as it is shielded by the slopes of the Wentworth Hills. The hilltop to the north west of the quarry (near "Kyawana") may be discerned from several kilometres away in the Dunmore/Minnamurra area. A V-shaped section of the slope to be quarried below "Kyawana" can be observed through a break in the hills from the south-east.

In 1996 Shellharbour City Council published baseline studies for its Rural Lands Study. The report included a visual landscape assessment, based on methods



PHOTOGRAPH 7 Looking west from Shell Cove estate. "Belmont" is on the ridge just left of centre. "Kyawana" hillcrest is barely visible above the ridge in the centre of the photograph.



PHOTOGRAPH 8 View north-west from the Princes Highway. "Kyawana" hillcrest is in the centre above the distant grassy slope.



PHOTOGRAPH 9 View north-west from Dunmore Lakes estate. This view is directly along the creek valley. The quarry extension will occupy the distant grassy triangle in the centre.



PHOTOGRAPH 10 Looking South from Green Meadows estate towards the north side of the "Kyawana" hill crest.

developed by EDAW (Australia) Pty Ltd. The study objectives included examining and recording the scenic qualities of the rural landscape and assisting in identifying areas needing protection to preserve the visual resource. The extractive industry sites in the Croom area fall within the Dunmore visual sub-region. The study notes that existing quarries remain well concealed by ridgelines and vegetation and are not visible from the major transport routes. The visual quality of this landscape is considered important because it is the entry to Shellharbour from the south and provides a rural buffer between urban areas of Shellharbour and Kiama. In the vicinity of the proposed quarry extension the highest visual management priority was assigned to land that can be viewed from the Princes Highway.

5.11.2 Proposed Development

The proposal will alter the visual characteristics of the immediate area through the following works:

- overburden and rock extraction;
- haul road;
- sight and noise bunds and screening vegetation on ridge tops; and
- infill planting in the revegetation area in the valley south of the quarry.

The quarry will progressively consume the area of land designated for extraction, replacing the green hill-slope with a steep-sided pit containing work areas, stockpiles, water storage and roads. Grass stabilisation of completed areas will become evident as the extraction progresses towards the east. Natural topography will generally restrict views into the quarry floor to the immediate vicinity.

The haul road will be fully constructed from the outset, the western section being on the surface and the eastern end in cut. The road will appear as a 14-metre wide unsealed carriageway with table drains on both sides. The section in cut is not parallel to the viewline extending from the Dunmore area to the ridge top (via the creek valley), thus limiting potential exposure of the cut from distant views.

The sight and noise bunds to be constructed on the ridge tops will initially appear as deposited earth on grassed paddocks, but after a few months of vegetation (grass) growth will become green embankments. Planted shrubs and trees will take longer to become established, but will ultimately shield the embankments and assist to screen views from external areas into the development site.

Infill planting in the revegetation area will alter the appearance of the creek valley by broadening the band of vegetation and replacing existing grassy patches with a forested appearance. This alteration will only be visible from the quarry site and immediately adjacent land.

5.11.3 Visual Impact Assessment

The visual impact of a development is a function of three factors:

- visibility of the development;
- sensitivity of likely viewers; and
- visual effect of the development in its context.

i. Visibility

Visibility is a measure of the exposure of the object to view from its surroundings. Based on inspection of views towards the site from publicly accessible land in all directions, and careful examination of aerial photographs and topographical mapping, potential viewing directions may be summarised as follows:

- middle distance views from the Greenmeadows Estate and nearby residential areas to the north;
- short distance views from within the property and from other land owned by quarrying companies to the south and west;
- short distance views from Dunsters Lane and parts of the dairy farm immediately north of the site;
- middle/long distance views from new residential development east of the Princes Highway; and
- long distance views from the Dunmore and Minnamurra areas to the south east.

Potential viewing directions are shown on *Figure 5.7*.

The only parts of the development potentially visible from residential areas to the north are the sight bund and associated vegetation planting beside the haul road. The existing ridge system completely obscures the proposed quarry from views from settled areas to the north.

To the south and west, the countryside is steeply undulating leading to a high ridge, exceeding 170 metres AHD, located about one kilometre from the quarry site. This high ground will prevent views of the development from areas to the west, south-west and south of the ridge system. The proposed Cleary Bros quarry will be visible from intervening land, owned by Readymix and occupied by existing quarries.

Dunsters Lane and the adjoining dairy farm on the ridge immediately north of the site will provide some viewing opportunities into the upper parts of the development. This ridge top area already offers direct views into the Readymix quarries to the south. Views from this area will be restricted by the natural fall of the

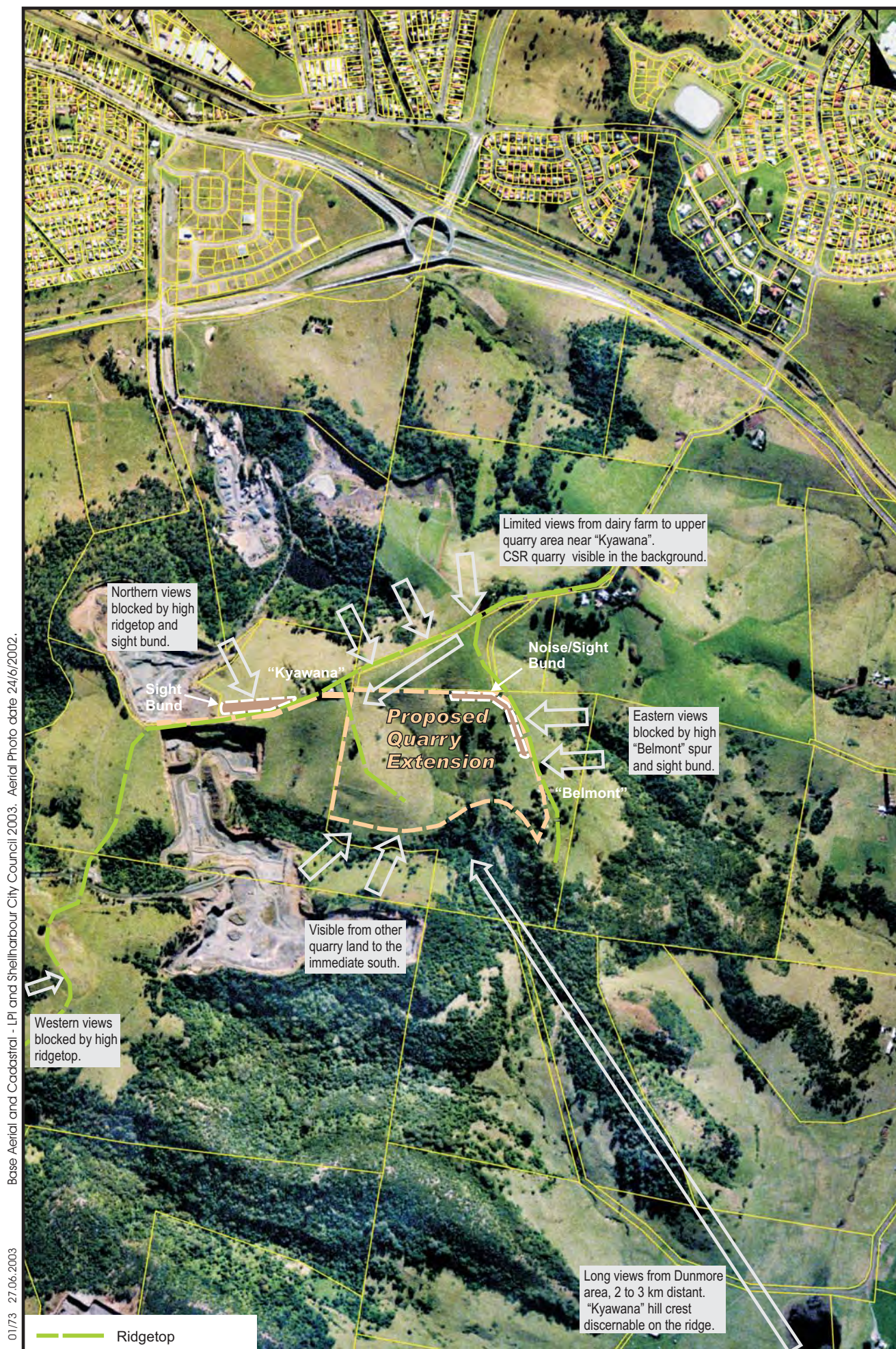


FIGURE 5.7 Potential Viewing Directions



land, the noise bund to be constructed along part of the northern side of the proposed quarry and by tree and shrub planting proposed on the bund and beside the haul road. There would be little opportunity to view the development from “The Hill” homestead located on the dairy farm because of the topography, the above screening measures and the visual barrier of trees around the house. Similarly, the site approved for a further rural cottage on that property is located to the east of the proposed quarry, where views will be screened by the earth berm to be constructed around the north east corner of the site.

The eastern spur on the property containing “Belmont” effectively blocks views into the site from new residential development east of the Princes Highway. The hilltop containing “Kyawana” is just visible over the crest of the spur, but this view will be blocked by the vegetated earth berm proposed for the “Belmont” spur.

The creek draining the quarry site flows from the hilly country through a ravine to the south-east. The ravine provides a V-shaped view corridor from distant areas at Dunmore and Minnamurra, some two to three kilometres from the site. Through this corridor the uppermost section of the property in its north-west corner may be discerned in the expansive ridge setting.

ii. Sensitivity

Viewers within the quarry site or on the adjoining Readymix property would be standing on land used for quarrying and in proximity to existing quarries. Persons on that land would have a low visual sensitivity to quarry infrastructure.

Persons present in Dunsters Lane and the adjoining dairy farm would have a moderate sensitivity to quarry infrastructure. The reason is that existing quarries can already be seen from these areas and Dunsters Lane provides access only to the dairy and the quarry properties, hence it is not in any sense a scenic route. “The Hill” residence itself is considered a more sensitive viewing location from which is desirable to minimise any views of quarry infrastructure, although this has already been accomplished by the grove of trees surrounding the buildings.

Persons viewing the hilly country from residential areas to the north are also considered to be highly sensitive to any quarry infrastructure.

Long distance viewers from the south east will have a moderate sensitivity to alterations to the view because of the scenic nature of the general area. The long distance to the proposed quarry means that any alteration would have to be substantial before these viewers would dwell upon it. Most viewers from the south-east would be highway travellers, normally considered to have a low sensitivity, except when passing through particularly scenic locations. An existing quarry face at Boral’s Dunmore quarry appears in the middle ground from these viewing locations.

iii. Visual Effect

The visual effect of the development is the manner in which it interacts with or alters the view. When a view that is substantially green (vegetation) becomes mostly brown (disturbed soil), there is a high visual effect. If the view is already disturbed or the change is small, screened or far away then the visual effect can be substantially reduced.

From residential areas to the north and east, the visual effect will be almost negligible. The only disturbance visible will be temporary while sight bunds are constructed on the ridge top. The disturbance will return to green within months to blend in with the remainder of the ridge line.

From within the properties owned by quarrying companies, the visual effect will be low. Existing quarries are already extensively visible in that valley so the development will be in an appropriate context.

From the adjoining rural property to the north, the appearance of quarrying activities contrasts with that of a dairy farm. The effect is lessened however, because:

- only a small part of Cleary Bros' quarry extension would be visible and then only from a limited part of the farm; and
- a more extensive area of quarrying is already visible in the same south westerly view, appearing immediately behind the small section of Cleary Bros' land that is currently visible.

It is unlikely that there will be any significant view of the development from "The Hill", and limited views from the site approved for a future rural cottage, where the principal aspect is to the east. Hence the visual effect from the dairy farm is considered low.

The visual effect from the south east will be low because of the separation distance, the appearance of an existing quarry face at Dunmore, the very minor segment of view to be affected and the benefit of obscuring vegetation to be planted beside the haul road where it passes through the "Kyawana" hill crest. The upper section of the western quarry wall will be visible from the south east through a V-shaped break in the hills, but owing to the separation distance and small segment of the view affected, the visual effect is considered to be low.

iv. Visual Impact

The visual impact of the development is a combination of the above factors, as summarised in *Table 5.15*. The visual impact is predicted to be low.

Table 5.15 VISUAL IMPACT ASSESSMENT SUMMARY

Viewing Location	Visibility (of the site)	Sensitivity (of likely viewers)	Visual Effect (of the alteration)	Assessed Visual Impact
Residential areas to the north and east	Sight bund is the only visible feature	High	Negligible, after revegetation	Low
Land owned by quarry companies to the south	Direct views of the quarry and haul road	Indifferent	Consistent with existing quarries	Negligible
Dairy property to the north	Views limited by bunds, topography and vegetation.	On Farm: Low At House: High	Low	Low
Long views from Dunmore and Minnamurra areas	North-western part of site visible through V-shaped break in hills	Moderate	Low, after revegetation near haul road	Low

5.11.4 Environmental Safeguards

In a number of cases the assessed visual impact is dependent upon screening vegetation, either planted upon a bund wall or elsewhere on the site. To ensure the effectiveness of the planned screens the vegetation will be nurtured, maintained and supplemented to ensure that the intended screening function is achieved and maintained. Monitoring of the vegetation screens will be carried out on an annual basis as set down in the environmental management and rehabilitation plan. The following steps will be incorporated into the plan:

- examine sight bunds after construction to confirm effectiveness;
- nurture and maintain plantings, every three months for the first year, thence annually;
- assess the effectiveness of vegetation screens every year with infill or additional planting as required;
- reassess visual impact of the quarry and haul road at the commencement of Stage 2 when the quarry moves to the north west corner of the site, with appropriate remedial action if necessary.

5.12 INDIGENOUS HERITAGE

The area of the proposed quarry extension has been the subject of two investigations of Aboriginal archaeology:

- Robert Paton Archaeological Studies Pty Ltd (1998)
- Mary Dallas Consulting Archaeologists (2001)

5.12.1 *Investigation by Robert Paton*

As part of planning for an extension to Cleary Bros Albion Park quarry Robert Paton Archaeological Studies Pty Ltd undertook a study of Aboriginal archaeological sites on the land under consideration. The report of this investigation, dated May 1998, was submitted to Shellharbour City Council in support of Cleary Bros rezoning application and is included as *Appendix P*. The area examined by Paton included the land subject to the current development applications together with part of the adjoining property to the east (Lot 7 DP 3709), which at that time formed part of the study area.

The study's aims were as follows:

- locate and record any Aboriginal sites in the proposed development area;
- consult with the local Aboriginal community regarding the proposed quarry extension; and
- identify any constraints that may be placed on the quarry expansion in respect of Aboriginal heritage.

Paton noted that no systematic archaeological survey work had previously been undertaken in the immediate region. A predictive statement was developed based on previous studies along the south coast and hinterland areas. Paton suggested that any archaeological sites possibly affected by the quarry extension would be located on the ridgelines and at lower elevations near the creek confluences.

During the field survey all tracks were walked and all areas examined where sufficient surface visibility was available. No Aboriginal sites were discovered during the survey, although Paton notes that ground surface visibility was very poor due to the heavy grass cover. A representative from the Illawarra Local Aboriginal Land Council was present during the inspection.

Paton recommended that owing to the poor surface visibility, further archaeological investigation be undertaken in accordance with the predictive statement. Test

excavation was recommended on the two ridges and at the creek confluence, with some limited testing outside these zones to test the predictive model.

5.12.2 Investigation by Mary Dallas

In preparing the local environmental study (LES) for the rezoning proposal, Shellharbour Council's consultant, Connell Wagner, engaged an archaeologist, Mary Dallas Consulting Archaeologists, to undertake further investigations. The report from the Dallas investigation is included in the LES, to be publicly exhibited in conjunction with this EIS. The objectives of this further archaeological study are summarised as follows:

- revisit the site with representatives of the Illawarra Local Aboriginal Land Council and initiate contact with the Wodi Wodi Tribal Elders Corporation to determine the current interest of these organisations in the land;
- undertake background research, prepare a predictive model of the potential for unrecorded sites and in this light review the previous archaeological survey;
- carry out a survey of the area in consultation with representatives of the two Aboriginal organisations, identify and record any Aboriginal sites and assess the potential for unrecorded sites to occur;
- prepare an appropriate report of the findings including management options and recommendations.

Mary Dallas inspected the site in December 2000 accompanied by the Illawarra Local Aboriginal Land Council representative who had been present during the Paton survey three years earlier. This representative is also the spokesperson for the Wodi Wodi Tribal Elders Corporation. Dallas describes the survey as comprehensive, but again no Aboriginal sites were identified. Dallas notes that while poor surface visibility was present in some parts of the quarry area, the locations most likely to contain Aboriginal sites had exposed surfaces with reasonable to good visibility, resulting from erosion, rock exposure, animal tracks, vehicle tracks, cuttings and dam construction.

Paton's areas of archaeological potential or sensitivity (creeklines and ridgelines) were re-inspected and found to be disturbed, with exposures of bedrock and little or no soil development. Dallas assessed these areas as having low to minimal potential to contain significant archaeological relics. Surface artefact scatters may be present but are unlikely to be substantial owing to the exposures of latite and likely shallow depth of potential artefact bearing deposit. Dallas observed that while the quarry site may contain some evidence of past Aboriginal use, such evidence is likely to result from sporadic use of the land by people moving between more favourable locations on the coast and hinterland plateau.

On this basis Dallas recommended that no further archaeological survey is required and further investigation by way of test excavation is not warranted. Letters from the Illawarra Local Aboriginal Land Council and the Wodi Wodi Tribal Elders Corporation attached to the report support the recommendations of Mary Dallas.

5.12.3 Assessment of Impact

Consistent with the recommendations of the more recent assessment by Mary Dallas, it is not proposed to undertake test excavations on the site to search for sub-surface artefacts. It is concluded the proposal is unlikely to have a significant impact on Aboriginal archaeology or cultural heritage.

It is an offence to knowingly disturb or destroy an archaeological relic or to disturb land for the purposes of discovering or moving a relic except in accordance with a permit issued by the Director-General of National Parks and Wildlife. Should any finding be discovered in the course of preparing or working the quarry site, which is suspected of being an archaeological relic, the National Parks and Wildlife Service would be informed and the advice of a professional archaeologist obtained before any further disturbance to the finding occurs.

5.13 NON-INDIGENOUS HERITAGE

Dr Iain Stuart of HLA Envirosciences has prepared a non-indigenous heritage assessment of the proposed quarry extension, included as *Appendix Q*. The report:

- researches the history of the area since European settlement;
- describes the physical evidence of historic settlement in the area of direct impact;
- analyses the cultural landscape;
- assesses the heritage significance of the landscape and the relics it contains; and
- recommends management and mitigation strategies for non-indigenous heritage features affected by the proposal.

The following discussion includes a summary of the report.

5.13.1 Settlement History of the Area

Squatters were the first non-indigenous settlers in the region, grazing stock in the coastal hinterland after 1812. Within a decade Governor Macquarie had granted large tracts of land to “respectable gentlemen”. The range of hills separating Lake

Illawarra and the Kiama district was within the land granted to D'Arcy Wentworth and became known as the Wentworth Hills. After Wentworth's death the land was subdivided resulting in Catherine Darley, one of Wentworth's daughters, obtaining title to most of the Wentworth Hills in 1851. The land passed to her son who maintained ownership until his death in 1899. During this period it is surmised that Joseph Dunster became a tenant, establishing his family at "The Hill". The Dunster family became prominent in development of the dairy industry in the Shellharbour district.

In 1901 the Darley estate was broken up, William Charles Dunster purchasing some 220 acres including "The Hill" and Walter Dunster, an absentee landlord, purchasing some 112 acres including the site of the proposed quarry extension. In December 1912 Samuel Hercules McDonald purchased Walter Dunster's holding. It is likely that "Belmont" house and farm date from this period as the building appears on the 1932 "Kiama" (inch to the mile) topographic map. McDonald's sons inherited the land in 1948. The formal road reserve leading from Dunster's Lane to "Belmont" farm was resumed in 1956.

"Kyawana" is located on an adjoining holding to the west, given to Robert Wentworth in the break up of the Wentworth estate. The land came into the ownership of George Fuller in 1879, who allowed quarrying on his land from 1880. A plan of subdivision was registered for this land in 1921 showing improvements such as fences, buildings and dams. "Kyawana" does not appear on the plan, but is present on the 1932 "Kiama" topographic map, suggesting that "Kyawana" was constructed in the decade following the 1921 subdivision.

The history of the area is associated with development of the dairy industry in the Illawarra region. The Dunster family played an important part in that development within the Shellharbour area, having achieved a long period of continuous occupation and dairy farming on the Wentworth Hills. Quarrying has a similar long period of association with the Wentworth Hills.

5.13.2 Physical Evidence in the Area of Direct Impact

i. Dry Stone Walls

The area of the quarry extension contains physical evidence of early settlement in the form of fences and farm dams. Two sections of stock fence within the quarry area have been constructed of stone and are referred to as dry stone walls. These fence sections are 25 and 109 metres long and appear to have been constructed to enable post and wire fence lines to be continued over exposed or shallow rock where installing fence posts with hand tools would have been impossible. The walls also provided a use for loose boulders collected from the grazing area where they would have inhibited grass growth and presented a hazard to stock. The stone walls are

located only on the Belmont farm suggesting they were constructed after this property came under separate management in 1912.

The rezoning application submitted to Shellharbour City Council in 1998 included a report on the condition of the stone walls and the feasibility of relocation. The report prepared by Geoff Duggan of Dry Stone Walling Australia is included as *Appendix R*. The report examines the two walls within the quarry area and a third longer wall located just east of “Belmont” and not affected by the quarry. The report concludes that the three walls have deteriorated significantly and would require major repairs to restore them to functional and lasting structures. In effect, for 90 per cent of their length the walls would have to be fully dismantled and rebuilt from ground level. Relocation is feasible from a practical perspective, as the walls characteristically have no mortar.

There are a series of farm dams and wire fences located within the area designated for quarrying.

ii. “Belmont”

Belmont is a weatherboard house with corrugated iron roof designed to take advantage of the extensive coastal views to the east. The fenced curtilage contains a garage, several sheds, vegetable garden and ornamental plantings. The entrance road passes beside a row of planted coral trees.

“Belmont” will not be physically altered by the quarry extension, although there will be nearby changes affecting the property:

- the existing entrance road will be relocated to the east to parallel the power line servicing the house;
- a three-metre-high earth berm will be constructed in the location of the current entrance road and coral trees, extending about half way from the northern property boundary towards the house, obscuring westerly views from part of the access road and farmland.

iii. “Kyawana”

“Kyawana” is overgrown with vegetation and has fallen into disrepair, being described by Stuart as derelict. The building is of timber construction with weatherboard cladding and corrugated iron roof. Sleep outs are in compressed cement sheeting. Surrounding outbuildings have been partly demolished except for the dairy.

Stuart considers that the outbuildings and dairy may have some potential as industrial archaeological sites, possibly containing information about the changing nature of the dairy industry.

The location of relics within the area of direct impact is shown on *Figure 5.8*.

5.13.3 Cultural Landscape

A cultural landscape is formed by the interaction of the environment with historical patterns of land use and human behaviour. Dairy farming has been the principal land use on the ridge top areas of the Wentworth Hills since the 1840s. Quarrying has been underway for almost as long but has tended to occur on the lower slopes.

Dairy farms in the area generally contain a mixture of steep and flatter land: arranged either with the farm house on the main ridge and some land running down the slopes (The Hill, Belmont, Kyawana, Croome Farms, Glenbrook) or with the farm house on the lower slopes and some land running up the slopes (St Ives, Rosemont, Kurrawong and others). Generally the dairy has been located close to the farmhouse. All but the steepest slopes have been cleared of the original rainforest. Paddocks are delineated with stock fences and some have improved pasture and farm dams.

This cultural landscape has been slowly changing owing to increased urbanisation on the northern and eastern sides of the Wentworth Hills and the slowly expanding quarries within the hills and to the south east.

5.13.4 Heritage Significance

Stuart assesses heritage significance by considering the broader cultural landscape first and then evaluating the individual items within the landscape likely to be affected by the quarry extension. The cultural landscape is assessed against the criteria included in the guideline *Assessing Heritage Significance* published by the NSW Heritage Office. In summary, the Wentworth Hills cultural landscape is consistent with a number of the assessment criteria. In particular the landscape has:

- historic association with nationally and locally important individuals;
- a significant historical role in development of the Illawarra dairy industry; and
- an ability to demonstrate the important characteristics of a dairy farm and provide information on the history of dairying through analysis of the landscape over time.

Given the historic extent of the dairying industry in coastal New South Wales however, Stuart considers the cultural aspects of the Wentworth Hills landscape unlikely to be unique. The heritage significance of the cultural landscape is

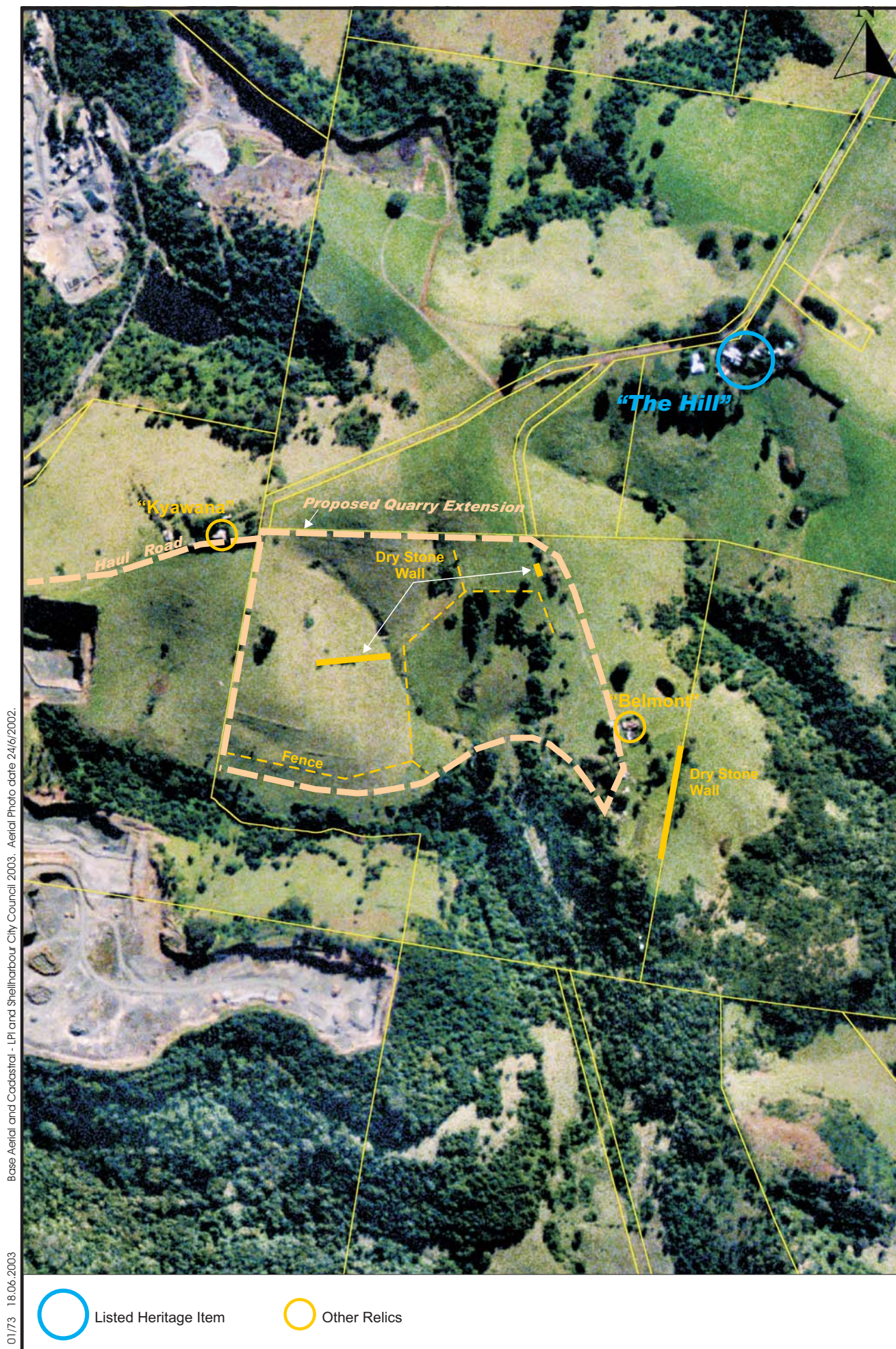


FIGURE 5.8 Location of Heritage Items and Relics



considered to be at the local rather than State level because of the existence of similar settlement patterns that can be observed elsewhere in the New South Wales coastal hinterland.

The assessment of individual heritage items within the landscape is summarised in Table 5.16.

Table 5.16 ASSESSMENT OF HERITAGE SIGNIFICANCE

Heritage Item	Assessed Significance	Reason
"The Hill" (as a farm within the landscape)	High	This farm was established in the 1860s and demonstrates all of the significant attributes of the Wentworth Hills cultural landscape. Previous heritage studies, the <i>Illawarra Regional Heritage Study Review</i> (DUAP) and the <i>Shellharbour European Heritage Study</i> (Shellharbour City Council), have focussed on the house itself rather than the farm, identifying the house as having heritage significance.
"Belmont" and "Kyawana" farms	Moderate	These farms were established at least half a century later than "The Hill" and therefore cannot contain evidence of earlier dairying activity.
Dry stone walls	Moderate	Although a distinctive and rare landscape feature in this area, they are poor examples of stone walling practice.
Fences and dams	Little	While contributing to the dairying landscape these are common features with no particular heritage significance.

5.13.5 Statutory Listings

During March 2003 the Commonwealth Register of the National Estate and the State Heritage Register were searched, revealing that there were no items listed on these registers within or near the proposed quarry extension.

Illawarra Regional Environmental Plan No 1, 1986 lists "The Hill" as an item of environmental heritage. Before consenting to development in the vicinity of "The Hill" the REP requires the consent authority to assess the effect of the development on "The Hill" and its setting (Clause 128).

Shellharbour Local Environmental Plan 2000 also lists "The Hill" as a heritage item, grading it to be of State significance. Clause 75 of the LEP contains a requirement for

the consent authority to take into account the effect of proposed development on the heritage significance of “The Hill” and on its setting.

The effect of section 139 of the Heritage Act 1977 is to require a permit to be obtained from the Heritage Council prior to disturbing any “relics” on the quarry site. Relics are defined in the Act to mean any deposit, object or evidence relating to the early non-indigenous settlement of the land and which is more than 50 years old. This requirement will apply in respect of removal of dry stone walls, “Kyawana” and any of its outbuildings and unless covered by exemption, any farm dams or old fences.

A permit issued pursuant to sections 139 and 140 of the Heritage Act is not an approval listed in section 91 of the EP&A Act for which the provisions of integrated development apply.

5.13.6 Assessment of Impact

The quarry extension will require removal of all heritage features within the area to be quarried and within the footprint of ancillary structures such as the haul road and earth berms. Such heritage features include farm dams, fences, dry stone walls and part or all of “Kyawana” and its associated outbuildings. The stone walls and “Kyawana” have been assessed as having moderate heritage significance. While removal of these relics will result loss of physical evidence of historic settlement, it is possible to record the details so the information is not lost. Section 5.13.7 describes mitigation measures in respect of these features.

The quarry extension will also affect the Wentworth Hills cultural landscape primarily to the extent that part of the quarry can be viewed within this landscape. As indicated in the visual impact assessment (section 5.11) there is very little potential for the quarry to be viewed from the lowlands surrounding the Wentworth Hills other than a distant view of a limited part of the site from the Dunmore area.

Of more significance is the view from farmland within the main ridge itself. The view from “Belmont” and its remaining grazing lands will be altered by the earth berm constructed near the access road on that property. This will screen the quarry (and the nearby Readymix quarry) from the road but will not alter the main aspect of “Belmont” farm, which is to the east. Earth berms and screening will also limit the view from “The Hill” farm, where the farmhouse is further away and surrounded by a grove of fig trees. Again, screening to be developed as part of the proposed quarry extension will also assist to reduce the existing impact on the landscape created by the neighbouring Readymix quarry.

5.13.7 *Management and Mitigation Strategies*

The following measures will be undertaken to mitigate the impact of the proposal on non-indigenous heritage.

- undertake survey and archival recording of the dry stone walls and fences as part of archiving all evidence of farming activity within the area of direct quarry impact;
- make a thorough archival recording of “Kyawana” and associated structures following NSW Heritage Office *Guidelines for Archival Recording*;
- undertake pre-quarrying surveys of “Belmont” and subject to owner agreement, “The Hill”, to establish the existing condition of these houses;
- screen the quarry as far as practicable from “The Hill” and “Belmont” by boundary plantings including plantings in the road reserve leading to Belmont. The siting and nature of plantings are to be set out by a landscape architect having regard to the cultural landscape of the Wentworth Hills; and
- nurture and maintain heritage screen plantings throughout the life of the quarry, with augmentation and replacement from time to time as required.

Clery Bros intends to preserve the stones recovered from the dry stone walls by using them to construct a dry stone entrance feature to the company’s processing plant.

5.14 SOCIO-ECONOMICS

5.14.1 *Strategic Value of the Resource for New South Wales*

In August 2000, the Department of Mineral Resources published an assessment of future demand for coarse aggregate in the Sydney region. The report reveals that Sydney’s demand for coarse aggregate continues to exceed local supply, with the shortfall in local production more than doubling over the last 20 years to 2.5 million tonnes per annum. The shortfall has been supplied from sources outside the region, principally from Shellharbour and Kiama local government areas.

Two of the four main sources of good quality coarse aggregate in the Sydney region, the Penrith Lakes Scheme and Prospect Hill, are predicted to be exhausted shortly after 2010. In the absence of other major sources being developed in the Sydney area, it is predicted that after 2010, importation of coarse aggregate to the Sydney region will increase significantly.

The report identifies an urgent necessity to develop a strategy for sourcing and transporting large quantities of aggregate from outside the Sydney region. A key element in the strategy is the need to protect currently operating quarries and proven resources from unnecessary sterilisation resulting from narrowly focussed planning decisions.

Cleary Bros has not in the past supplied coarse aggregate to the Sydney region and has no plans to do so in the future. The company has instead preferred to concentrate on helping to meet the demand for aggregate in the Illawarra area. Most of Cleary Bros competitors in the Shellharbour/Kiama area supply coarse aggregate into the Sydney region. It is predicted that these suppliers will divert an increasing proportion of their production towards Sydney over the coming decade as Sydney demand increases. During this period it is likely that construction industry in the Illawarra area will become more reliant on Cleary Bros to supply products containing coarse aggregate from its Albion Park quarry.

5.14.2 Importance of the Quarry for Cleary Bros

Cleary Bros produces concrete through a vertically integrated organisational structure where the company undertakes a number of successive operations, including extracting and processing hard rock and sand, transporting these materials to the company's batching plants, concrete batching and delivery to the end user. This structure gives Cleary Bros control over its major material supplies and other cost inputs enabling competitive pricing to be maintained. The benefits from the integrated structure accrue to the company in the form of sustained production and profits and to the community in the form of price competition that works to hold down concrete prices.

Should Cleary Bros be unable to secure continued access to a controlled source of hard rock and thereby become reliant on its competitors for this vital resource, the competitors would be in a position to squeeze Cleary Bros' profit margins until the concrete business became uncompetitive. In these circumstances the closure of Cleary Bros Concrete Division is seen as inevitable in the medium term. This may have repercussions for the viability of the entire Cleary Bros Group.

5.14.3 Economic Analysis

In September 1998, Gillespie Economics prepared, on behalf of Cleary Bros, a preliminary benefit-cost analysis and economic assessment of the proposed extension to the company's Albion Park quarry. This assessment was submitted to Shellharbour City Council as part of the application for the subject land to be rezoned.

The Gillespie report considered the rezoning and quarry extension within two economic frameworks:

- benefit-cost analysis to assist consideration of the economic efficiency or net community welfare impact of the proposal;
- regional economic analysis to assist consideration of the contribution of the quarry to direct and indirect regional output, value added, income and employment.

The benefit-cost analysis placed indicative dollar values on a range of potential economic costs and benefits of extending the quarry. The analysis showed that the net present value of benefits over costs would be in the order of \$19 million (1998 dollars). Externality benefits and costs were not quantified. Such benefits include the pricing advantage to the community in maintaining competition and the surplus to Cleary Bros quarry-reliant operations, such as concrete making. Externality costs include environmental impact. The economic efficiency of the proposal would only come into question if the net costing of externalities were to exceed \$19 million (1998 dollars).

The regional economic analysis showed that if Cleary Bros were to cease quarrying at Albion Park, the minimum medium term impacts on the Illawarra regional economy would be those associated with

- cessation of quarrying at Albion park; and
- closure of the Concrete Division of Cleary Bros as a result of becoming uncompetitive.

In these circumstances the economic impact was conservatively estimated to be the annual loss of some \$20 million in direct and indirect regional output, \$8 million in direct and indirect value added including \$4.3 million in wages and in the order of 94 jobs (1998 dollars).

5.14.4 *Effect on Dairy Farming*

At the present time Cleary Bros allows the land affected by the proposed quarry extension to be used for cattle grazing associated with the neighbouring dairy farm managed from "The Hill". The opportunity for the dairy farm to use this land will be lost as the quarry expands across the property. Agricultural consultants, Cowman Stoddart Pty Ltd investigated the likely impact of the quarry extension on the continued operation of "The Hill" dairy farm. In undertaking the report Cowman Stoddart visited the farm and spoke to Ms Susan Dunster. A report of the investigation is included as *Appendix S*.

Cowman Stoddart reports that the dairy farm has a milking herd of about 110 cows and a further 40 dry cows. Dry cows and some younger stock are grazed on Cleary

Bros' land and other land owned by Readymix. Issues raised by the Dunsters and considered by Cowman Stoddart with regard to the dairying enterprise include:

- abortion in cattle
- effect of dust on pasture
- use of Dunsters Lane by quarry vehicles;
- loss of grazing land; and
- landslip on the quarry boundary.

Information was presented indicating that about five cows abort per year. Cowman Stoddart observed that this is within the five per cent of herd that is the natural limit accepted by veterinarians and is not necessarily correlated with quarry blasts.

With regard to dust, Cowman Stoddart quotes the results of research in the Hunter Valley where it has been found that mine generated dust has no measurable effect on pasture palatability to dairy cattle, the willingness of dairy cattle to graze such pasture or their milk production.

Dunsters Lane will not be used by quarry vehicles or for any other purpose associated with operation of the quarry. In the interim period, prior to construction of the haul road, it may be used infrequently for access to the property for investigative and survey purposes.

Cowman Stoddart observes that it is common practice for dairy farms to be used solely for the milking herd and for dry cows to be located on a separate property accessed by motor vehicle. The progressive loss of grazing land on the quarry site will require the Dunsters to find other land to lease in the area for a dry run, but in the opinion of Cowman Stoddart will not mean the end of dairying at "The Hill".

Cleary Bros will ensure that there is no instability associated with the boundary of the quarry site so that there is no risk of landslip on the Dunsters' property.

In addition Cleary Bros will continue to allow pastureland on its properties to be grazed until the land is needed for operations. Should any significant weed infestations develop associated with the quarry, Cleary Bros will take appropriate action to suppress the outbreak. Pastures will be managed and maintained in good condition to avoid any deterioration of the suitability of the remaining land for continued use in association with the dairy.

5.14.5 Social Impact

Having regard to the circumstances of the application, being for a continuation of an existing quarry on company land using an existing workforce, it is apparent that the proposed extension of Cleary Bros' Albion Park quarry will not create significant

social impacts nor will it alter demand for social infrastructure in the local area or Shellharbour as a whole. In particular, the proposal will not cause:

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

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

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

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

5.15 PUBLIC HEALTH AND ENVIRONMENTAL HAZARDS

5.15.1 Occupational Health and Safety

The health and safety of the quarry workforce, persons on surrounding properties and the community at large will be at the forefront of site management procedures. The welfare of the workforce will be protected by strict observance of occupational health and safety protocols required by WorkCover and the Department of Mineral Resources.

5.15.2 Security Fencing

Secure manproof fencing of the operational area will deter unauthorised personnel from accessing the site from adjoining lands. In addition to stock fencing maintained along the property boundaries, a two-metre high chain wire fence will be erected around the operational area and patrolled weekly to confirm that there are no breaches and that any access gates not in use are locked. The fence will carry signs warning of the excavation and will closely fit the ground profile to deter animal passage.

5.15.3 Blast Warning

Blasting will be managed so that persons outside the boundary fence are not at risk from blasting debris. Nevertheless the audible blast warning will be sufficiently loud to be heard beyond the security fence, alerting any persons nearby. Notices on the fence will explain the nature and purpose of the blast warning.

5.15.4 Hazardous Substances

Hazardous substances will not be stored at the quarry. In particular, specialists will bring explosives to the site whenever blasting is to take place and remove all unused materials the same day. Fuels and lubricants will be brought to the quarry during the day as required for fuelling and maintaining plant and removed when those operations are complete.

Should there be a need for herbicides or pesticides to be used these will be brought to the quarry for the particular use and then removed.

The quarry will not emit or release any materials to the air, water or soil in such concentrations as would constitute an environmental hazard. The very little waste produced will be primarily from machinery repairs and maintenance.

5.15.5 Bushfire Management

The Shellharbour Rural Lands Study identifies the bushland areas in the gully on the property as being generally of high fire risk, notwithstanding that some of this bushland is rainforest. Currently, the land affected by quarrying is primarily grass-covered and outside the high fire risk area. The quarry itself will not contain flammable materials except as associated with mobile plant and being mostly exposed rock will retard the passage of any grass fire on the property. In this regard the quarry will serve as a fire break, obviating the need for any peripheral clearing for this purpose.

The following measures will be adopted to assist in managing the risk from bushfire:

- sufficient water for fire fighting and fire fighting apparatus will be maintained on the property and periodically checked during the bushfire season;
- procedures will be developed for responding to bushfires threatening the quarry plant or the property and included in the emergency response procedures in the environmental management and rehabilitation plan;
- staff training will include familiarity with fire-fighting procedures; and

- drills will be carried out from time to time to ensure equipment readiness and staff familiarity with equipment and procedures.

The presence of the quarry and its workforce will be of assistance to the rural bush fire brigade, by increasing manpower and facilities available to fight bushfires.

5.16 CUMULATIVE IMPACTS

5.16.1 Overview

Hard rock is being extracted from a number of locations in and around the Wentworth Hills, extending from Stockyard Mountain to Bass Point. Given the importance of this resource for the construction industry and the area of land already zoned or approved for extraction, it can be anticipated that the quarrying industry will continue to extract from the Shellharbour district for many decades into the future.

The proposed extension to Cleary Bros' quarry will operate concurrently with other undertakings extracting the hard rock resource from the district. Cumulative effects may arise particularly in relation to truck traffic and alteration of the landscape. The separation between existing quarries and sensitive receptors assists to minimise operational interaction between the extractive workings. However there would be some accumulation of effects of quarry noise, dust and blasting from the proposed Cleary Bros quarry and the neighbouring Readymix quarry, especially should an easterly extension of the latter be later approved.

5.16.2 Traffic

Each of the existing quarries in the district has separate access to the main road system. Hence traffic from Cleary Bros' quarry does not queue with trucks from other quarries at the intersection of the access road and East-West Route.

The cumulative effect of traffic from the quarries in the area occurs on the main road system where quarry traffic blends with other local and through traffic. The main road system has adequate capacity to handle the normal daily traffic demands in the area, although holiday traffic peaks sometimes cause reduced travel times.

The proposed quarry extension will not bring about any significant change in traffic generation from the Cleary Bros operation. Hence the proposal will not increase cumulative traffic impacts.

5.16.3 *Landscape*

The landscape of the former dairying country in the Wentworth Hills west of the Princes Highway at Croom is undergoing gradual change. Hard rock quarrying commenced in the hills more than 120 years ago. A series of active and former quarries have progressively developed from hard rock removal. To date the quarries have generally not been backfilled or undergone final rehabilitation, although provision for this to eventually occur may be included in some previous planning approvals. Extractive workings have generally been confined to land that is out of sight from the Princes Highway and from areas zoned for more intensive development on the eastern side of the highway. The extent of extractive operations is evident however, from the remaining dairying land and few public road reserves along the crest of the ridge system. From these vantage points extractive workings are apparent in the near landscape.

The proposed extension to Cleary Bros quarry will contribute to the landscape impact of existing quarry workings in this area. However the incremental impact will be moderated by the southern orientation of the site, the extent of screening possible and the context of more extensive existing quarried lands already in the view. Addition of the subject site to this altered landscape will not constitute a new or incompatible feature. The southern orientation will have an ameliorating effect of preventing the full extent and depth of the quarry being viewed from most vantage points in the ridge-top dairying land. In the longer term, unless an alternative land use emerges, the appearance of a green rural landscape will be restored.

Hence while there will be a cumulative landscape impact of the proposal with existing quarries in the Wentworth Hills, it will be confined to an area already significantly disturbed by extractive industry and largely owned by quarrying companies. South-westerly views in this area do not have strong scenic attributes, owing to the nearby high ridgelines and presence of existing quarries in the foreground. The more extensive easterly coastal views will not be affected by the proposal. For the above reasons the cumulative landscape impact of the proposal with other quarries in the area is considered acceptable to enable the resource to be won.

5.16.4 *Operational Impacts*

The proposed extension to Cleary Bros' quarry is located within a few hundred metres of both Cleary Bros' existing quarry and the Readymix quarry. When the new quarry commences operation, extraction will phase out at Cleary Bros' existing quarry, so there will be little cumulative operational impact from the new and old quarries.

The proposed quarry will operate in proximity to ongoing extraction in the Readymix quarry. Cumulative operational impacts may potentially occur from these

two operations with respect to dust deposition and noise at residential receptors. The assessment of noise impacts in section 5.6 and air quality impacts in section 5.8 have taken into account the contribution from Readymix's existing operations as part of the current background. The conclusions of those assessments take cumulative impact into account.

With each quarry ensuring that its blast emissions remain within EPA goals, there will be no cumulative effect on the magnitude of blast emissions. The frequency of blasts will remain unaltered, as Cleary Bros existing quarry will cease production.

5.16.5 Other Potential Cumulative Effects

i. Flora and Fauna

In considering the impact of the proposal on flora and fauna, Kevin Mills & Associates has taken into account the surrounding land uses and the extent of lands in the area previously cleared for grazing. The assessment referred to in section 5.10 considers the impact of the proposal on flora and fauna having regard to the altered surroundings. Mitigating measures are designed to prevent significant cumulative impacts from the proposal in conjunction with other land uses.

ii. Indigenous Heritage

As there were no Aboriginal artefacts recorded on the site and there was considered little likelihood of any being present, the proposal is considered not to have a significant cumulative impact with other development in the area.

iii. Non-Indigenous Heritage

The proposal will not require destruction of any listed items of environmental heritage, although some relics of the former dairying land use will be removed and the cultural landscape will be altered. The cumulative impact of quarrying in the Wentworth Hills is to slowly remove evidence of former land uses within the areas designated for extraction. However such evidence will remain in other parts of the Wentworth Hills where a substantial area of farming land is visually prominent and for this reason unlikely to ever be designated for extraction. Hence the cumulative impact on non-indigenous heritage will not erase all evidence of historic settlement of the Wentworth Hills.

iv. Water Flow and Quality

The proposed quarry extension drains to the same creek system that flows from part of the existing Readymix quarry. The relevant safeguards outlined in this EIS are designed to avoid cumulative deterioration of water flow and quality within the creek. Water will be released to mirror natural flows as far as practicable and water quality criteria will be met by all released water.

Chapter 6

JUSTIFICATION AND CONCLUSIONS

6.1 JUSTIFICATION

The quarry extension is justified because it enables a locally-based and employment-generating company to continue hard rock extraction in an environmentally sustainable manner in a district with a long history of quarrying. The justification is expanded in more detail under the following categories:

- social and economic considerations
- biophysical considerations; and
- ecological sustainability

6.1.1 *Social and Economic Considerations*

The proposed quarry extension has economic benefits for New South Wales and the Illawarra region. As explained in section 5.14, two of the main sources of aggregate for the Sydney region are predicted to be exhausted within the next decade, resulting in increased reliance on supplies from the Shellharbour and Kiama areas. Most of Cleary Bros competitors already supply coarse aggregate from the Illawarra to Sydney. As the Sydney demand increases these producers are expected to divert an increasing proportion of their production to Sydney. During this period the Illawarra construction industry is likely to become more reliant on Cleary Bros to supply coarse aggregate, as the company has no plans to supply products to Sydney. The quarry extension is essential if Cleary Bros is to fulfil this role.

As indicated in section 1.3 the quarry extension is vital to the economic future of the company. A significant portion of Cleary Bros business, including quarry products, concrete batching and civil engineering works is dependent upon a supply of coarse aggregate. It is not tenable for the company to continue operating in these markets without a reliable supply of hard rock from a quarry controlled by the company.

The economic analysis prepared by Gillespie Economics and referenced in section 5.14 has demonstrated the economic efficiency of the proposal and quantified the significant economic impact on the Illawarra economy if the quarry extension were not to proceed.

The quarry extension will have some economic impact on the adjoining dairy farm. Cowman Stoddart (*Appendix S*) investigated the likely effects on the dairy, indicating

that the substantive issue was the need for the dairy to find alternative grazing for its dry cows if the Cleary Bros property became unavailable for this purpose. In the opinion of Cowman Stoddart the practice of locating dry cows on another property accessed by motor vehicle is commonplace in the industry and while having some impact on the existing operation, will not cause the end of dairying at “The Hill”. On this advice it is considered the economic impact on dairying does not significantly detract from the overall economic benefits to be gained from proceeding with the quarry extension.

From consideration of social issues, there is little social impact from proceeding but there would be the social consequences of unemployment and reduced economic activity in the region if the proposal were not to proceed.

It is considered the proposal is justified from a social and economical perspective.

6.1.2 Biophysical Considerations

Being a large extractive operation, the proposal will affect the biophysical environment, during operation and beyond. However the impacts can be managed to within established criteria and confined to a limited area. The proposal has been designed to protect surrounding land that is not incorporated in the project so that following rehabilitation at the end of the quarry’s life, the only persisting change of significance will be the altered landform and the enhanced area of native vegetation to the south.

The site is currently cleared grazing land with some isolated trees on the upper slopes and minor patches of vegetation regrowth in the gullies. The substantive area of threatened rainforest and eucalypt forest communities on the property is outside the area proposed for quarrying and will be retained and enhanced as part of the project. Fig trees will be planted to supplement habitat for the Grey-headed Flying-fox.

Topography largely obscures the site from view from significant viewing points. Mounding and screen planting is proposed at selected locations to further reduce viewing opportunities. The proposal will not significantly affect the regionally important perception of the Wentworth Hills, gained from the Princes Highway, as a continuous rural area separating Shellharbour from Kiama.

There have been no Aboriginal artefacts discovered on the property, nor are any of the relics on the property listed as heritage items. Some relics of earlier settlement will be removed by the proposal including the dilapidated homestead “Kyawana” and sections of dry stone walls, assessed as having moderate heritage significance. Archival recording of these relics will preserve evidence of previous settlement. The cultural landscape will be affected but its principal element, the operating dairy farm, will remain with only minor alteration in the outlook from that property.

The environmental assessment has shown that operational impacts are controllable to contemporary standards using proven techniques. Established soil erosion and sediment management methods will be employed to control runoff water. Water quality and flows in the natural creek system beyond the site will be maintained by controlled release of collected water after settling and conditioning to meet water quality criteria. Detailed analysis has shown that controls for dust, noise and blasting will be effective in preserving the amenity of residences on the neighbouring dairy farm. When conditions of consent are available, operational requirements will be concisely detailed in a quarry environmental management and rehabilitation plan, to be utilised as the guiding document for quarry management and for monitoring and performance reporting.

In summary:

- operational impacts on the biophysical environment will be controlled to within established standards;
- the permanent alteration to the landform will not be of ecological significance and will not alter major drainage patterns;
- the extent of the quarry will be apparent to very few people; and
- the proposal will not affect any Aboriginal relics or listed heritage items.

It is considered that the controlled effect of the proposal on the biophysical environment does not detract from the justification for proceeding with the proposal.

6.1.3 Ecological Sustainability

The project justification includes consideration of the four principles of ecologically sustainable development set down in Schedule 2 of the *Environmental Planning and Assessment Regulation, 2000*:

- *The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
- (ii) an assessment of the risk-weighted consequences of various options,*

The proposal does not threaten serious environmental damage. The area proposed for quarrying has been carefully selected to avoid the significant stand of vegetation on the property. The excavation will collect runoff, preventing escape of sediment

from the site. The quarry will absorb a tributary creek, but controlled release of treated water from the excavation will compensate for the intercepted flow. There is no suggestion that appropriate environmental safeguards outlined in this EIS will be postponed.

- ***Inter-generational equity*** - namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

The proposed quarry extension will provide for orderly winning of a hard rock resource that can be economically extracted at current cost structures in the industry. It will not sterilise any opportunity for further extraction in the future should future generations decide this is warranted. The land will be rehabilitated to a useable state consistent with its future planned use as agreed with regulatory authorities when the quarry is to be closed. Realising this outcome will be for the benefit of present and future generations.

- ***Conservation of biological diversity and ecological integrity*** namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

The proposed quarry extension will not significantly affect biological diversity or ecological integrity. The impact of the proposal on flora and fauna has been assessed and appropriate safeguards adopted, including protection of existing creekline vegetation and revegetation of bushland on adjoining grassed areas.

- ***Improved valuation and pricing of environmental resources*** namely, that environmental factors should be included in the valuation of assets and services, such as:
 - (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

The proposal includes pollution controls and quarry rehabilitation at the cost of the proponent, Cleary Bros. The cost of containing, avoiding and abating pollution will be reflected in the price to the end user of the hard rock material extracted from the site. There is no significant waste as such from the extraction. Quarry overburden is needed for rehabilitation and reduces the quantity of external backfill material.

The proposal is sustainable in ecological terms. It is an extension to an existing quarry avoiding environmentally sensitive lands in an area with a long history of extractive industry. Environmental controls described in this EIS and to be further detailed in the environmental management and quarry rehabilitation plan include a combination of well-established techniques (such as for noise and dust suppression), modern practices (such as for blast design) and site-specific solutions (such as for vegetation retention and visual screening). In total, the environmental safeguards will protect the natural environment, the amenity of the residence in the area and the public perception of the Wentworth Hills as a green farming area.

In conclusion, the proposal is considered justified because it provides for identified extractive resources of State and regional significance to be extracted in a manner that will benefit the Illawarra economy without a risk of serious environmental degradation.

6.2 COMPILATION OF MITIGATION MEASURES

In accordance with Clause 72 and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, measures proposed to mitigate the effects of the proposal on the environment are compiled in *Table 6.1* below. These safeguards will be expanded following receipt of development consent and licence conditions and incorporated in the environmental management and quarry rehabilitation plan for the facility.

Table 6.1 MITIGATION MEASURES

Environmental feature to be protected	Mitigation Measure
Topography	<ul style="list-style-type: none"> • Cleary Bros to liaise with Readymix, should the latter be granted approval to extract up to the western boundary of the site, to jointly rehabilitate the area producing a consistent landform across the property boundary.
Geology and soils	<ul style="list-style-type: none"> • always restrict soil disturbance to the minimum area necessary for work to proceed; • quickly restore and stabilise any soil disturbance outside the quarry rim or inside the rim if the area is not ready for working and there is erosion risk; • recover topsoil prior to disturbing new areas and place in low, uncompacted stockpiles for re-use; • grass and stabilise topsoil stockpiles to minimise losses by wind and water erosion; • revegetate final quarry surfaces as soon as possible to minimise soil loss; • maintain vegetation on finished surfaces to limit subsequent erosion; and • store fuel and other potential contaminants outside the quarry.
Hydrology	<ul style="list-style-type: none"> • release collected water from the quarry to the creek in accordance with a management regime to maintain riparian flows; • time large releases to mirror rainfall events rather than steady flow; and

Environmental feature to be protected	Mitigation Measure
	<ul style="list-style-type: none"> monitor groundwater levels downhill from the quarry and if necessary implement compensatory surface flows.
Water Quality	<ul style="list-style-type: none"> install sediment controls for all earthworks outside the quarry rim; install temporary sediment controls for initial quarry workings until there is certainty that the excavation can retain all stormwater; refuel plant and equipment at least 100 metres from the water storage; respond quickly in accordance with documented emergency clean up procedures in the event of a fuel spill; test and if necessary treat collected water prior to release to the creek; regularly collect and remove any waste or litter appearing on the site; limit fertiliser use on revegetating areas to avoid nutrient rich runoff; and remove any windblown litter from the quarry as often as necessary.
Noise (operation)	<ul style="list-style-type: none"> construct an earth berm at the north east corner to limit operational noise at the nearest residence, "The Hill"; select all plant to achieve specified sound power levels; and limit hours of operation as indicated in Section 5.6.
Noise (bund construction)	<ul style="list-style-type: none"> select construction plant and equipment to achieve acoustical objectives; operate construction plant and equipment to minimise noise; undertake bund construction as quickly as possible; and monitor construction noise to confirm objectives are being met.
Blasting	<ul style="list-style-type: none"> prior to commencement, undertake a property condition survey on "The Hill" and all associated buildings and structures; for each blast, incorporate deck charges in the front row of blast holes; initiate the blast in the opposite direction to the nearest sensitive receptor; limit the maximum instantaneous charge in accordance with site laws developed by Richard Heggie Associates; monitor blasting effects and adjust blast designs as extraction advances; and meet the cost of repairs to any property damage confirmed to have been caused by the quarry workings.
Air quality	<ul style="list-style-type: none"> confine vehicle movements to a single access path within the quarry; maintain the haul road and vehicle path in a moistened state; cease dust generating activity during particularly strong winds; employ a wheel shaker or wheel wash at the site entrance; clean any deposited material from the sealed access road to the processing plant as often as necessary; and minimise the drop height for trucks unloading overburden.
Flora and fauna	<ul style="list-style-type: none"> Maintain land between the southern edge of the quarry and the creek as a buffer zone; peg and fence a revegetation area within the buffer zone; install the fence as a preparatory measure, prior to commencing any excavation or other quarry work; as soon as the fence is in place, remove grazing stock from the revegetation area and commence planting;

Environmental feature to be protected	Mitigation Measure
	<ul style="list-style-type: none"> • implement planting and ongoing management of the revegetation area in accordance with the quarry environmental management and rehabilitation plan; • select species used for the revegetation program from the list of local indigenous plants provided in the report by Kevin Mills & Associates; • source all seedlings for the revegetation program from local plants to maintain the genetic integrity of the local species; • prior to clearing the patches of native vegetation on the quarry site, gather seeds, cuttings and other propagative material for use in revegetation; • carry out weed control and other maintenance in the revegetation area for the duration of the quarry life and rehabilitation; • inspect the revegetation area annually by a suitably qualified person and prepare a report for incorporation in the annual environmental report; • release water from the quarry site on a varied basis, mirroring local rainfall as far as possible; and • monitor the riparian environment along the creek line annually to assess the need for any revision of the water release program and incorporate findings in the annual environmental report.
Visual	<ul style="list-style-type: none"> • construct sight bunds beside the haul road and quarry north east corner; • examine sight bunds after construction to confirm effectiveness; • nurture and maintain plantings, every three months for the first year, thence annually; • assess the effectiveness of vegetation screens every year with infill or additional planting as required; and • reassess visual impact of the quarry and haul road at the commencement of Stage 2 when the quarry moves to the north west corner of the site with appropriate remedial action if necessary.
Archaeology	<ul style="list-style-type: none"> • if any Aboriginal relics are found during construction work, advise NPWS and obtain advice from an archaeologist.
Non-Indigenous heritage	<ul style="list-style-type: none"> • record and archive all evidence of farming activity within the area of direct quarry impact including survey and archival recording of the dry stone walls and fences; • make an archival recording of “Kyawana” and associated structures following NSW Heritage Office <i>Guidelines for Archival Recording</i>; • undertake pre-quarrying surveys of “Belmont” and with owner agreement, “The Hill”, to establish the existing condition of these houses; • screen the quarry as far as practicable from “The Hill” and “Belmont” by boundary plantings including plantings in the road reserve leading to Belmont; • engage a landscape architect to set out the siting and nature of screen plantings having regard to the cultural landscape of the Wentworth Hills; and • nurture and maintain heritage screen plantings throughout the life of the quarry, with augmentation and replacement from time to time as required.

Environmental feature to be protected	Mitigation Measure
Dairy farming	<ul style="list-style-type: none"> do not obtain site access from Dunsters Lane except for initial investigation and survey; ensure the boundary of the quarry site is stable so that there is no risk of landslip on the adjoining dairy property; suppress any weeds within the quarry and any outbreak from the quarry onto pastureland; manage and maintain the remaining pastureland on the property to prevent deterioration and allow its continued use by the dairy; and maintain access for grazing cattle to Cleary Bros and Readymix grasslands for as long as practicable.
Public health and environmental hazards	<ul style="list-style-type: none"> observe occupational health and safety protocols required by WorkCover and the Department of Mineral Resources; erect a two-metre high chain wire fence around the operational area with warning signs and patrol weekly; issue an audible blast warning sufficiently loud to be heard beyond the security fence prior to each blast; and do not store any hazardous substances within the quarry.
Waste management	<ul style="list-style-type: none"> encourage staff to avoid as far as practicable taking materials into the quarry that will later have to be removed as waste.

REFERENCES

- Connell Wagner (2003)
Cleary Bros Quarry, Croom, Proposed Rezoning (draft, revision 3)
- Department of Housing (1998)
Managing Urban Stormwater, Soils and Construction
- Department of Mineral Resources (2000)
Supply and Demand for Course Aggregate in the Sydney Planning Region
- Environment Protection Authority (1999)
Industrial Noise Policy
- Environment Protection Authority (1995)
Environmental Noise Control Manual
- Environment Protection Authority (1999)
Environmental Criteria for Road Traffic Noise
- Environment Protection Authority (1998)
Action for Air
- Gillespie Economics (1998)
Preliminary Benefit Cost Analysis and Regional Economic Assessment of Proposed Albion Park Quarry (submitted to Shellharbour City Council with the rezoning application)
- Hazleton P.A. (1992)
Soil Landscapes of the Kiama 1:100,000 Sheet
- New South Wales Heritage Office
Assessing Heritage Significance
- Packham G. H. (1969)
The Geology of NSW
- Shellharbour City Council (1996)
Rural Land Study – Baseline Studies
- Shellharbour City Council (2000)
Rural Land Study – Supplementary Information to the Baseline Studies

APPENDICES

Appendix A

CLAUSE 71 “PRESCRIBED FORM”

SUBMISSION OF ENVIRONMENTAL IMPACT STATEMENT (EIS)

PREPARED UNDER THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 - SECTION 78A(8)

EIS PREPARED BY

Name: T W Perram
Qualifications: BSc(Eng), MEngSc, DipEnvStud
Address: Perram & Partners
12 Clanwilliam Street, EASTWOOD NSW 2122

in respect of: Extension of Hard Rock Quarry

DEVELOPMENT APPLICATION

Applicant Name: Cleary Bros (Bombo) Pty Ltd
Applicant Address: 39 Five Islands Road, PORT KEMBLA NSW 2505
Land to be developed: Address Dunsters Lane, Croom
Lot No. DP/MPS, Vol/Fol etc. Lot 1 DP 858245, Part Lot 2 DP 858245, Lot 2 DP 1021840, and Lot 23 DP 1039967
Proposed Development Extend an existing hard rock quarry onto Lot 1 with a new haul road traversing Lot 2 DP 858245. Remove hard rock from the extended quarry via the existing quarry on Lot 2 DP 1021840 to the existing processing plant on Lot 23 for processing, storage and sale.

ENVIRONMENTAL IMPACT STATEMENT

An environmental impact statement (EIS) is attached

DECLARATION

I declare that I have prepared this environmental impact statement and to the best of my knowledge

- it has been prepared in accordance with clauses 72 and 73 of the *Environmental Planning and Assessment Regulation 2000*,
- it contains all available information relevant to the environmental assessment of the proposed development,
- the information contained in the statement is neither false nor misleading.

Signature:



Name:

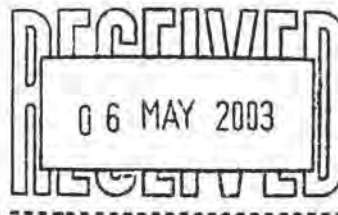
T W Perram

Date:

30 October 2003

Appendix B

REQUIREMENTS OF THE DIRECTOR- GENERAL



Mr Terry Perram
Principal
Perram and Partners Pty Limited
12 Clanwilliam Street
EASTWOOD NSW 2122

Major Development
Assessment

Ref: S00/00534

Dear Mr Perram,

**Proposed Extension to Cleary Bros' Albion Park (Rail) Quarry – Lot 1,
DP 858245, Part Lot 2, DP 858245, Shellharbour Local Government Area**

Our reference: S00/00534

Thank you for your letter seeking consultation with the Director-General for the preparation of an Environmental Impact Statement (EIS) for the above-mentioned development in accordance with Section 73(6) of the *Environmental Planning and Assessment (EP&A) Act 1979*. Section 73(6) provides that when over two years has elapsed after issue of Director-General's Requirements (DGRs), and if a development application is not made, the applicant should consult the Director-General further in relation to the preparation of the Environmental Impact Statement (EIS).

As part of this consultation, agencies contacted previously have been requested to provide any changes to their requirements. Attachment No. 1 outlines the statutory matters that must be included in any EIS under clauses 71 and 72 of the *Environmental Planning and Assessment Regulation 2000* (the *Regulation*). Under clause 73(1) of the *Regulation*, the Director-General requires the EIS to address the issues listed below. You should note also, that if the Development Application to which these requirements relate is not made within two years of the date of this letter, you must consult further with the Director-General prior to lodging your application.

Specific Issues

General

- Include a topographic map of the locality at a scale of 1:25,000 showing the location of all component parts of the proposal, property boundaries, local and major roads and areas from which the proposal would be visible.
- Include a recent aerial photograph (preferably colour) of the locality and general photographs of the area of the proposal and existing works. The aerial photograph should clearly show the subject site, surrounding lands, the photograph's orientation and scale.
- Describe the extent of the development including stockpiles (location and size), work areas, haul roads, process areas, and all activities associated with the site both in words and on plans.

Planning

- Address issues arising from Illawarra Regional Environmental Plan No. 1, Rural Lands, Extractive Materials, Environmental Heritage including Schedule 1 listings relevant to this proposal.
- Address the Shellharbour Rural Strategy, Rural Local Environmental Plan, and Local Environmental Study over the subject site.
- Address State Environmental Planning Policy (SEPP) No. 11 – Traffic Generating Developments.

Adjoining Land Uses

- Provide an assessment of the impact of the development on adjoining residences, in particular, the Dunstar property, and proposed amelioration measures to mitigate impacts, including any proposed acquisition proposals.
- Identify the implications of the tenancy of Belmont homestead and any measures proposed to the landowner.

- Identify issues relating to adjacent quarry lands not held by Cleary Brothers and the impacts on possible future extraction of resources on those lands. Documented consultation with CSR and other landowners must be provided.
- Identify the impact of the development on adjoining land uses, particularly the adjoining agricultural/dairy farms.
- Provide details of the inter-relationship of the proposal with existing developments and existing approved development consents.

Justification and Alternatives

- Identify alternative sources of aggregate and alternative materials.
- Provide a justification of the proposal in terms of local and regional context.

Resource Issues

- Describe the geology and size of the resource, the exploration methods (eg drilling) used to define it and a summary of the results provided. Plans and cross-sections showing the extent of the deposit, drillhole locations, and the proposed extraction area should be included. Relevant supporting documentation should be appended or referenced.
- Describe the characteristics of the material to be produced, proposed products and the suitability of the material for the intended applications. Provide details of testing undertaken to assess the quality of the material.
- Identify the markets for the quarry products.
- Describe the anticipated production rates, expected life of the operation, proposed extraction methods, quantities of overburden and other waste rock materials and details of proposed staging and timeframes.
- Describe the proposed use/management of overburden and other waste rock materials.
- If approval were given, then the operator is required to provide annual production data as requested by the Department of Mineral Resources, in the manner required on a standard form supplied for that purpose.

Cumulative Impacts

- Provide an assessment of the potential cumulative impacts of the proposal having regard to existing and likely future development in the locality. This assessment should consider noise, air quality, visual, water issues, traffic impacts and any loss of Aboriginal or non-Aboriginal heritage items, vegetation or fauna habitat.

Consultation

- Give full details of recent (2003) community consultation undertaken. A report including who was consulted, how the affected community was identified, what consultation methods were used, issues raised by the community and the manner in which these issues would be addressed must be provided in the EIS. The report should also identify the procedures used to notify the community.
- Some agencies have yet to provide their requirements. You should contact those agencies identified directly, if you do not receive any information within the next few days.

Air Quality

- An air quality impact assessment must be carried out in accordance with EPA (2001) *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* for the construction and operational phases both within the development site and along any transportation routes (including internal routes). Identify measures that would be adopted to minimise those impacts.
- Identify mitigation measures to minimise or remove the air quality impacts associated with the proposal including methods for suppressing dust from all activities.

Water Quality

- Describe the existing water environment, including rainfall, sensitivity of the surface water and groundwater resource, value of the water resources and any existing environmental impacts on groundwater and surrounding surface waters.
- Provide details of the hydrological catchment, including catchment drainage, surface drainage characteristics, changes relating to existing quarry operations on existing flow regimes and groundwater, and location of any recharge areas, seeps or strings and the current use of groundwater.
- Identify new works within 40 metres of the top of the bank of the watercourse which may require a Part 3A permit under the *Rivers and Foreshores Improvement Act 1948* and identify any proposal for water storages on site as these may require a surface water licence under the *Water Act 1912*;

- Incorporate requirements from the Department of Land and Water Conservation in a letter dated 20 November 2000 (appended at Attachment 2);
- Identify the impact the loss of surface water flow will have on the stands of rainforest vegetation, Illawarra Lowland Grassy Woodland and Illawarra Subtropical Rainforest to the south of the site. Provide details of measures proposed to recharge groundwater and to provide water flows for the purpose of maintaining the remnant rainforest areas, without compromising water quality.
- Identify the methods of cleaning and transferring water from the extraction area to the watercourses to maintain pre-quarry water flow and quality;
- Provide the results of baseline water quality monitoring as recommended in the draft Local Environmental Study (LES) on that site as part of the rezoning application;
- Identify waste water and stormwater management measures for all components of the development.
- Provide details of proposed drainage works and soil conservation strategies and erosion and sediment control strategies to reduce the risk of soil erosion associated with the proposal, including details of an erosion and sediment control plan.

Blasting and vibration

- Provide a blasting impact assessment to assess impacts on residences including the identification of measures to prevent impact.

Noise

- Provide an assessment of noise impacts in accordance with the EPA *"Industrial Noise Policy"* including a cumulative noise impact assessment for the existing quarry remaining in operation and the implications of surrounding quarry operations.
- Specify operational hours for all activities.
- Describe the development and its operation identifying all noise sources from the development and the noise impacts from the construction, quarrying operations, processing plant and transport movements on local residents;
- Identify noise impacts at local residences as a result of traffic noise generated by the proposal must be assessed in accordance with EPA *"Environmental Criteria for Road Traffic Noise."*
- Provide details of proposed mitigation, monitoring and management measures to meet EPA goals/standards on noise emissions.

Transport

- Identify options for transporting materials from extraction site to the processing plant;
- Identify options for transporting materials to subsequent markets. This should include rail, road and sea;
- Describe access arrangements over adjoining quarry operators land;
- Obtain confirmation from the Roads and Traffic Authority (RTA) that an overpass will be constructed to provide access to quarry site when East-West Road is upgraded as part of the Princes Highway, and give the timing of the link.
- Provide an assessment of overall traffic impacts, ie, the extent to which any additional traffic may impact on the safety and efficiency of the road network, especially on major intersections and the efficiency of traffic movement through Albion Park and any amelioration measures proposed.
- Provide an assessment of the level of impact on pavement conditions resulting from the existing and predicted heavy vehicle movements associated with quarry operations. The costs associated with the increased wear and tear on the pavement, ie, the extent of the acceleration of damage and the need to rehabilitate the pavement should also be evaluated. Identify measures that would be adopted to minimise those impacts.
- Describe the physical and legal access through CSR Readymix land.

Flora and Fauna

- An assessment of the impacts on flora and fauna, critical habitats, threatened species, populations or ecological communities, or their habitats should be carried out. Requirements for survey and assessment should be consistent with National Parks and Wildlife Service guidelines. Where information relies on previous surveys and assessments these will need to be updated to ensure survey and assessment methodologies are in line with current best practice and changes in legislation, ie new listings under Commonwealth and State legislation. Survey and assessment methodology used. The assessment should involve the following steps:
 - i) conduct baseline surveys and consult relevant databases and listings by the Scientific Committee;

- ii) describe the types and condition of habitats in, and adjacent to, the land to be affected by the proposal;
- iii) prepare a list of species, populations or ecological communities, or their habitats that may occur on the site and conduct targeted surveys for these;
- iv) apply a Section 5A test (*EP&A Act*) to species, populations or ecological communities or their habitats that may be affected by the proposal. The EIS must justify any decision not to apply the test to all of the species, populations or ecological communities identified in step iii);
- v) prepare a Species Impact Statement (SIS) for any species, populations or ecological communities or their critical habitats that are likely to be significantly affected by the proposal. (Note: An SIS must be prepared in accordance with any requirements of the Director-General of the National Parks and Wildlife Service.).
- Provide details of any proposed mitigative strategies, including revegetation/rehabilitation works (including details on the possibility of endemic seed or vegetative material collection) and the provision of compensatory habitat.
- Provide details of potential bushfire risk and management.
- Outline weed management, including a program to control the spread of weeds, particularly onto the dairy pastures.

Aboriginal and European Heritage

- Provide an Aboriginal heritage assessment, which conforms to the National Parks and Wildlife Service Guideline (previously provided), and include an assessment of potential impacts of the quarry site and infrastructure (including drainage works) on areas of cultural and/or archaeological sensitivity, including Aboriginal sites, and detail proposed mitigative and management measures. Also include documentation from the Aboriginal community outlining their assessment and recommendations and incorporate these into the recommended management measures in the EIS.
- Identify and map Aboriginal sites which will be affected by the proposal and for which Section 90 consent will be sought under the National Parks and Wildlife Act, 1974.
- Provide details of heritage issues with respect to existing buildings, particularly "The Hill", considered to be of State significance and a Heritage Item in Illawarra Regional Environmental Plan (REP) 1 and Shellharbour LEP 2000, and the dry stone walls which are listed as a heritage item in Illawarra REP 1. The EIS should identify proposed mitigation and management measures to be adopted in regard to the preservation of Heritage items.
- Identify measures to minimise the impact on the cultural landscape.

Economic and Social Issues

- Provide a Social Impact Assessment.
- Include results of existing quarry resource investigations and a cost/benefit analysis of extracting material from existing Cleary Brothers' sites, including removal of overburden/breccia as opposed to creating a new quarry.
- Describe loss of agricultural land and impact on existing agricultural land uses and provide measures to minimise these impacts.

Visual Assessment

- Describe the methods used to reduce the visual impacts from quarry activities and excavation including the impact of any emplacement areas, stockpiles, surface facilities and night lighting.
- Provide measures to reduce the visual impact of the proposed quarry and haul road to surrounding main roads and residential areas.

Waste Management

- Identify the adoption of the EPA environmental performance objectives and details of how the objectives will be achieved.
- Provide details of all wastes in accordance with the EPA environmental guideline "Assessment, Classification and Management of Non-liquid Wastes" including quantities and qualities of wastes generated by the development, and recycling proposals.
- Include methods to eliminate and reduce wastes.

Rehabilitation

- Provide the proposed rehabilitation procedures during and after completion of extraction.
- Identify the proposed end use for the site or options for end use. Include a description of the end use options and opportunities to co-ordinate rehabilitation with adjoining quarry operations.

- Define options for integrating and coordinating extraction and rehabilitation along the common boundary with the CSR site.
- Identify integration with the existing quarry and expected time frames for the cessation of operations.
- Prepare and include a revegetation plan that includes details of surface preparation, topsoil management, seed species and maintenance program including weed control and replanting failed rehabilitation.

State Significant Development Requirements

For all State Significant Development Applications, the Director-General requires you to:

- Nominate the name (and contact number) of a person who will be made available to answer public enquiries about the proposal.
- Consult with the community who is likely to be affected by the proposal;
- Consult with the local Council; and
- Advise the Department of the relevant newspapers circulating in the area affected by the proposal.

Integrated Development

Under section 91 of the Act, Development Applications (DAs) are "integrated development" where certain licences or approvals are required from bodies other than the consent authority. The agencies listed below have been identified as integrated approval authorities from which licences or approvals may need to be obtained if you are granted development consent.

The EIS should address the detailed requirements of the integrated approval bodies: Environment Protection Authority (EPA); National Park and Wildlife Service (NPWS), Shellharbour City Council. Although not identified as integrated approval authorities at this time, the requirements from the Department of Land and Water Conservation (DLWC), NSW Agriculture (attached) and Roads and Traffic Authority (RTA) should also be considered.

If further integrated approvals are identified before the Development Application is lodged, you must conduct your own consultation with the relevant agencies to identify their requirements for the EIS.

When you lodge your Development Application for the proposal, you must include:

- At least one copy of the Development Application and supporting information for each of the integrated approval bodies; and,
- Cheques for \$250 (GST Inclusive), made payable to each of the integrated approval bodies.

The EIS should be accompanied by a floppy disk containing an electronic file of the Executive Summary of the EIS, which may be published on the Department's website. The document can be in any format amenable to conversion to the portable document format (.pdf) and should be optimised for viewing on a PC screen.

Consultation

You should consult with Shellharbour City Council and take into account any comments the Council may have in the preparation of the EIS. The EIS should also address other issues that emerge from consultations with relevant local, State and Commonwealth government authorities, service providers and community groups, in particular EPA, NPWS, RTA, NSW Heritage Office, Environment Australia, the relevant local Aboriginal groups including the Illawarra Local Aboriginal Land Council and local residents.

The Department's EIS guideline '*Extractive Industry-Quarries*' should also be consulted in the preparation of the EIS. The Guideline is available for purchase from the Department's Information Centre, Ground Floor, 20 Lee Street, Sydney or by calling (02) 9762 8086.

It is unclear from your Form A whether the NSW Heritage Office is an approval body for the proposal. It would appear from the original Planning Focus Meeting, that an approval may be required from the Heritage Council due to the quarry's potential impacts on "The Hill". You should consult the Heritage Office directly to determine whether an approval is required from this agency and have regard to their requirements.

Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*

If your proposal contains any actions that could have a significant impact on matters of National Environmental Significance, then it may require additional approvals under the *Commonwealth Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act). These approvals are in addition to any approvals required under NSW legislation. If you have any questions about the application of the EPBC Act to this proposal, you should contact Environment Australia in Canberra (6274 1111 or <http://www.environment.gov.au>).

Changes to the regulated development fees

As of July 1 2002, a one-off additional fee of \$110 is payable to the consent authority on Development Applications lodged on or after that date for:

- integrated development; and
- development that requires concurrence (other than assumed concurrence, see clause 64 of the Regulation).

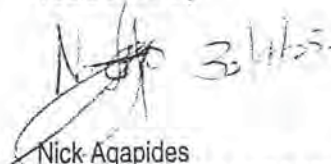
Please note that as of 1 November 2002, the fee schedule in the Regulation for development applications has been amended. You will need to consider the revised schedule when determining the fee payable to the consent authority.

State Environmental Planning Policy No. 34 - Major Employment Generating Industrial Development

Should this Proposal meet the criteria set out in Schedule 1 of SEPP 34 either in the employment of 100 or more persons on a full-time basis or in having a capital investment value of \$20 million or more (excluding land), under Section 8 of the SEPP, the Minister is the consent authority.

Please contact Sylvia Nillsen on (02) 9762 8153 if you require any further information regarding the Director-General's requirements for the EIS. For more information on the process for State Significant Development, please refer to the Department's Web site (www.duap.nsw.gov.au – look under "Assessing Development Proposals/Lodging a Development Application with us").

Yours sincerely



Nick Agapides

Manager, Mining and Extractive Industries

As Delegate for the Director-General

Note: Matters of National Environmental Significance under the EPBC Act are:

- i) World Heritage properties;
- ii) RAMSAR wetlands;
- iii) threatened species or ecological communities listed in the EPBC Act;
- iv) migratory species listed in the EPBC Act;
- v) the environment in a Commonwealth marine area;
- vi) nuclear actions.

STATUTORY REQUIREMENTS FOR THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT UNDER PART 4 OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

In accordance with the *Environmental Planning and Assessment Act 1979* (the Act), an environmental impact statement (EIS) must meet the following requirements.

Content of EIS

Pursuant to Schedule 2 and clause 72 of the *Environmental Planning and Assessment Regulation 2000* (the Regulation), an EIS must include:

1. A summary of the environmental impact statement.
2. A statement of the objectives of the development or activity.
3. An analysis of any feasible alternatives to the carrying out of the development or activity, having regard to its objectives, including the consequences of not carrying out the development or activity.
4. An analysis of the development or activity, including:
 - (a) a full description of the development or activity; and
 - (b) a general description of the environment likely to be affected by the development or activity, together with a detailed description of those aspects of the environment that are likely to be significantly affected; and
 - (c) the likely impact on the environment of the development or activity, and
 - (d) a full description of the measures proposed to mitigate any adverse effects of the development or activity on the environment, and
 - (e) a list of any approvals that must be obtained under any Act or law before the development or activity may be lawfully carried out.
5. A compilation, (in a single section of the environmental impact statement) of the measures referred to in item 4(d).
6. The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical, economic and social considerations, including the following principles of ecologically sustainable development:
 - (a) The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific

certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - (ii) an assessment of the risk-weighted consequences of various options,
- (b) Inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations,
 - (c) Conservation of biological diversity and ecological integrity, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
 - (d) Improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

An environmental impact statement referred to in Section 78A(8) of the Act shall be prepared in written form. The prescribed form to accompany the environmental impact statement must comply with the

requirements of clause 71 of the Regulation and be signed by the person who has prepared it.

Procedures for public exhibition of the EIS are set down in clauses 77 to 81 of the Regulation.

Attention is also drawn to clause 283 of the Regulation regarding false or misleading statements in EISs.

Note

If the development application to which the EIS relates is not made within 2 years from the date of issue of the Director-General's requirements, under clause 73(6) of the Regulation the proponent is required to reconsult with the Director-General.

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Appendix C

INDEX TO DIRECTOR-GENERAL'S REQUIREMENTS

INDEX TO DIRECTOR-GENERAL'S REQUIREMENTS (April 2003 letter)

Director-General's Requirement	Comment	Location in EIS
<u>General</u>		
Include a topographic map of the locality at a scale of 1:25,000 showing the location of all component parts of the proposal, property boundaries, local and major roads and areas from which the proposal would be visible.	Shown on various diagrams at various scales	Chapter 2 & Chapter 5
Include a recent aerial photograph (preferably colour) of the locality and general photographs of the area of the proposal and existing works. The aerial photograph should clearly show the subject site, surrounding lands, the photograph's orientation and scale.	Aerial and other photographs are included at various locations in the EIS	Chapter 2 & Chapter 5
Describe the extent of the development including stockpiles (location and size), work areas, haul roads, process areas, and all activities associated with the site both in words and on plans.	Explained in text and diagrams	Sections 3.2 & 3.3
<u>Planning</u>		
Address issues arising from Illawarra Regional Environmental Plan No.1, Rural Lands, Extractive Materials, Environmental Heritage including Schedule 1 listings relevant to this proposal.		Section 4.5 & Appendix F
Address the Shellharbour Rural Strategy, Rural Local Environmental Plan, and Local Environmental Study over the subject site.		Sections 4.5, 4.6 & Appendix F
Address State Environmental Planning Policy (SEPP) No. 11 - Traffic Generating Developments.		Section 4.5 & Appendix F
<u>Adjoining Land Uses</u>		
Provide an assessment of the impact of the development on adjoining residences, in particular, the Dunstar [sic] property, and proposed amelioration measures to mitigate impacts, including any proposed acquisition proposals.	Impact on the residence is considered under the headings of specific impacts. There is no acquisition proposal.	Chapter 5.
Identify the implications of the tenancy of Belmont homestead and any measures proposed to the landowner.	The previous land-owner has vacated.	Section 2.1
Identify issues relating to adjacent quarry lands not held by Cleary Brothers and the impacts on possible future extraction of resources on those lands. Documented consultation with CSR and other landowners must be provided.	Adjacent quarry lands are owned by Readymix. See letter in Appendix E.	Section 2.2, 2.4 & Appendix E
Identify the impact of the development on adjoining land uses, particularly the adjoining agricultural/dairy farms.	There is one adjoining dairy farm.	Section 5.14 & Appendix S

Director-General's Requirement	Comment	Location in EIS
Provide details of the inter-relationship of the proposal with existing developments and existing approved development consents.	Existing consents held by Cleary Bros will continue.	Sections 1.2 & 3.3 & Chapter 5
<u>Justification and Alternatives</u> Identify alternative sources of aggregate and alternative materials.		Section 2.4
Provide a justification of the proposal in terms of local and regional context.		Section 6.1
<u>Resource Issues</u> Describe the geology and size of the resource, the exploration methods (eg drilling) used to define it and a summary of the results provided. Plans and cross-sections showing the extent of the deposit, drillhole locations, and the proposed extraction area should be included. Relevant supporting documentation should be appended or referenced.		Section 3.1 & Appendix I
Describe the characteristics of the material to be produced, proposed products and the suitability of the material for the intended applications. Provide details of testing undertaken to assess the quality of the material.		Section 3.1 & Appendix I
Identify the markets for the quarry products.		Section 3.1
Describe the anticipated production rates, expected life of the operation, proposed extraction methods, quantities of overburden and other waste rock materials and details of proposed staging and timeframes.		Sections 3.1, 3.3 & 3.5
Describe the proposed use/management of overburden and other waste rock materials.		Section 3.3
If approval were given, then the operator is required to provide annual production data as requested by the Department of Mineral Resources, in the manner required on a standard form supplied for that purpose.	Noted	N/A
<u>Cumulative Impacts</u> Provide an assessment of the potential cumulative impacts of the proposal having regard to existing and likely future development in the locality. This assessment should consider noise, air quality, visual, water issues, traffic impacts and any loss of Aboriginal or non-Aboriginal heritage items, vegetation or fauna habitat.		Section 5.16

Director-General's Requirement	Comment	Location in EIS
<p><u>Consultation</u></p> <p>Give full details of recent (2003) community consultation undertaken. A report including who was consulted, how the affected community was identified, what consultation methods were used, issues raised by the community and the manner in which these issues would be addressed must be provided in the EIS. The report should also identify the procedures used to notify the community.</p>	<p>Owing to the isolation of the site, the affected community is largely limited to adjoining landowners: Readymix and the Dunsters.</p>	<p>Section 1.5 & Appendix E, Section 5.14 & Appendix S</p>
<p>Some agencies have yet to provide their requirements. You should contact those agencies identified directly, if you do not receive any information within the next few days.</p>	<p>Noted. Subsequent correspondence was received</p>	<p>N/A</p>
<p><u>Air Quality</u></p> <p>An air quality impact assessment must be carried out in accordance with EPA (2001) <i>Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW</i> for the construction and operational phases both within the development site and along any transportation routes (including internal routes). Identify measures that would be adopted to minimise those impacts.</p>		<p>Section 5.8 & Appendix M</p>
<p>Identify mitigation measures to minimise or remove the air quality impacts associated with the proposal including methods for suppressing dust from all activities.</p>		<p>Section 5.8 & Appendix M</p>
<p><u>Water Quality</u></p> <p>Describe the existing water environment, including rainfall, sensitivity of the surface water and groundwater resource, value of the water resources and any existing environmental impacts on groundwater and surrounding surface waters.</p>		<p>Sections 5.3, 5.4 & 5.5 & Appendix J</p>
<p>Provide details of the hydrological catchment, including catchment drainage, surface drainage characteristics, changes relating to existing quarry operations on existing flow regimes and groundwater, and location of any recharge areas, seeps or strings and the current use of groundwater.</p>		<p>Sections 5.1, 5.5 & Appendix J</p>
<p>Identify new works within 40 metres of the top of the bank of the watercourse which may require a Part 3A permit under the <i>Rivers and Foreshores Improvement Act 1948</i> and identify any proposal for water storages on site as these may require a surface water licence under the <i>Water Act 1912</i>.</p>		<p>Section 3.2</p>

Director-General's Requirement	Comment	Location in EIS
Incorporate requirements from the Department of Land and Water Conservation in a letter dated 20 November 2000 (appended at Attachment 2);	Letter included in Appendix E.	
Identify the impact the loss of surface water flow will have on the stands of rainforest vegetation, Illawarra Lowland Grassy Woodland and Illawarra Subtropical Rainforest to the south of the site. Provide details of measures proposed to recharge groundwater and to provide water flows for the purpose of maintaining the remnant rainforest areas, without compromising water quality.		Section 5.10 & Appendix O
Identify the methods of cleaning and transferring water from the extraction area to the watercourses to maintain pre-quarry water flow and quality;		Section 3.4
Provide the results of baseline water quality monitoring as recommended in the draft Local Environmental Study (LES) on that site as part of the rezoning application;		Section 5.5 & Appendix K
Identify waste water and stormwater management measures for all components of the development.		Section 3.4
Provide details of proposed drainage works and soil conservation strategies and erosion and sediment control strategies to reduce the risk of soil erosion associated with the proposal, including details of an erosion and sediment control plan.		Sections 3.4, 5.2 & 5.5
<u>Blasting and vibration</u> Provide a blasting impact assessment to assess impacts on residences including the identification of measures to prevent impact.		Section 5.7 & Appendix L
<u>Noise</u> Provide an assessment of noise impacts in accordance with the EPA "Industrial Noise Policy" including a cumulative noise impact assessment for the existing quarry remaining in operation and the implications of surrounding quarry operations.		Section 5.6 & Appendix L
Specify operational hours for all activities.		Section 3.3
Describe the development and its operation identifying all noise sources from the development and the noise impacts from the construction, quarrying operations, processing plant and transport movements on local residents;		Sections 3.3, 5.6 & Appendix L

Director-General's Requirement	Comment	Location in EIS
Identify noise impacts at local residences as a result of traffic noise generated by the proposal must be assessed in accordance with EPA "Environmental Criteria for Road Traffic Noise". [sic]		Section 5.6 & Appendix L
Provide details of proposed mitigation, monitoring and management measures to meet EPA goals/standards on noise emissions.		Section 5.6 & Appendix L
Transport Identify options for transporting materials from extraction site to the processing plant;		Section 2.4
Identify options for transporting materials to subsequent markets. This should include rail, road and sea	There are no viable rail and sea options	Section 2.4
Describe access arrangements over adjoining quarry operators land.		Section 2.1
Obtain confirmation from the Roads and Traffic Authority (RTA) that an overpass will be constructed to provide access to quarry site when East-West Road is upgraded as part of the Princes Highway, and give the timing of the link.	Yallah - Oak Flats deviation in 15 to 20 years. Overpass proposed	Section 5.9
Provide an assessment of overall traffic impacts, ie, the extent to which any additional traffic may impact on the safety and efficiency of the road network, especially on major intersections and the efficiency of traffic movement through Albion Park and any amelioration measures proposed.		Section 5.9
Provide an assessment of the level of impact on pavement conditions resulting from the existing and predicted heavy vehicle movements associated with quarry operations. The costs associated with the increased wear and tear on the pavement, ie, the extent of the acceleration of damage and the need to rehabilitate the pavement should also be evaluated. Identify measures that would be adopted to minimise those impacts.		Section 5.9
Describe the physical and legal access through CSR Readymix land.		Sections 2.1 & 3.2

Director-General's Requirement	Comment	Location in EIS
<p>Flora and Fauna</p> <p>An assessment of the impacts on flora and fauna, critical habitats, threatened species, populations or ecological communities, or their habitats should be carried out. Requirements for survey and assessment should be consistent with National Parks and Wildlife Service guidelines. Where information relies on previous surveys and assessments these will need to be updated to ensure survey and assessment methodologies are in line with current best practice and changes in legislation, ie new listings under Commonwealth and State legislation. Survey and assessment methodology used. The assessment should involve the following steps:</p> <p>i) conduct baseline surveys and consult relevant databases and listings by the Scientific Committee;</p> <p>ii) describe the types and condition of habitats in, and adjacent to, the land to be affected by the proposal;</p> <p>iii) prepare a list of species, populations or ecological communities, or their habitats that may occur on the site and conduct targeted surveys for these;</p> <p>iv) apply a Section 5A test (EP&A Act) to species, populations or ecological communities or their habitats that may be affected by the proposal. The EIS must justify any decision not to apply the test to all of the species, populations or ecological communities identified in step iii);</p> <p>v) prepare a Species Impact Statement (SIS) for any species, populations or ecological communities or their critical habitats that are likely to be significantly affected by the proposal. (Note: An SIS must be prepared in accordance with any requirements of the Director-General of the National Parks and Wildlife Service.).</p>		Section 5.10 & Appendix O
Provide details of any proposed mitigative strategies, including revegetation/rehabilitation works (including details on the possibility of endemic seed or vegetative material collection) and the provision of compensatory habitat.		Section 5.10 & Appendix O
Provide details of potential bushfire risk and management.		Section 5.15
Outline weed management, including a program to control the spread of weeds, particularly onto the dairy pastures.		Section 5.14

Director-General's Requirement	Comment	Location in EIS
<p><u>Aboriginal and European Heritage</u></p> <p>Provide an Aboriginal heritage assessment, which conforms to the National Parks and Wildlife Service Guideline (previously provided), and include an assessment of potential impacts of the quarry site and infrastructure (including drainage works) on areas of cultural and/or archaeological sensitivity, including Aboriginal sites, and detail proposed mitigative and management measures. Also include documentation from the Aboriginal community outlining their assessment and recommendations and incorporate these into the recommended management measures in the EIS.</p>	Also refer to Mary Dallas' report in the LES	Section 5.12 & Appendix P
Identify and map Aboriginal sites which will be affected by the proposal and for which Section 90 consent will be sought under the National Parks and Wildlife Act, 1974.	There are none	Section 5.12
Provide details of heritage issues with respect to existing buildings, particularly "The Hill", considered to be of State significance and a Heritage Item in Illawarra Regional Environmental Plan (REP) 1 and Shellharbour LEP 2000, and the dry stone walls which are listed as a heritage item in Illawarra REP 1. The EIS should identify proposed mitigation and management measures to be adopted in regard to the preservation of Heritage items.		Section 5.13 & Appendix Q & Appendix R
Identify measures to minimise the impact on the cultural landscape.		Section 5.13 & Appendix Q
<p><u>Economic and Social Issues</u></p> <p>Provide a Social Impact Assessment.</p>		Section 5.14
Include results of existing quarry resource investigations and a cost/benefit analysis of extracting material from existing Cleary Brothers' sites, including removal of overburden/breccia as opposed to creating a new quarry.	Cleary Bros does not have any other active hard rock quarry sites	Section 5.14
Describe loss of agricultural land and impact on existing agricultural land uses and provide measures to minimise these impacts.		Section 5.14 & Appendix S
<p><u>Visual Assessment</u></p> <p>Describe the methods used to reduce the visual impacts from quarry activities and excavation including the impact of any emplacement areas, stockpiles, surface facilities and night lighting.</p>		Section 5.11

Director-General's Requirement	Comment	Location in EIS
Provide measures to reduce the visual impact of the proposed quarry and haul road to surrounding main roads and residential areas.		Section 5.11
<u>Waste Management</u> Identify the adoption of the EPA environmental performance objectives and details of how the objectives will be achieved.		Section 3.3
Provide details of all wastes in accordance with the EPA environmental guideline "Assessment, Classification and Management of Non-liquid Wastes" including quantities and qualities of wastes generated by the development., and recycling proposals.		Section 3.3
Include methods to eliminate and reduce wastes.		Section 3.3
<u>Rehabilitation</u> Provide the proposed rehabilitation procedures during and after completion of extraction.		Section 3.6
Identify the proposed end use for the site or options for end use. Include a description of the end use options and opportunities to co-ordinate rehabilitation with adjoining quarry operations.		Section 3.6
Define options for integrating and coordinating extraction and rehabilitation along the common boundary with the CSR site.		Section 3.6
Identify integration with the existing quarry and expected time frames for the cessation of operations.		Section 1.3
Prepare and include a revegetation plan that includes details of surface preparation, topsoil management, seed species and maintenance program including weed control and replanting failed rehabilitation.	Detailed plan to be part of quarry EM & RP (refer Section 3.7)	Section 3.6

Appendix D

MINISTER'S DECLARATION (1999)
AND SECTION 117 DIRECTION (1994)

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

DECLARATION

I, the Minister for Urban Affairs and Planning, in pursuance of section 76A(7) of the Environmental Planning and Assessment Act 1979, having formed the opinion that the classes of developments listed in the Schedule to this Declaration are of State environmental planning significance, declare them to be State significant development.

This declaration takes effect on the day the declaration is gazetted.

ANDREW REFSHAUGE, MP

Deputy Premier
Minister for Urban Affairs and Planning
Minister for Aboriginal Affairs
Minister for Housing

SYDNEY, 3 August 1999

SCHEDULE

An extractive industry, if in the opinion of the consent authority:

1. the resource has been identified as being of State or regional significance in a strategic plan adopted by the Director-General; or
2. the total resource (the subject of the development application) is greater than 5 million tonnes; or
3. the proposed extraction rate is greater than 200,000 tonnes per annum; or
4. the project is to be located in an "environmentally sensitive area of State significance".

An aquaculture industry if in the opinion of the consent authority,

1. the project has been identified as being of State or regional significance in a strategic plan adopted by the Director-General; or
2. the project will employ more than 20 people; or
3. the project is to be located in an "environmentally sensitive area of State significance".

A **railway freight terminal** if in the opinion of the consent authority,

1. the project has been identified in a Freight Strategy prepared by the Department of Transport adopted by the Director-General; or
2. the project employs more than 100 people; or
3. the capital investment value of the project is \$20M or more; or
4. the project is to be located in an “environmentally sensitive area of State significance”.

Environmentally sensitive area of State significance

For the purpose of the Declaration, environmentally sensitive areas of State significance means:

- a. land identified and mapped in SEPP 14 or SEPP 26, or
- b. land reserved as an aquatic reserve or marine park under the Fisheries Management Act 1994, or
- c. land declared under RAMSAR or recognised as a World Heritage area; or
- d. land identified in a planning instrument as being of Aboriginal cultural significance; or
- e. land identified approved by the Minister for the Environment for inclusion in a National Park but which has not yet been gazetted; or
- f. land identified as being critical habitat or habitats of threatened populations or ecological communities listed in the Threatened Species Conservation Act at the time the development application was lodged.

DEPARTMENT OF URBAN AFFAIRS AND PLANNING

Governor Macquarie Tower, 1 Farrer Place, Sydney 2000.
Box 3927 GPO Sydney 2001. DX 15 Sydney.
Telephone: (02) 391 2000 Fax: (02) 391 2111.

CIRCULAR NO. **C26**

Issued
16 December 1994

To all Councils

SECTION 117(2) DIRECTION NO. G28 - COAL, OTHER MINERALS, PETROLEUM AND EXTRACTIVE RESOURCES

INTRODUCTION

The Minister for Planning, the Hon. Robert Webster, MLC, has made a direction under Section 117(2) of the *Environmental Planning and Assessment Act, 1979* (the Act) to ensure there is adequate recognition of coal, other minerals, extractive and petroleum resources throughout the State and where appropriate to maintain access to obtain these resources. A copy of the Direction, No. G28 - Coal, Other Minerals, Petroleum and Extractive Resources, is attached to this circular.

The Direction applies to a council taking action to prepare a draft local environmental plan which includes proposed prohibitions or restrictions on mining or extractive industries. If this is the case, the council must seek the views of the Director-General of the Department of Mineral Resources. The Director-General may object to the preparation of a draft plan on the grounds set out in the Direction and advise the council to this effect. The council, if it wishes to go ahead, must refer the draft plan, when it is prepared, to the Department of Planning. The Director of Planning will make a decision on whether the draft plan can be publicly exhibited.

Councils with delegations given by the Director of Planning will be advised by separate letter of a change to the delegations relating to this matter. The change will be that councils will not have delegation to certify a draft plan for public exhibition in accordance with section 65 of the Act, where an objection has been made by the Director-General of the Department of Mineral Resources in response to the consultation required under the attached section 117(2) Direction No. G28.

Further information on the Direction and how it works is provided below.

- Contact: M. Smith
- Our reference: S990/07350/002
- Telephone: (02) 391 2172

HOW THE DIRECTION WORKS

When the Direction applies

The Direction applies when a council is taking action to prepare a draft local environmental plan, including an amendment to an existing plan, which involves any of the following matters:

- (a) Introduces on any land in the State a prohibition on: the mining of coal or other minerals; the extraction of petroleum; or the obtaining of extractive materials.
- (b) Is likely, by changing the permissible use of any land in the State, to restrict: the mining of deposits of coal or other minerals; the extraction of deposits of petroleum; or the obtaining of deposits of extractive materials; and the Director-General of the Department of Mineral Resources (DMR) has objected to the proposed change in the permissible use.

Extent of Application

The Direction will apply where a council proposes to prepare a draft plan which introduces a prohibition on mining or extractive industry and these land uses are currently permitted. However, the Direction does not apply to an amendment to any existing plan which only maintains an existing prohibition on the recovery of any of the resources specified in the Direction. For example, the Direction does not apply where a residential zone is changed to a commercial zone, and mining or extractive industry is prohibited in each case.

The Direction can apply also to any proposed change in a plan to introduce a permissible land use, previously not permitted, which may be incompatible with mining or an extractive industry. The potentially incompatible land use could involve either the actual land where the resource is located, or land in the vicinity or elsewhere, having regard to the possible effects of noise, visual impact, traffic or any other relevant consideration arising if mining or an extractive industry commenced in the locality. Mining or an extractive industry is likely to be restricted in these circumstances because it could be incompatible with the use proposed in the draft plan.

Where a council is carrying out a review of its principal plan or plans it is possible that some mining or extractive industry could be prohibited or restricted. Councils are therefore advised in general to regard the Direction as applying when such a review of its principal plan or plans is being undertaken and there are identified deposits of coal, other minerals, petroleum or extractive resources in their areas.

Consultation Requirements

Where the Direction applies, councils are required, in accordance with clause 2(a) and 2(b) of the Schedule to the Direction, to consult the DMR as part of their consultation functions pursuant to section 62 of the Act. Councils will need to:

- ascertain whether the Director-General of the DMR has any objection to the preparation of the draft plan and the reasons for that objection; and

- identify the likely impact of the draft plan on the recovery or the sterilisation of any of the types of resources specified in the Direction.

To enable councils to comply with clause 2(b) of the Schedule to the Direction, the DMR will notify councils of identified resources in their areas. However, if a council has not yet been notified at the time it is preparing a plan possibly subject to the Direction, it should consult with the DMR for advice.

Where there is no objection by the DMR

If the DMR advises the council in writing that it has no objection to the preparation of the draft plan, or does not respond to the council within 40 days of commencement of consultation, then the council may proceed with the preparation of that draft plan on the basis that the section 117(2) Direction No. G28 has no further effect.

Where there is an objection by the DMR

If the Director-General of the DMR objects in writing to the preparation of the draft plan, the council will not have any delegation from the Director of Planning pursuant to section 23 of the Act to certify the draft plan for public exhibition under section 65 of the Act. The relevant change to the delegations will be covered in separate advice by letter from the Secretary of the Department to councils.

INFORMATION TO BE PROVIDED TO THE DMR

When consulting the Department of Mineral Resources (DMR) councils are asked to provide the following information:

- the reasons for deciding to prepare the draft plan;
- a description of the land affected by the draft plan, including a map clearly showing the location;
- details of the current planning provisions applying to the land the subject of the draft plan and land in its vicinity;
- justification for the proposed change in landuse, including economic, social and environmental considerations;
- any alternative approaches to achieving the objectives of the draft plan; and
- the implications of the draft plan with respect to the effect on existing or possible future extraction of the resource.

COUNCIL REQUEST FOR A CERTIFICATE UNDER SECTION 65


Where the DMR has objected to the preparation of a draft plan and the council wishes to obtain a certificate from the Director of Planning under section 65 of the Act to enable exhibition of the draft plan, the council is required to provide the Director of Planning with the following material:

- the information as indicated above and provided by the council to the DMR;
- a copy of the advice received by the council from the DMR; and
- justification for the council's position as to why it is not prepared to accept the views of the DMR and wishes to go ahead with the draft plan.

FURTHER INFORMATION

For further information on this Direction, inquiries may be directed to the Department's Regional Manager for the council's area, or to the Department of Mineral Resources, Sydney, on (02)901.8886.

The Department appreciates the co-operation and assistance of councils in implementing this Direction.

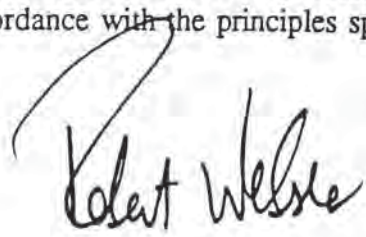


E. Smith
Secretary

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979
DIRECTION UNDER SECTION 117(2) No. G28

COAL, OTHER MINERALS, PETROLEUM AND
EXTRACTIVE RESOURCES

I, the Minister for Planning, pursuant to Section 117(2) of the Environmental Planning and Assessment Act 1979 (the Act), direct each Council in the State of New South Wales (the State), to exercise its functions under Divisions 4 and 5 of Part 3 of the Act in relation to the preparation of a draft local environmental plan in accordance with the principles specified in the Schedule to this Direction (S90/07350/002)



ROBERT WEBSTER
Minister for Planning

Sydney,

6/12 1994.

SCHEDULE

1. This Direction applies to the preparation of a draft local environmental plan which:
 - (a) introduces a prohibition on:
 - (i) the mining of coal or other minerals, or
 - (ii) the extraction of petroleum, or
 - (iii) the obtaining of extractive materials,on any land in the State; or,
 - (b) is likely to restrict:
 - (i) the mining of deposits of coal or other minerals which have been identified by the Department of Mineral Resources (DMR), or
 - (ii) the extraction of deposits of petroleum which have been identified by the DMR, or
 - (iii) the obtaining of deposits of extractive materials which have been identified by the DMR,by changing the permissible use of any land in the State, to permit a use which is potentially incompatible with mining or an extractive industry.

2. In the exercise of its consultation functions pursuant to section 62 of the Act regarding the preparation of a draft local environmental plan to which clause 1 applies, a council must consult the Director-General of the DMR to:
 - (a) ascertain whether the Director-General of the DMR has any objection to the preparation of that draft local environmental plan, and the reasons for that objection; and,
 - (b) identify the likely impact of that draft local environmental plan on the mining of coal or other minerals, or the extraction of petroleum, or the obtaining of extractive materials, or the sterilisation of any such resources.
3. Where a council does not receive, within 40 days of commencement of consultation in accordance with clause 2, a written notification outlining the reasons for any objection the Director-General of the DMR may have to the preparation of that draft local environmental plan, then the council may proceed with preparation of that draft local environmental plan.
4. Where a council does receive, within 40 days of commencement of consultation in accordance with clause 2, a written notification outlining the reasons for any objection the Director-General of the DMR may have to the preparation of that draft local environmental plan, then:
 - (a) the council shall include in its submissions to the Secretary of the Department of Planning pursuant to section 64 of the Act a copy of the notification outlining the reasons for any objection the Director-General of the DMR may have, together with a copy of that draft local environmental plan; and
 - (b) the council shall submit a statement justifying its reasons for proceeding with preparation of that draft local environmental plan.

Appendix E

CONSULTATION RESPONSES

12 May 2003



Mr T Perram
Perram & Partners
12 Clanwilliam Street
EASTWOOD NSW 2122

Cleary Bros Albion Park Quarry Extension - EIS

Dear Mr Perram

Thank you for providing us with the opportunity to provide input into the preparation of the EIS.

We recently provided comments to PlanningNSW on this matter and provide the same comments to you. We have no additional matters to raise.

The issues we request be addressed in the EIS for the proposed extension to the existing quarry are as follows:

- a. Blasting impacts on surrounding dwelling houses.
- b. Noise impacts from the processing plant and transport movements on dwelling houses.
- c. Options for transporting materials from extraction site to the processing plant.
- d. Options for transporting materials to subsequent markets. This should include rail, road and sea.
- e. Impact the loss of surface water flow will have on the stands of rainforest vegetation, Illawarra Lowland Grassy Woodland and Illawarra Subtropical Rainforest to the south of the site.
- f. Method of cleaning and transferring water from the extraction area to the watercourses to maintain pre quarry water flow and quality.
- g. Results of existing quarry resource investigations. Cost/benefit analysis of extracting material from existing Cleary Bros sites, including removal of overburden/breccia as opposed to creating a new quarry.

All communications

addressed to:

GENERAL MANAGER

P.O. Box 155 Shellharbour Square

Shellharbour City Centre 2529

Telephone: 02 4221 6111

Facsimile: 02 4221 6016

DX 26402 Shellharbour Square

ADMINISTRATION CENTRE:

Lamerton House, Lamerton Cres.

Shellharbour City Centre 2529

COUNCIL MEETING CHAMBER:

Cnr Shellharbour &

Lake Entrance Roads Warilla



**Perram & Partners
Cleary Bros EIS**

- h. Impact habitat loss will have on listed/preliminary listed Threatened Species & Endangered Species.
- i. Impact on Endangered Ecological Communities.
- j. Impact on heritage items.
- k. Impact on cultural landscape.
- l. Method of suppressing dust from all activities.
- m. Results of baseline water quality monitoring as recommended in the draft LES.
- n. Access arrangements over adjoining quarry operators land.
- o. Confirmation from RTA that an overpass will be constructed to provide access to quarry site when East-West Road upgraded as part of the Princes Highway.
- p. Impact of vehicle movements on residential areas and traffic movements in the area.
- q. Loss of agricultural land and impact on existing agricultural land uses.
- r. Consideration of end use options and opportunities to coordinate rehabilitation with adjoining quarry operations.
- s. Extent of imported backfill required to achieve site rehabilitation/development.
- t. Discussion needed on Environment Protection and Biodiversity Conservation Act and its relationship to this proposal.
- u. Methods used to reduce visual impacts from quarry activities and excavation.
- v. Social impact assessment required.

We have attached an extract of the draft Rural LEP showing the draft zones, an extract of the draft State & Regionally Significant Mineral Resource layer as well as an extract showing areas of high conservation significance. These plans cost \$5.00 each. Please send your payment as soon as possible.

Please contact me on 42216136 if you need more information.

Yours sincerely



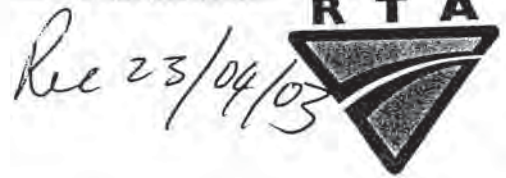
**Ian Rankine
Senior Strategic Planner**

401.5329

Fiona Ristovski - (02) 4221 2409

S00/00534

Ms Sylvia Nillsen
Major Development Assessment
PlanningNSW
GPO Box 3927
SYDNEY NSW 2001



**Roads and Traffic
Authority**

www.rta.nsw.gov.au

ABN 64 480 155 255

Southern Region

Level 4
90 Crown Street
Wollongong NSW 2500
Telephone (02) 4221 2460
Facsimile (02) 4227 3705
PO Box 477
Wollongong NSW 2520
DX 5178 Wollongong

Proposed Extension to Cleary Brothers' Albion Park (Rail) Quarry.

Dear Ms Nillsen,

I refer to your letter dated 31 March 2003 regarding the Development Application and Environmental Impact Assessment (EIS) for the proposed extension of the Cleary Brothers' Quarry at Albion Park Rail. The opportunity to participate in the assessment process is appreciated.

It is noted that Director - General's Requirements were issued to the proponent in March 2001 and no further action was taken. The RTA provided comments in this regard in a letter dated 21 November 2000.

As stated in the initial letter, the RTA's primary concern is the volume and effect of potential additional traffic generated by the proposed quarry. As there have been some significant changes to the road network at Oak Flats/ Albion Park Rail since the original requirements were issued, the following comments are offered for consideration when preparing the EIS:

- It is noted that Cleary Brothers' light and heavy vehicle traffic now access the quarry via a roundabout intersecting the newly constructed East West Link. In terms of the RTA's requirements for the EIS, analysis of the impact of the potential traffic generated by the proposed quarry on both the Princes Highway and the East West Link should be undertaken.

This would include details of existing and additional traffic volumes at all nearby intersections along with any necessary amelioration measures identified. Specific details should be provided about the impact on intersection performance as a result of the proposed development for the Princes Highway Oak Flats Interchange, the East West Link/Cleary Brothers access, Princes Highway/Tongarra Road and Princes Highway/Illawarra Highway.

- Identification of likely road, cycleway and public transport infrastructure upgrades needed to support this proposal.
- An assessment of the potential increase in toxicity levels of loads transported on arterial and local roads and consequently the preparation of an incident management strategy that outlines incident response and management measures.
- Details of the expected destinations of heavy vehicles delivering the quarry's product including the proposed routes to be utilised.
- Details of the type and size of heavy vehicles expected.
- The EIS should also include an assessment of the level of impact on pavement condition resulting from the existing and predicted heavy vehicle movements associated with quarry operations. The costs associated with the increased wear and tear on the pavement ie. the extent of the acceleration of damage and the need to rehabilitate the pavement should also be evaluated.
- An assessment of overall traffic impacts is required ie. the extent to which any additional traffic may impact on the safety and efficiency of the road network, especially on major intersections and the efficiency of traffic movement through Albion Park Rail. The RTA and Council have recently finalised an interim strategy to manage traffic along the Princes Highway through Albion Park Rail until the eventual construction of the Yallah to Oak Flats deviation. Analysis of whether traffic generated as a result of the proposed quarry may impact on the implementation of the above strategy should also be included.

Should you have any questions relating to this matter please contact Fiona Ristovski on 42 212409 at the RTA's Southern Regional Office.

Yours faithfully



Rick Chaseling
Development Manager
16 April 2003

So sorry for the delay

DEPARTMENT OF MINERAL RESOURCES

EIS RESOURCE DATA

The Department of Mineral Resources considers that it is in the best interests of the proponent to fully assess the resources which are subject of the proposal. This means that a thorough geological assessment should be undertaken to determine the nature, quality and extent of the resource. Failure to undertake such an assessment could lead to operational problems and possibly failure of the proposal.

Resource Assessment

The following issues need to be addressed in the environmental impact statement (EIS):

1. A summary of the regional and local geology including information on the stratigraphic unit or units subject of the proposal.
2. The amount of material available for extraction and the method or methods used to determine this amount (e.g. drilling, trenching, geophysical methods). Plans and cross-sections summarising this data, at a standard scale, showing location of drillholes and/or trenches, and the area proposed for extraction, should be included in the EIS. Relevant supporting documentation such as drill logs should be appended. Major resource proposals should be subject to extensive drilling programs to identify the nature and extent of the resource.
3. Characteristics of the material or materials to be produced:
 - a) For clay/shale extraction proposals, ceramic properties such as plasticity, drying characteristics (e.g. dry green strength, linear drying shrinkage), and firing characteristics (e.g. shrinkage, water absorption, fired colour) should be addressed.
 - b) For sand extraction proposals, properties such as composition, grain size, grading, clay content and contaminants should be indicated. The inclusion of indicative grading curves for all anticipated products as well as the overall deposit is recommended.
 - c) For hard rock aggregate proposals, information such as grain size and mineralogy, nature and extent of weathering or alteration, and amount and type of deleterious minerals, if any, should be indicated.
 - d) For other proposals, properties relevant to the range of uses proposed for the particular material should be indicated.

Details of tests carried out to determine the characteristics of the material should be appended. Such tests should be undertaken by NATA registered testing laboratories.

4. An assessment of the quality of the material and its suitability for the anticipated range of applications should be given.
5. The amount of material anticipated to be produced annually should be indicated. If the proposal includes a staged extraction sequence details of the staging sequence needs to be provided. The intended life of the operation should be indicated.
6. If the proposal is an extension to an existing operation, any past annual production data (by financial year) for all products should be supplied in support of the proposal.
7. An assessment of alternative sources to the proposal and the availability of these sources. The impact of not proceeding with the proposal should be addressed.
8. Justification for the proposal in terms of the local and, if appropriate, the regional context. Identification of the subject site in relevant planning instruments such as regional environmental plans, should be noted.
9. Information on the location and size of markets to be supplied from the site.
10. Transport routes for the material to the market.
11. The location and size of stockpiles.

Safety Issues

In the safety issues, the following points are made:

1. All operations are to comply with the Mines Inspection Act, 1901, as amended.
2. The company is to nominate a person (or persons) as General Manager and Production Manager as required by the Mines Inspection Act 1901, Section 5 and 5B.
3. The General Manager must appoint trained and competent shotfirers to conduct all blasting operations.
4. The company is required to contact the Regional Inspector of Mines for a list of guidelines and safety issues which are to be addressed and for the required competencies for a Production Manager.

Mineral Ownership

The Mining Act 1992, and its precursors, defines which minerals are owned by the Crown. Many quarry materials are not prescribed minerals under the Mining Act. In general terms this means these materials are owned by the landowner and a mining title is not required for their extraction.

Sand, loam, river gravel, and coarse aggregate materials such as basalt, sandstone, and granite are not prescribed minerals under the Mining Act 1992. Therefore, the Department of Mineral Resources has no statutory authority over the extraction of these commodities, apart from its role under the Mines Inspection Act 1901 (as amended) with respect to safe operation of mines and quarries. However, the Department is the principal government authority responsible for assessing the State's resources of construction materials and for advising State and local government on their planning and management.

Minerals such as *brick clay, kaolin and limestone* are prescribed minerals under the Mining Act 1992. The proponent needs to determine whether the material is privately owned or Crown mineral (publicly owned). If it is privately owned, then either a notification under Section 8 of the Mining Act 1992 or, alternatively, a mining lease or mineral claim would be required. If it is a Crown mineral, an application for a mining lease or mineral claim will have to be lodged.

For your information, *brick clay* was proclaimed a Crown mineral on 22 January 1913, *kaolin* was proclaimed a Crown mineral on 15 July 1907 in terms of the Mining Act and *limestone* was proclaimed a Crown mineral on 21 August 1907.

If you are unsure whether a mining title is required for your proposal you should contact the Department of Mineral Resources.



Goulburn Office

NSW Agriculture

159 Auburn Street
PO Box 389
GOULBURN NSW 2580

Telephone: (02) 4828 6600
Facsimile: (02) 4822 3261
<http://www.agric.nsw.gov.au>

Your ref:
Our ref: AJD.VS

20 November, 2000

Mr Richard Lloyd
Senior Environmental Planning Officer
Development and Infrastructure Assessment
Department of Urban Affairs and Planning
GPO Box 3927
SYDNEY NSW 2001

Dear Richard,

Re: Cleary Bros Proposed Gravel Pit, Albion Park

Thank you for the opportunity to attend the Planning Focus Meeting and view the site. My initial impression is that this is attempting to push a development into an area where in all reasonableness it isn't sustainable.

There is some doubt about the ability of Cleary's to transport the material through a haul road on CSR's land. That was indicated at the meeting.

I fully realise the bona fide of Cleary's and their undoubted commitment to the Illawarra. That's probably for others to judge. The benefits to the Illawarra should not override the commitment to the environment.

This Department has the following concerns, which will need to be addressed in the document.

1. The impact on the adjoining dairy farm. There is considerable concern over noise, dust vibration, ground water, surface water and simply falling over the edge by errant cows from this proposal. This will need to be investigated.

Consultants always say that flyrock is no concern, however as the force comes closer to the dairy the risk increases.

2. The use of the existing site. When and how will the existing hole be rehabilitated to some landscape that is valuable to the community?
3. Storage of topsoil. A plan for effective storage and management of topsoil held for rehabilitation of the void should be included.

4. Weeds. Disturbed ground is a haven for weeds in all climates. A program to control the spread of weeds, particularly onto the dairy pastures should be developed in the document.
5. Dust. The control of dust is an essential study. Pastures and crops when covered by dust become unpalatable. Prevention of even the slightest dust nuisance onto the pastures is an essential study.
6. Groundwater. Extraction may have some impact on groundwater resources. Any potential impacts will need to be identified.

This Department would be pleased to review the document when it is prepared.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'A.J. Dymock', with a stylized flourish at the end.

A.J. Dymock
Agricultural Environmental Officer



NSW
NATIONAL
PARKS AND
WILDLIFE
SERVICE

ABN 30 841 387 271

5 MAY 2003

Ms Sylvia Nillsen
Environmental Planning Officer
Major Development Assessment
PlanningNSW
GPO Box 3927
SYDNEY NSW 2001

Your Ref.: S00/00534
Our Ref.: 96/765

Dear Ms Nillsen

**Re: Proposed extension to Cleary Brothers' Albion Park (Rail) Quarry –
Shellharbour LGA**

Thank you for your letter dated 31 March 2003 requesting the National Parks and Wildlife Service's (NPWS) requirements for the Environmental Impact Statement for an extension to an existing quarry at Albion Park Rail owned by Cleary Brothers.

The NPWS has a statutory responsibility for the protection and care of native flora, native fauna and Aboriginal objects and places. Accordingly the NPWS has an interest in ensuring that potential impacts to these attributes are appropriately assessed and managed.

In October 2000, NPWS Environmental Impact Assessment Guidelines were provided to the Department of Urban Affairs and Planning to be incorporated into the Director-General's Requirements which were issued in March 2001 for the proposed development. Please find attached the current version of this document called "General Guidelines for Impact Assessment".

In order to adequately determine impacts on native flora, fauna and Aboriginal objects and places, the following detailed comments are provided:

Flora and fauna study

The NPWS is concerned about the cumulative impact on native flora and fauna, (particularly *Cynanchum elegans*) due to numerous extraction activities in the study area and resulting changes to the hydrological regime.

The flora and fauna study should include an analysis of impacts on threatened species including *Cynanchum elegans*, *Zieria granulata* and *Daphnandra* sp. C (Schedule 1 TSC Act), and a number of regionally significant species including *Geijera latifolia*, *Alchornea ilicifolia*, *Canthium coprosmoides*, *Derringingia amaranthoides*, *Cinnamomum oliveri*, and *Austromyrtus acmenoides*, in the remnant vegetation. As the cumulative impact of extraction activities in the Albion Park area may result in the loss of some of these populations, the importance of the subject site to the conservation of these species needs to be assessed.

Conservation Program:
& Planning Division
Central Directorate
Level 6
43 Bridge Street
P.O. Box 1967
Hurstville NSW
2220 Australia
Tel: (02) 9585 6678
Fax: (02) 9585 6442
www.npws.nsw.gov.au

This should include:

1. A determination of the extent of known and potential habitat in the area.
2. A determination of the likely extent of each population, including the age of the plants and available seed bank.
3. Assessment of the significance of each population within a local and regional context.
4. Justification of proposed buffer widths as sufficient to avoid impact on the remnant vegetation and threatened species.
5. An assessment of any changes to the water regime on the species composition and long term viability of the remnant vegetation and habitat values considering long and short term impacts. This assessment should be based on data from hydrological modelling and other relevant information. Analysis should include any reduced overland and through water flow on wet sclerophyll forest and rainforest vegetation that requires a certain level of water to survive. This is also necessary as reduced soil moisture may encourage weed encroachment, potentially affecting the viability and maintenance of the forest.
6. An analysis of potential sedimentation, erosion, drainage and discharge and the potential effectiveness of mitigation measures in minimising impacts on the remnant vegetation.

More generally, the flora and fauna study should comprise a description of vegetation communities on the site including:

- descriptive profile of each community;
- Threatened flora and fauna and Endangered Ecological Communities listed under the *Threatened Species Conservation Act, 1995* (including preliminary listings and/or determinations) and listed under the *Commonwealth Environment Protection and Biodiversity Conservation Act, 1999* and their conservation significance. The study should include
 - 1) those recorded on the site or in the vicinity of the site (see NPWS Wildlife Atlas)
 - 2) those with the potential to occur; and
 - 3) their conservation significance.
- an assessment of the conservation significance of the vegetation communities at both a local and regional scale;
- the extent and impact of proposed clearing;
- the extent and impact of other disturbances;
- the habitat values of the vegetation, ie available habitat attributes and which threatened species or species of non-threatened fauna they relate to;
- the extent and nature of revegetation proposed.

Aboriginal Heritage

An assessment should be conducted on the Aboriginal heritage values of the subject site and adjoining area. The study on archaeological potential and cultural significance should be conducted in accordance with NPWS guidelines contained in the NPWS' publication "Aboriginal Cultural Heritage: Standards and Guidelines", which may be purchased by contacting the NPWS' Cultural Heritage Conservation Division on (02) 9585 6571. The study should address the following:

- an archaeological assessment;
- an Aboriginal cultural heritage assessment;
- the likelihood of disturbance of Aboriginal sites;

- details of consultation with the local Aboriginal community; and
- proposed ameliorative measures.

Should the development application be approved, the NPWS recommends that management guidelines, a rehabilitation plan and monitoring and contingency plans for threatened species habitat be provided with the development application.

Should you require any additional information please contact Isabelle Connolly, Conservation Planning Officer on 9585 6841 or email isabelle.connolly@npws.nsw.gov.au.

Yours sincerely,

Helen Mulligan 30/4/03

Helen Mulligan
A/Manager, Conservation Planning Unit
Central Conservation Programs and Planning Division



NSW NATIONAL PARKS AND WILDLIFE SERVICE

GENERAL GUIDELINES FOR IMPACT ASSESSMENT

The National Parks and Wildlife Service (NPWS) has an interest in the potential impacts of proposals on the following:

- areas of native vegetation;
- areas of potential value as habitat for native fauna;
- sites and places of Aboriginal cultural heritage, including areas of archaeological potential; and
- land dedicated under the *National Parks and Wildlife Act 1974 (NP&W Act)*.

If these attributes are anticipated to be present in your study area and / or likely to be impacted, it is recommended that assessments by a suitably qualified person be undertaken to determine the extent of impact. The NPWS suggests that the following basic details be included in the assessments:

- the qualifications and experience of the person undertaking the work; and
- a detailed description of survey methodology including survey design, sampling methods, weather conditions, time and duration of surveys and location of any survey sites and transect lines.

Specific issues that are recommended to be addressed by the assessments are detailed below.

General information

- description of the proposal and the way in which the environment will be modified;
- map(s) placing the proposal in a regional and local setting;
- applicability of Local Environmental Plans, Regional Environmental Plans and State Planning Policies to the proposal;
- information on the current and past land uses of the site and that of the surrounding area; and

- appropriately scaled maps which identify the location and extent of any areas of native vegetation and fauna habitat and Aboriginal cultural heritage value in relation to the area of proposed development.

Impacts

- prediction of the likely impact of the proposal on land dedicated under the *NP&W Act*;
- prediction of the likely impacts of the proposal on areas and items of natural significance, such as native vegetation and fauna habitat, and on Aboriginal heritage sites and areas of cultural significance. This should include consideration of any off-site impacts; and
- assessment of measures available to minimise the impact of the proposal on these attributes, including potential conservation options, alternative development options and monitoring programs, if appropriate.

Native flora, fauna and threatened species

The following information is considered necessary to assess the potential impact of a proposal:

- detailed description and mapping of all vegetation communities in the study area;
- identification of any vegetation communities or plant species which are of local, regional or state conservation significance (including threatened species, populations, ecological communities or critical habitat listed under the *Threatened Species Conservation (TSC) Act*). The criteria for establishing significance should be documented;
- description of known or expected fauna assemblages within the study area;
- identification of fauna habitat likely to be of local, regional or state significance (including habitat of threatened species, populations, ecological communities or critical habitat listed under the *TSC Act*);
- identification of habitat corridors and linkages between areas of remnant native vegetation which may assist faunal movement through the area and an assessment of the conservation significance of these; and
- prediction of the likely impact of the proposal on the above attributes (quantification of the extent of impact where practical).

In addition to these general requirements, there are specific requirements relating to the assessment of a proposal and its potential impact on threatened species, populations, ecological communities, their habitats and critical habitat.

The provisions of the *TSC Act* and related provisions of the *Environmental Planning & Assessment Act* should be considered when undertaking the assessment of a proposal. In addition to the *TSC Act* itself, further information on the provisions of the *TSC Act* may be obtained from the Department of Urban Affairs and Planning Circular No. A13 (12 December 1995). The NPWS has also produced Information Circulars

on the *TSC Act* which may be obtained by contacting the NPWS Information Centre on (02) 9585 6333.

Concurrence provisions

Where a consent authority determines that a proposal is likely to have a significant effect on threatened species or their habitats, a species impact statement (SIS) must be prepared in accordance with the requirements of the Director-General of the National Parks and Wildlife Service. If, after considering the SIS, a consent authority intends to grant approval to a proposal that will have a significant effect on threatened species or their habitats then the concurrence of the NPWS is required. If the Minister for Urban Affairs and Planning is the consent authority the concurrence of the NPWS is not required, but consultation must occur with the Minister for the Environment before development consent is granted.

The process and timeframes for development applications that require concurrence are detailed in Division 2 of the *Environmental Planning and Assessment Regulation 1998*.

Aboriginal heritage

General issues

For the purposes of these guidelines Aboriginal heritage is considered to include "Aboriginal objects" and places of significance to Aboriginal communities.

Under the *NPW Act*, an 'Aboriginal object' is defined as any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains. Aboriginal objects are confined to physical evidence. Aboriginal objects are commonly referred to as Aboriginal sites.

An "Aboriginal place" is a place which has been declared so by the Minister for the Environment because he or she believes that the place is or was of special significance to Aboriginal culture. It may or may not contain physical Aboriginal objects.

It should also be noted that there are places in the landscape which have particular meaning for Aboriginal people, for example, spiritual areas or natural mythological areas. Although these areas are not protected under the *NPW Act*, unless they contain physical remains of Aboriginal occupation or have been declared an 'Aboriginal place', it is recommended that the potential impact of proposals on such places also be considered in the assessment process.

Assessment process

It is recommended that an assessment be conducted of the Aboriginal cultural values of the study area if the proposal involves disturbance to substantially unmodified ground surfaces. If the study area is considered to have archaeological potential or cultural significance then it is recommended that a survey and assessment be undertaken in accordance with NPWS guidelines. These guidelines are contained in the NPWS' publication "Aboriginal Cultural Heritage: Standards and Guidelines", which may be purchased by contacting the NPWS' Cultural Heritage Conservation Division on (02) 9585 6571.

Should any Aboriginal archaeological sites be present in the study area, you should consider the requirements of the *NP&W Act* with regard to Aboriginal objects. Under s90 of the *NP&W Act* it is an offence to knowingly damage or destroy Aboriginal objects without the prior permission of the Director-General of the NPWS.

In assessing Aboriginal heritage values, consideration should also be given to whether the study area is likely to contain places of cultural significance to the Aboriginal community. It should be noted that places of cultural significance to the Aboriginal community are not limited to archaeological sites. An assessment of cultural significance should involve consultation with community representatives and if necessary, documentary research to establish whether there are any places of traditional or historic significance to the Aboriginal community.

Integrated Development Assessment

Under recent amendments to the *EP&A Act*, a range of approvals and licences issued by various agencies have been integrated with the development approval process. Section 91 of the *Environmental Planning and Assessment Amendment Act 1997* lists the approvals of agencies which are included in the integrated development assessment (IDA) process.

This includes Section 90 approvals under the *NP&W Act* regarding consent to knowingly destroy, deface or damage or knowingly cause or permit the destruction or defacement of or damage to an Aboriginal object or Aboriginal place. Where an Aboriginal object or an Aboriginal place is known to occur on land prior to the lodgement of a development application, and the development proposal will damage, deface or destroy the Aboriginal object or Aboriginal place, thereby requiring a consent to destroy from the Director-General of the NPWS, the NPWS will become an approval body.

It should be noted that where an Aboriginal object or Aboriginal place is found to occur on land after a development application is lodged, separate NPWS approval will still be required under Section 90 of the *NP&W Act*.

The NPWS has prepared detailed guidelines to assist councils and applicants in the IDA process (copies available upon request). The guidelines outline the role of the NPWS in the IDA process and describe the information that needs to be submitted in an integrated development application. In summary, two types of information are required:

- Aboriginal cultural heritage assessment which involves consultation with the Aboriginal community groups. The NPWS is committed to working in partnership with the Aboriginal community groups in the management of Aboriginal sites and requires community assessment of any Aboriginal site management; and
- Archaeological assessment which involves the assessment of Aboriginal sites and their management based on archaeological heritage criteria.

Environmental impact statements

Where an environmental impact statement (EIS) is required to be prepared for an integrated development, the Director-General of the Department of Urban Affairs and Planning (DUAP) must request each approval body to provide their requirements in relation to the EIS. If the approval body does not provide those requirements within 14 days then the Director-General of DUAP must inform the applicant and the applicant must consult with the approval body to obtain its requirements for the EIS.

If an EIS is to be prepared for an integrated development that involves a Section 90 approval under the *NP&W Act*, the NPWS will be requested to provide its requirements for the EIS. In this situation, the NPWS requirements for the EIS are the same as for any IDA proposal that requires a Section 90 approval under the *NP&W Act*. These requirements are detailed in the attached guidelines.

Databases

The NPWS has two GIS databases which may provide information of use to you if you proceed to undertake further assessment. These are:

- Atlas listing of fauna and flora records in NSW;
- Aboriginal Heritage Information Management System.

The material from these databases is available upon written application and the receipt of the appropriate fee. If you are interested in obtaining access to the Atlas database, please contact the Data Licensing Officer, GIS Division, on (02) 9585-6684. Records from the Aboriginal Heritage Information Management System may be obtained upon written application to the Registrar, Cultural Heritage Conservation Division, on (02) 9585-6471.

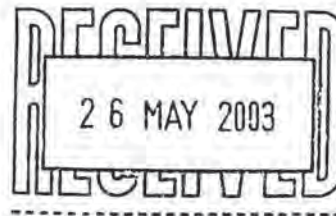
Further Information

For further information please contact:

Manager, Conservation Planning Unit
Conservation Programs and Planning Division
Central Directorate
NPWS
PO Box 1967
Hurstville NSW 2220

Ph - (02) 9585 6674
Fax - (02) 9585 6442

Your Reference :
Our Reference : 280102A10:WOF9254,WOF9416:PW
Contact : Paul Wearne, (02) 4224 4100



Department of Urban & Transport Planning
(Attention: Sylvia Nilsen)
GPO Box 3927
SYDNEY NSW 2001

South Coast

Dear Madam

**PROPOSED EXTENSION TO CLEARY BROS ALBION PARK RAIL QUARRY
SHELLHARBOUR GOVERNMENT AREA**

We are writing in reply to your letter dated 31 March 2003 requesting advice on whether the Environment Protection Authority's (EPA) requirements for an Environmental Impact Statement (EIS) for the above development, dated 6 December 2000, are still valid.

We have reviewed our previous correspondence dated 6 December 2000. In that letter the EPA expressed considerable concern regarding that proposal being determined prior to Council establishing a strategic planning framework for this and other extractive operations in the area. We are attaching a copy of this letter as the strategic concerns remain relevant to this assessment.

The EPA has reviewed its requirements for the EIS and the revised document is also attached. These amendments contain the changes in environmental policy and requirements which have occurred since our letter of December 2000.

Should you have any enquiries please contact the above designated officer.

Yours sincerely

A handwritten signature in dark ink, appearing to read "Trevor Jones 15/5/03".

TREVOR JONES
Regional Manager South Coast

Att

cc: TW Perram and Partners Pty Ltd
(Attention: Terry Perram)
12 Clanwilliam Street
EASTWOOD NSW 2122

(N:\IDA\LETTERS\WOF9265 EXTENSION TO CLEARY BROS QUARRY.DOC)

Environment Protection Authority

PO Box 513 Wollongong East NSW 2520 Australia

Telephone 61 2 4224 4100

Facsimile 61 2 4224 4110

ABN 43 692 285 758

www.epa.nsw.gov.au

Level 3 NSW Government Offices 84 Crown Street Wollongong NSW 2500

ATTACHMENT

Issues to be addressed in the development of an Environmental Impact Statement (EIS) for the proposed Cleary Brothers (Bombo) Pty Ltd – Proposed Hard Rock Quarry, Albion Park

The Environment Protection Authority (EPA) requests the following issues be addressed in the EIS for the proposed hard rock quarry, Albion Park.

PREAMBLE

The extent of the development must be fully detailed in the EIS including those activities which could be directly or indirectly impacted by the proposal. This may include stockpiles, work areas, haul roads, process areas and all activities associated with the site. In addition details should be provided on the integration with the existing quarry and expected time frames for the cessation of operations. Such details should also include rehabilitation strategies.

The proposed development would be located 300 to 400 metres from the Dunster's residence, and this close proximity compounds the level of risk in relation to environmental impacts associated with activities at the quarry. For example, the level of risk increases with blasting operations occurring closer to the Dunster's property, due to factors such as the geology of the land beneath the Dunster residence which could contribute to unacceptable blasting impact. The EIS must detail options and identify preferred strategies to address this risk. One option the proponent may wish to explore is the possible purchase of the Dunster property.

The EPA recommends that the format of the EIS be such that the following environmental performance objectives are highlighted at the start of each relevant section. The section then would detail how these objectives will be achieved.

Executive Summary

The executive summary should include an overview discussion of the extent to which the proposal achieves the identified environmental outcomes.

The Location

Provide an overview of the affected environment to place the proposal in its local and regional environmental context including:

- Meteorological data (for example rainfall, temperature and evaporation, wind speed and direction);
- Topography (for example landform element, slope type, gradient and length);
- Surrounding land uses (potential synergies and conflicts);
- Soil types and properties (including erodibility, engineering and structural properties, dispersibility and any soil issues such as salinity);
- Availability of services and the accessibility of the site for passenger and freight transport;
- Surrounding landuses and planning zonings;
- Anticipated land contours after mining; and
- Potential long-term use of the land after mining operations cease.

The Proposal

Overview of the proposal

The proposal should be clearly described and refer to:

- The size and type of the operation, the nature of the processes and the products, by-products and waste produced (both for current operation and proposed future operation);
- A life cycle approach to the use or management of all materials and products;
- The anticipated level of performance in meeting cleaner production principles;

- The staging and timing of the proposal and any plans for future expansion; and
- The proposal's relationship to the existing operations at the quarry or any other industry or facility.

Outline actions to achieve cleaner production principles, including:

- Measures to minimise waste (typically through addressing source reduction);
- Proposals for use or recycling of by-products;
- Proposed management methods for solid and liquid waste;
- Air management systems including all potential sources of air emissions, proposals to re-use or treat emissions, emission levels relative to relevant standards in regulations, discharge points;
- Water management system including all potential sources of water pollution, proposals for re-use, treatment etc and performance of existing surface water management system.
- Noise management including the identification of measures to mitigate any potential noise impacts associated with the proposed development;
- Assessment for any site contamination, treatment and prevention systems.

Outline construction works including:

- Actions to address any existing soil contamination;
- Any earthworks or site clearing; re-use and management of excavated material (including use of spoil on site);
- Construction timetable and staging; hours of construction; proposed construction methods and;
- Environmental protection measures, including noise mitigation, dust control and erosion and sediment control measures.

1. SCOPE OF WORKS

- 1.1 Define the premises (including any other premises associated with the proposed activity) relevant to the Development Application and details of the land use zoning, and any potentially affected areas.
- 1.2 Describe the existing quarrying operations.
- 1.3 Clearly describe the scope of work associated with the proposed extension of the quarry including all linkages with existing activities and processes at the premises, and providing a diagram of the layout of the site, vehicle turning areas, truck cleaning and maintenance areas, storage/stockpile areas etc
- 1.4 Describe the type of equipment to be used, sensitive receptors, local surrounding environment, source(s) of wastes, local climatic conditions.
- 1.5 The assessment needs to consider all phases of the project cycle including construction, routine operation, start-up operations etc.
- 1.6 Provide details on how the quarry extension will be integrated with the existing surface water management system.
- 1.7 Provide details on construction timetable and staging; hours of construction, environment protection measures, including water controls, noise mitigation measures, dust control measures and waste management.
- 1.8 Identify the origin, type and quantity of the materials.
- 1.9 Describe the procedure for handling and sorting all materials including reject and contaminated materials and management of reject materials.

2. AIR

Environmental Outcomes

The development must be designed, constructed, operated and maintained to achieve the following environmental outcomes:

- No visible dust emissions from material handling, storage, processing, haul roads, transport and material transfer systems.
- No offensive odour beyond the boundary of the premises
- A NO_x neutral situation and a reduction in NO_x emissions to 1998 levels where relevant in order to meet the NSW Government's 25 year Air Quality Management Plan.

In addition, the development must be designed, constructed, operated and maintained to minimise:

- Vehicular kilometres travelled (VKT).

The EPA considers that the requirements contained in NSW EPA, 2001, Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW must be appropriately addressed in the assessment and proposed management report for air quality for this development.

The development must have regard for the National Environment Protection Measure for Ambient Air Quality standards for criteria pollutants; and other recognised standards, goals, criteria, or objectives for air toxics.

Issues to be addressed

The EIS must demonstrate that these outcomes will be achieved and, in particular, include information concerning the following:

2.1 Existing Environment

- 2.1.1 Identify any sensitive locations likely to be affected by activities at the site, such as residential/rural residential properties which could be affected by air impacts.
- 2.1.2 Identify the land use zoning of the site and the immediate vicinity. Describe existing air quality, using existing information and on-site monitoring. Any necessary air monitoring programs should be established as early as possible in the site evaluation and project formulation. The following should be considered in developing a baseline monitoring program:
 - Simultaneous meteorological data collection;
 - Pollutants to be monitored;
 - Number and location of sampling sites;
 - Duration of survey;
 - Sampling equipment;
 - Sampling protocols; and
 - Existing monitoring data.

2.2 Identification of potential pollutants and assessment of impacts

- 2.2.1 The assessment should consider all phases and ancillary activities and identify all activities likely to generate air impacts or have the potential to cause harmful effects on the environment including health and amenity, and all related environmental issues, including those detailed below.

Construction Phase

- 2.2.2 Details of dust controls and mitigation measures during the construction phase.

Material Handling, Storage and Quarry site

- 2.2.3 Details of material handling, storage and transfer system.
- 2.2.4 Details of cleaning devices fitted to any conveyor systems.
- 2.2.5 Details of any pollution controls to suppress dust at transfer points as a result of material being transferred around the site. Note: All conveyors must be fully enclosed to prevent wind blown dust.

- 2.2.6 Details on the location and size of any stockpiles including their management to prevent wind blown dust.
- 2.2.7 Details of proposed techniques to suppress wind blown dust especially the quarry site and associated activities.
- 2.2.8 Information should be provided on strategies for dust suppression in relation to high wind early warning management.
- 2.2.9 Details of spillage response including details of sealed surface management to prevent windblown dust in particular truck loading areas.
- 2.2.10 Details on truck loading including details on dust suppression during loading operations.

Haul Road

- 2.2.11 Details on location of the haul road including information on its management. Note: the haul road must be sealed.

Material Processing Area

- 2.2.12 Details on the environmental performance of processing equipment such as crushers. This equipment must be operated to meet the environmental outcomes.
- 2.2.13 Details are to be provided on process material handling and storage.
- 2.2.14 Details of spillage response including details of sealed surface management to prevent windblown dust in particular truck loading areas.
- 2.2.15 Details on truck loading including details on dust suppression during loading operations.
- 2.2.16 Details of any air pollution controls or mitigation measures and expected performance.
- 2.2.17 Details on any mobile crushing and associated pollution controls to meet the environmental performance objectives.

2.3 Emissions and Environmental Impacts

- 2.3.1 Identify all air pollutants likely to be generated, including but not necessarily restricted to odour, dust, dust deposition, total suspended particulates and PM 10:
 - Provide emission rates for those pollutants for the different activities being undertaken at the site;
 - Determine the resulting ground level concentration of pollutants.
- 2.3.2 Determine the effects of pollutant concentrations on the environment including human health and amenity.
- 2.3.3 Provide details of environmental monitoring required to demonstrate impact assessment criteria are not being compromised in the construction and operational phases.
- 2.3.4 Due to the close proximity of the premises to residential land uses, computer dispersion modelling must be undertaken to predict any impacts as a result of emissions. These may include:
 - gaseous emissions;
 - dust/particulate emissions.
 - odour impacts;
 - local cumulative impacts;
 - regional cumulative impacts;
- 2.3.5 The modelling assessment must include information on:
 - modelling technique and calibration protocols;
 - topography and climatic influences on dispersion ;
 - surrounding land uses – if there is the possibility of a health risk, note exact locations of dwellings or other sensitive land uses, provide a perspective view of the study area such as the terrain file used in dispersion models;
 - all assumptions;
 - relationship to air quality standards, goals and guidelines;
 - recommendations for future monitoring during construction and operational phases.
 - details on the adequacy of pollution controls or mitigation measures to meet environmental objectives.

3. WATER

The EPA notes advice provided by the proponent at the Planning Focus Meeting that some water will need to be available to recharge both groundwater and to provide water flows in the unnamed creek to the south of the site for the purpose of maintaining the remnant rainforest areas. Advice should be sought from Department of Sustainable and Natural Resources and the National Parks and Wildlife Service on the regime for recharging the water body for this purpose including the identification of appropriate water quality criteria. The EPA would not support indiscriminate discharges to the waterway of poor water quality but must be undertaken in a manner which maintains the integrity of the local rainforest and waterway communities while ensuring pollution of water does not occur. Details on how this matter is addressed should be included in the EIS.

Environmental Outcomes

The facility must be designed, constructed, operated and maintained so that:

- The operation of the facility does not compromise the protection of aquatic ecosystems in receiving waters;
- There is no discharge of polluted waters to waters at any time;
- All polluted water (including process waters, washdown waters and polluted stormwater) is captured on the site and directed to reticulated sewer where available or else collected, treated and beneficially reused, where this is consistent with environmental and health guidelines and complies with Section 120 of the Protection Of Environment Operations Act;
- Bunding is in accordance with the EPA technical guidelines '*Bunding and Spill Management*' and designed for no-discharge.

The following policies and guidelines need to be considered when taking into account water issues on site:

- ANZECC (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*;
- The NSW State Groundwater Policy - Framework Document, Quality Protection Policy, Groundwater Quantity Management Policy and Groundwater Dependent Ecosystems Policy;
- The relevant targets within the State Water Management Outcomes Plan;
- *Managing Urban Stormwater: Council Handbook, Draft (November 1997)*;
- *Managing Urban Stormwater: Source Control, Draft (January 1999)*; and
- NSW Department of Housing '*Managing Urban Stormwater: Soils and Construction*', (August 1998).

In addition:

- Any trafficable areas must be sealed.

Issues to be addressed

The EIS must show that these outcomes will be achieved and, in particular, include information concerning the following:

3.1 Hydrology

3.1.1 Details are required on the hydrological catchment. Such information should also include a hydrological assessment which includes:

- Site drainage including a catchment perspective;
- Surface drainage characteristics;
- Connection of surface water to groundwater (if any);

- Changes resulting from the quarrying activity to existing flow regimes including groundwater; and
- The locations of any recharge areas, seeps or springs and the current use of groundwater.

3.1.2 Describe the existing water environment, including:

- Meteorology including climatic data, for example rainfall, etc;
- Sensitivity of the surface water and groundwater resource;
- Value of the water resource (economic, social and environmental value);
- Stream morphology.
- Any existing environmental impacts on groundwater and surrounding surface waters.

3.1.3 The condition of any natural waterbodies (expressed as level of compliance with relevant water quality objectives and standards) and levels of appropriate water quality parameters which could be impacted by the development.

3.2 Assessment of Impacts

Construction Phase

3.2.1 Details on soil and water management for the site during the construction phase of the development in accordance with the following two guidelines, *"Managing Urban Stormwater Soils and Construction"* and *"Managing Urban Stormwater Treatment Techniques"*.

Operational Phase

3.2.2 Detail the hydrological regime and catchment and provide information to demonstrate compliance with the environmental outcomes specified.

3.2.3 Describe surface water management for the premises and the proposed strategy to handle collected waters.

3.2.4 An integrated water management plan should be developed for the site, which addresses all aspects of the water cycle. The aim of the plan should be to maximise the potential for reuse and minimise water demand and the risk of water pollution. It should evaluate options such as:

- Using rainwater tanks to utilise the significant catchment area on the rooves of the sheds to substitute water supplied from groundwater and reduce stormwater impacts;
- collecting and storing stormwater and using it for dust control; and

3.2.5 Provide details on the use of any hazardous material (for example, fuel or chemicals) on site and their handling/use and storage and management practises to address any incidents involving accidental spills.

3.2.6 Details of surface water management including reuse initiatives.

3.2.7 Description of the potential sources of pollution and assessment of the pollutant characteristics.

3.2.8 As assessment of the adequacy of the design and management measures to minimise impacts, including those to prevent and control any discharges from the site. (Note: the local climate is such that the area is prone to intense rainfall events).

3.2.9 Details should provided on the adequacy of surface water pollution controls and the proposed strategy to handle collected waters so the structures are available for any proceeding rainfall events.

3.2.10 Details of any impacts on the groundwater hydrogeological regime.

3.2.11 Details of any equipment and maintenance areas, including wash down facilities, oil and water separation.

3.2.12 Details on stormwater management during the operational phase of the development, including separate controls for defined dirty and clean areas of the site.

3.2.13 Details of stormwater management of open stockpiles.

3.2.14 Details on surface water management of material process areas.

3.2.15 Details of any process waters and associated treatment and reuse.

4. NOISE

Environmental Outcomes

The facility must be designed, constructed, operated and maintained so that the facility:

- Complies with the NSW EPA Industrial Noise Policy.
- Does not cause intrusive noise at the nearest affected premises.
- Does not compromise local planning noise amenity goals.

The EPA considers that the following Noise Policies and Issues should form the basis for noise assessment and management for this development:

- Environmental Noise Management Series: NSW Industrial Noise Policy, January 2000.
- Environmental Noise Management Series: Environmental Criteria for Road Traffic Noise, May 1999.
- Chapter 171 Noise Control Guideline, Construction Site Noise, Environmental Noise Control Manual, 1994.
- Technical basis for Guidelines to Minimise Annoyance due to Blast Overpressure and Ground Vibration, Australian and New Zealand Environment Council, September 1990.
- Chapter 171 Noise Control Guideline, Construction Site Noise, Environmental Noise Control Manual, 1994.
- Chapter 163 Noise Control Guideline, Rail Traffic Noise, Environmental Noise Control Manual, 1994.

Issues to be addressed

The EIS must show that these objectives will be achieved and, in particular, include information concerning the following:

Construction Noise

- 4.1 Details should be provided on the expected impacts as a result of construction noise.
- 4.2 Proposed construction hours need to be specified.
- 4.3 If 24 hour work is proposed, specific measures to address noise impact during night time hours will need to be specified in the EIS. In assessing night time activity sleep disturbance criteria apply.
- 4.4 The identification of a construction noise management protocol which address the following issues:
 - compliance standards;
 - community consultation;
 - complaints handling monitoring systems;
 - site contact person to follow up complaints;
 - mitigation management measures;
 - the designed orientation of the proposed mitigation methods demonstrating the best practice;
 - construction time;
 - contingency measures when noise complaints are received; and
 - monitoring methods and programs.

Operational Noise

- 4.5 Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties.
- 4.6 The noise impact assessment must be undertaken in accordance with the EPA *Industrial Noise Policy*.
- 4.7 A blasting impact assessment must be undertaken to assess any impacts to the nearest most affected residences including the identification of measures to prevent impact.

- 4.8 Describe the development and its operation identifying all noise sources from the development. This must include expected noise level and noise character (for example, tonality, impulsiveness, vibration) likely to be generated from noise sources and proposed mitigation measures during:
 - (a) operational phases including sheet coil handling activities in particular the noise impacts associated with reversing alarms, include pumps, fans, conveyor systems, transport of goods, product handling, etc;
 - transport including traffic noise generated by the proposal;
 - (b) other services.
- 4.9 *Note: Noise emission levels and characteristics can be sourced from direct measurement of similar activities or from literature (if full references are provided).*
- 4.10 Specify the times of operation and all noise producing activities including number and times of truck movements and proposed truck routes to and from the proposed development.
- 4.11 If night time operation is proposed, specific measures to address noise impact during night time hours will need to be specified in the EIS. In addressing night time activity, sleep disturbance criteria apply.
- 4.12 Identify measures to be implemented to meet the environmental outcomes specified above.
- 4.13 Detail any potential noise from operation of stockpiles, mobile equipment reversing alarms, exact details are to be provided on any crushing on the site.
- 4.14 Any noise impacts as a result of traffic noise generated by the proposal must be assessed in accordance with "EPA Environmental Criteria for Road Traffic Noise" (1998).
- 4.15 An assessment of cumulative noise impact including the existing quarry remaining in operation and the implications of surrounding quarry operations.
- 4.16 Predictions of both pre and post development noise levels.
- 4.17 Details on noise monitoring to assess compliance with the predictions.

5. WASTE

Environmental outcomes

The development must be designed, operated and maintained:

- In accordance with the principles of the waste hierarchy and cleaner production.
- To ensure that the handling, processing and storage of all materials used at the premises does not have negative environmental or amenity impacts.
- The beneficial reuse of all wastes generated at the site are maximised including but not necessarily limited to slurries, dusts and sludges.
- No waste disposal on site except in accordance with an EPA licence.

In addition:

- Liquid and non-liquid waste residuals should be classified and managed according to the Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (NSW EPA, 1999).

Issues to be addressed

- 5.1 Characterisation of all wastes in accordance with the NSW EPA Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes (June 1999).
- 5.2 Outline cleaner production actions, including:
 - (a) measures to minimise waste
 - (b) proposals for use or recycling of by-products (including recycling of screenings)
 - (c) proposed long term management methods of solid and liquid waste
- 5.3 Provide details of liquid and non-liquid waste management at the facility, including:
 - (a) Identification and scale of all possible waste streams;
 - (b) Methods for handling/transportation of any wastes generated at the site;

- (c) Details of any stockpiling or storage of wastes and the time frame for reuse;
- (d) The method for management of all wastes or recovered materials at the facility; and
- (e) Characterisation and quantities of all wastes their destinations and management.
- 5.4 Provide details of the type and quantity of any chemical substances to be used or stored and describe arrangements for their safe use and storage.
- 5.5 Waste tracking and control. Identify all wastes that cannot be reused. In the assessments of these wastes reasons must be provided on why these wastes cannot be reused. Management of wastes must also be identified in accordance with the EPA environmental guideline, *"Assessment, Classification and Management of Non-liquid Wastes"*.
- 5.6 Clearly detail all environmental impacts associated with waste management.
- 5.7 All other information necessary to demonstrate how the above environmental outcomes and policy requirements will be achieved.

6. HAZARD ANALYSIS

Even with the best forms of technology and pollution controls, there still remains the risk of the possibility of unintentional or accidental emissions to the environment due to operational error and plant failure, which could result in air emissions, wastewater discharges, etc. The EIS should fully assess and identify procedures to prevent or minimise these risks to human health and the environment.

7. CONTAMINATED LAND

The land use, history and site needs to be considered in the EIS with regard to possible site contamination. A site assessment must be undertaken to assess whether there is any site contamination and its extent or whether there is any off site impact. This information is essential in developing the site. Such an assessment must be undertaken in accordance with the Department of Transport and Urban Planning's *"Contaminated Sites Guidelines"*.

8. ENVIRONMENTAL MANAGEMENT

The EIS must show that these objectives will be achieved and in particular, include information concerning the following:

- Operational procedures to manage air and noise emissions and any potential water discharges.
- Measures to assess any pollution control failures, including appropriate alarms to alert operators.
- Reporting procedures for exceedences to the EPA.
- Environmental training program.
- Complaint handling mechanisms.
- Strategies to achieve acceptable emissions in responding to the event of exceedences and emergency management plans.

9. GENERAL

- 9.1 Details of landuse proposed following mine closure and its relationship to other lands within the regional context.
- 9.2 Details on progressive mine site rehabilitation (including the existing excavation site and the appropriate landuse for the existing site.)
- 9.3 Details on a final Mine Closure Plan developed to address needs in accordance with the proposed landuse.
- 9.4 Details on environmental monitoring.
- 9.5 Details on the location of remnant rainforest vegetation and its significance.
- 9.6 Details on any site clearing.
- 9.7 Details on management of stripped topsoil to ensure it is available for rehabilitation of the site.

- 9.8 Details on overburden management including the identification of controls to prevent wind blown dust and contaminated stormwater pollution.
- 9.9 As part of an assessment in natural resource management investigate opportunities to integrate with other resources in the Region such as slags etc, to ensure resources in the region are being fully utilised.



Director
Development and Infrastructure Assessment
Department of Urban Affairs and Planning
GPO Box 3927
SYDNEY NSW 2001

Contact: Norm Sewell
Phone: 02 4226 8614
Fax: 02 4226 8599
e-mail: nsewll@dlwc.nsw.gov.au

Attention: Valerie Smith, Project Officer

20 November 2000

Dear Val

**Re: EIS REQUIREMENTS FOR PROPOSED HARD ROCK QUARRY AT
ALBION PARK (CLEARY BROS)**

Reference your letter of 20 October, 2000 and subsequent site inspection and planning focus meeting held to discuss the above proposal on 9 November, 2000.

DLWC would wish to see the issues listed below addressed in the Environmental Impact Statement.

1. Integrated Development – this development requires a 3A Permit under the Rivers and Foreshores Improvement Act (1948) because it is proposed to excavate material from the bank and bed and within 40 metres from the top of the bank of the watercourse that intersects the site from NW to SE.

The EIS needs to address in relation to this watercourse:

- any change in the surface hydrology as a result of the proposal
- any change in water quality leaving the site
- strategies to divert uncontaminated surface water including stormwater runoff around or away from the quarry and other disturbed areas
- strategies to prevent adverse impacts on the water quality by separating contaminated water from non-contaminated water on site to minimise amount to be collected or treated; measures to collect and treat any contaminated water
- a design criteria of sedimentation dams to contain runoff from the quarry.

2. Groundwater Issues – the EIS should address:

- any change in groundwater hydrology as a result of the proposal
- watertable and the relationship with the maximum excavation depth
- the location of any groundwater bores within 1 km of the site.

3. Erosion Control – the EIS should address:

- measures to minimise the area denuded at any one time
- a program to control wind and water erosion from stockpiles
- an integrated system of measures to control water flow within the site to minimise the volume and velocity of water flow and the transmission of sediment including the construction and maintenance of sediment ponds and traps
- a strategy to stabilise and maintain batters on excavated areas, open drains and bund walls to prevent erosion.

4. Rehabilitation – the EIS should address:

- the method of storage of topsoil, including measures to separate less fertile subsoil overburden from more fertile topsoil
- identify topsoil and overburden stockpile locations
- identify stockpile surface stabilisation measures such as mulching or temporary vegetation establishment
- outline proposed rehabilitation of cut and fill batter and access roads
- present details of reshaping of disturbed areas to create a landform that is aesthetically compatible with the surrounding area
- develop a revegetation plan that includes surface preparation, seed species and maintenance program for areas to be rehabilitated
- address proposed final use of the site.

5. Native Vegetation Clearing – the site inspection revealed an area of native vegetation in the SE corner. The EIS should address:

- the total area of native vegetation proposed to clear
- identify species particularly in regard to the Threatened Species Conservation Act

DLWC will determine whether this proposal requires development consent under the Native Vegetation Conservation Act 1997 for clearing of the native vegetation.

The proponent should be advised by DUAP that the NVC Act is not part of the integrated development approval process. DLWC encourages the applicant to consider early lodgement of any NVC application. It should be noted that consent under the EP&A Act does not mean that consent will also be given to clear native vegetation under the NVC Act.

Yours sincerely



Norm Sewell
Catchment Advisory Officer
Illawarra District



Contact: C Allen
Telephone: 02-9849 9569
allenc@heritage.nsw.gov.au
File: S90/07417/001
HRL: 12573

Mr Terry Perram
TW Perram and Partners Pty Ltd
12 Clanwilliam Street
Eastwood NSW 2122

Dear Mr Perram,

Re: Proposed Extension to Albion Park Quarry - EIS

I refer to your letter requesting comments on heritage requirements for the preparation of the above EIS.

The property called "The Hill", referred to in your letter, is not listed on the NSW State Heritage Register. As such this Office defers any comment on the management of the item to Shellharbour Council under the provisions of its Local Environmental Plan. In regard to other general heritage impacts associated with the proposed Quarry extension, the following issues should be addressed in the EIS:

- The heritage significance of the area to be impacted by the proposed Quarry extension must be assessed. This assessment should include natural areas and places of Aboriginal, historic or archaeological significance. It should also include a consideration of wider heritage impacts in the area surrounding the site.
- Non-Aboriginal heritage items within the area affected by the proposal are to be identified by field survey. This should include any buildings, works, relics (including relics underwater), trees or places of non-Aboriginal heritage significance. A statement of significance and an assessment of the impact of the proposal on the heritage significance of these items should be undertaken. Any policies to conserve their heritage significance should be identified. This assessment should be undertaken in accordance with the guidelines in the NSW Heritage Manual. The field survey and assessment must be undertaken by a qualified practitioner/consultant with historic sites experience.
- The relics provisions in the Heritage Act require an excavation permit to be obtained from the Heritage Council prior to commencement of works if disturbance to a site with known or potential archaeological relics is proposed. The EIS should identify any areas, which may require permits prior to the commencement of works.

The Heritage Office would be happy to review any further documentation that may address any archaeological impacts pursuant to Section 139 of the NSW Heritage Act. If you have any questions, please do not hesitate to contact this Office on 9635 6155.

Yours sincerely,

Susan Macdonald
Principal Heritage Officer

22.10.01

Level 11, 2-10 Wentworth Street, Parramatta NSW Locked Bag 5020, Parramatta NSW 2124
Telephone (02) 9635 6155 Facsimile (02) 9891 4688 www.heritage.nsw.gov.au DX 8225 PARRAMATTA



29 October 2001

Mr G Granger
Cleary Bros Pty Ltd
PO Box 210
Port Kembla
NSW 2505

Dear Graeme,

Cleary Bros – Proposed Albion Park Quarry Expansion

CSR Limited being the owner of Lot 2, DP 858245 hereby consent to the making of the development application by Cleary Brothers (Bombo) Pty Ltd for the development of a haul road, associated with a proposed quarry expansion on Lot 1, DP 858245.

This consent to the making of the development application does not imply CSR's support for the proposed development nor does it preclude CSR's right to make a submission in respect of the proposed development.

It should also be noted that this consent does not imply CSR's support for any proposed rezoning of CSR land, nor does it preclude CSR's right to make a submission nor negotiate in respect of any rezoning.

This letter does not bestow any rights to the use of the land by Cleary Bros or any other entity. This is the subject of separate commercial agreements between Cleary Brothers and CSR Ltd.

Yours sincerely,

A handwritten signature in black ink, appearing to read "D. Kelly", with a long horizontal stroke extending to the right.

David Kelly
Planning & Development Manager
CSR Readymix Sydney





24 October 2002

Mr J Cleary
Managing Director
Cleary Bros (Bombo) Pty Ltd
PO Box 210
Port Kembla
NSW 2505

Dear John,

Cleary Bros – Proposed Albion Park Quarry Extension

CSR Limited being the owner of Lot2, DP 858245 hereby consent to the exhibition of a Local Environment Study (LES) for the rezoning of a portion of this land, for the purpose of a haul road associated with the proposed Cleary Bros Albion Park Quarry expansion.

This consent to the exhibition of the LES does not preclude CSR's right to make a submission in respect of the LES nor does it bestow any rights to the use of the land by Cleary Bros or any other entity.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Norman Ruddock", written over a horizontal line.

Norman Ruddock
General Manager
CSR Readymix Sydney



Appendix F

PRESCRIBED MATTERS FOR CONSIDERATION BY THE CONSENT AUTHORITY

PREScribed MATTERS FOR CONSIDERATION BY THE CONSENT AUTHORITY

This Appendix is included to assist the consent authority. It summarises the matters for consideration prescribed under the Environmental Planning and Assessment Act and the various planning instruments applicable to the site and provides a brief response to each matter, indicating the compliance of the proposal (where the matter is relevant).

F.1 SECTION 79C, ENVIRONMENTAL PLANNING AND ASSESSMENT ACT

Section 79C of the Environmental Planning and Assessment Act, 1979 sets down matters to be considered, where relevant, by the consent authority when determining a development application.

Each of the matters included in Section 79C is reproduced in full below in italics.

- (a) *the provisions of:*
 - (i) *any environmental planning instrument; and*
 - (ii) *any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority; and*
 - (iii) *any development control plan; and*
 - (iv) *the regulations (to the extent that they prescribe matters for the purposes of this paragraph)**that apply to the land to which the development relates,*

The relevant planning instruments are Shellharbour LEP, 2000, Illawarra Regional Environmental Plan (No1 1986) and State Environmental Planning policy Nos 11. Draft Shellharbour Rural LEP 2001 is relevant for the purposes of section 79C(a)(ii). The role of the relevant instruments and plans is explained in Chapter 4. Matters referenced within these documents for specific consideration by the consent authority when determining a relevant development application are addressed in sections F.2 to F.5.

Matters prescribed in the Environmental Planning and Assessment Regulation (Clause 66) include: the Government Coastal Policy, which is not relevant to this site; and standards for the demolition of buildings, which are also not relevant to this site.

- (b) *the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*

The likely impacts of the proposal on the environment and social and economic impacts are considered in chapters 5 and 6.

(c) *the suitability of the site for the development,*

The suitability of the site is considered in Chapter 2.

(d) *any submissions made in accordance with the Act or the regulations,*

Submissions made in accordance with the Act will be received and considered by the Minister for Infrastructure and Planning after the development applications are placed on public exhibition.

(e) *the public interest.*

This is a matter for the Minister to consider, having regard to the strategic value of the extractive resource to New South Wales, the employment and economic benefits provided by Cleary Bros to the Illawarra community, the need for the company to obtain approval to extend its quarry, the suitability of the development for the site and the ability of the quarry to operate in an environmentally sustainable manner.

F.2 SHELLHARBOUR LEP, 2000

This consideration is based on the understanding that the land subject to development for the quarry extension and ancillary uses will be rezoned 4(c) - *Extractive Industrial* prior to the development applications being determined. Matters for consideration by the consent authority, or conditions to be met by the development, included in Shellharbour Local Environmental Plan, 2000 are listed (or paraphrased) individually in *Table F.1*, together with a summary of the consideration of the proposal under that heading.

Table F.1 SHELLHARBOUR LEP MATTERS FOR CONSIDERATION

Matter for Consideration	Consistency of Proposal
Clause 10(3) - <i>The objectives of the zone are required to be taken into account by the consent authority before development consent is given to the carrying out of development within that zone.</i>	The objectives of the extractive industrial zone are stated in clause 32(2), below
Clause 32(2) <i>Objectives of Zone 4(c) - Extractive Industrial zone: To identify those areas specifically allocated for extractive purposes.</i>	The proposed quarry extension is consistent with the objectives of this zoning, which allocates the land for extraction.

Matter for Consideration	Consistency of Proposal
Clause 72(1)(d) requires that development consent be obtained to move a relic. Clause 72(2) requires that the consent authority must take into consideration the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item	Relics affected by the project include dry stone walls, "Kyawana", farm fences and dams. The heritage significance of these items is considered in chapter 5.
Clause 75 - The consent authority must take into consideration the likely effect of the proposed development on the heritage significance of a heritage item or heritage conservation area, and on its setting, when determining an application for consent to carry out development on land in its vicinity.	A heritage item, "The Hill", is located on land to the north-west of the proposed development. The likely effect of the proposal on the heritage significance of "The Hill" and on its setting is discussed in chapter 5. "Kurrawong" is located south-west of the proposal but is at a lower elevation on a non-adjoining allotment. There would be no significant effect on the heritage significance of "Kurrawong".

F.3 ILLAWARRA REGIONAL ENVIRONMENTAL PLAN (NO 1-1986)

The text of Illawarra Regional Environmental Plan (No 1-1986) is presented in seventeen Parts, each containing provisions relating to a different aspect of the environment or likely human activity in the Illawarra Region. Parts of the REP relevant to the proposal include:

- ❑ Part II - Provisions Relating to Rural Lands;
- ❑ Part III - Provisions Relating to Extractive Materials;
- ❑ Part XV - Provisions Relating to Heritage

Particular clauses of the REP within the above Parts that specify matters for consideration by the consent authority, or conditions to be met by the development, are listed (or paraphrased) in *Table F.2*, together with a summary of the consideration of the proposal under that heading.

Table F.2 MATTERS FOR CONSIDERATION - ILLAWARRA REP

Consideration	Compliance of proposal
Land Supporting Rainforest Vegetation Clause 14(5) – <i>The consent authority shall not grant consent to development involving removing trees from land identified as supporting rainforest vegetation species unless it has consulted with the Director of NPWS and is satisfied that the development will be so managed as not to have any detrimental effect on the rainforest or rainforest species, or any detrimental effect can be justified by other factors.</i>	<p>The proposal is located on land that contains remnant rainforest. The contiguous area of rainforest will be protected and enhanced with infill plantings. Some isolated regrowth patches in the farming paddocks will be removed as part of the proposal. The impact on rainforest vegetation is considered in section 5.10.</p>
Transport of Extractive materials Clause 35 – <i>When practicable, the consent authority should consider attaching to appropriate development consents a condition requiring the transport of extractive materials or other bulk freight by other than road haulage.</i>	<p>It is not practicable for products from Cleary Bros quarry to be transported by means other than road transport.</p>
Development in the vicinity of an item of the environmental heritage Clause 128 – <i>The consent authority shall not consent to the carrying out of development in the vicinity of an item of the environmental heritage unless it has made an assessment of the effect which the carrying out of that development would have on the historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the item of the environmental heritage and its setting.</i>	<p>“The Hill” is listed in the REP as an item of the environmental heritage and the proposed quarry extension is in the vicinity of “The Hill”. The impact of the proposal on “The Hill” is discussed in section 5.13.</p>

F.4 SEPP NO 11 – TRAFFIC GENERATING DEVELOPMENTS

There are no specific matters for consideration by the consent authority specified in SEPP 11, other than a requirement to consider any representations from the Roads and Traffic Authority.

F.5 DRAFT SHELLHARBOUR RURAL LEP 2001

On 15 April 2003 Shellharbour City Council provided a copy of the latest post-exhibition version of the draft Shellharbour Rural LEP, Matters for consideration by the consent authority included in that draft are considered in *Table F.3* below. For the purposes of this consideration, it is assumed that the land affected by the proposed quarry extension and ancillary development will be rezoned to 1(x) – *Extractive Industry Zone* as proposed in the draft. When gazetted, the draft rural LEP will amend Shellharbour LEP 2000. Accordingly, the clause numbers in the following table refer to the proposed amended clauses of Shellharbour LEP 2000.

Table F.3 MATTERS FOR CONSIDERATION – DRAFT RURAL LEP

Matter for Consideration	Consistency of Proposal
Addition to clause 10 10(4) <i>The Council must not grant consent for the development of rural zoned land unless it has taken into consideration the sustainable development goals of this plan and is satisfied that the development is consistent with the aims and objectives of the relevant zone.</i>	The sustainable development goals of the plan are included in the new clause 11. The aims and objectives of the 1(x) zone are included in Clause 32B(2) and 32B(3). Both clauses are referenced below.
Clause 11 Sustainable development goals Agriculture a. <i>retain productive capacity of high class agricultural land and the continued use of rural lands for sustainable agriculture.</i>	The area affected by the proposed quarry extension is not considered to be high class agricultural land. Mapping included in the Rural Land Study indicates that the area is classified 3 and 4 by the Department of Agriculture.
Biodiversity b. <i>protect and enhance valuable natural environments including riparian and wildlife corridors, core conservation areas and areas of high conservation value;</i>	The proposal is consistent in that the contiguous area of rainforest vegetation and the stand of eucalypts that is a remnant of an endangered ecological community will be preserved.
Wildlife habitats c. <i>to achieve a network of representative native habitats including wildlife and riparian corridors to support native flora and fauna and enhance biodiversity conservation objectives;</i>	The riparian corridor will be retained and enhanced. Additional plantings will include fig trees which are used by the Grey-headed flying fox

Matter for Consideration	Consistency of Proposal
<p><i>Cultural Heritage</i></p> <p>d. <i>protect and preserve items, places and areas, including the escarpment, which have natural and cultural heritage significance for our community;</i></p> <p>e. <i>protect and preserve items, sacred sites and areas which are important to the Aboriginal peoples of the Illawarra;</i></p> <p>f. <i>ensure the preservation of the landscape and special scenic qualities of the rural area;</i></p>	<p>Heritage items listed in the LEP will not be affected by the quarry extension. Other minor relics will be recorded prior to removal.</p> <p>Studies have found no items, sites or areas of importance and none are expected.</p> <p>The proposed extension is largely screened by topography or separated by significant distance from likely viewing points.</p>
<p><i>Settlement</i></p> <p>g. <i>to define urban boundaries and ensure that planning and development have regard to the principles of total catchment management and the concept of ecologically sustainable development;</i></p> <p>h. <i>ensure that rural settlement:</i></p> <p>i. <i>is ancillary to and supports other rural land uses;</i></p> <p>ii. <i>protects the agricultural potential of rural land;</i></p> <p>iii. <i>does not occur in locations that pose a risk to public safety due to hazards including flood, land slip and bush fire;</i></p> <p>iv. <i>is compatible with the scenic and cultural heritage of the rural landscape;</i></p> <p>v. <i>protects and/or enhances nature conservation areas and riparian and wildlife corridors and their associated values and function/processes;</i></p> <p>vi. <i>minimises, and where possible avoids, land use conflicts with agricultural uses; and</i></p> <p>vii. <i>provides for a variety of appropriate settlement opportunities.</i></p>	<p>Not relevant as the proposal does not involve settlement of rural lands.</p>

Matter for Consideration	Consistency of Proposal
<p><i>Mineral extraction</i></p> <p>i. <i>Carefully manage extractive industry to:</i></p> <p>i. <i>minimise potential conflicts with surrounding land uses;</i></p> <p>ii. <i>protect and enhance adjoining ecologically significant areas;</i></p> <p>iii. <i>avoid rendering the important resources unavailable;</i></p> <p>iv. <i>provide transportation routes which minimise impacts on the community and the environment; and</i></p> <p>v. <i>consider short and long term end land use options for extraction areas in consultation with the community, with emphasis on protecting the surrounding scenic rural character;</i></p>	<p>The proposal includes limitations on noise, and blasting to minimise conflict.</p> <p>The adjoining contiguous rainforest area will be protected and enhanced by the proposal.</p> <p>The proposal will enable extraction of the resources.</p> <p>Extracted material will be transported on a private haul road to the existing processing plant.</p> <p>The rezoning proposal and EIS give the community ample opportunity to consider the effects of the proposal and the proposed methods for protecting scenic character.</p>
<p><i>Rural development</i></p> <p>j. <i>promote opportunities for appropriate rural-based economic development;</i></p>	<p>The proposal is rural-based economic development.</p>
<p><i>Tourism</i></p> <p>k. <i>promote tourism and recreational opportunities which preserve natural areas, cultural and historical landscapes; and</i></p>	<p>Not relevant to the proposal.</p>
<p><i>Community consultation</i></p> <p>l. <i>continue to encourage community awareness and participation in identifying and resolving planning issues and decision making.</i></p>	<p>The proposed development does not affect achievement of this goal and is consistent with it.</p>
<p>Clause 32B Extractive Industry 1(x) Zone</p> <p>(2) <i>Aim of the zone</i></p> <p><i>The aim is to carefully manage the extraction of mineral resources in a manner which considers surrounding land uses and end use options of the altered landscape whilst minimising the environmental impacts of mineral extraction.</i></p>	<p>The proposal is consistent with this aim. This EIS considers the effect of the proposal on surrounding land uses and considers end use options.</p>

Matter for Consideration	Consistency of Proposal
<p>(3) Objectives of the zone</p> <p>The primary objectives are to:</p> <p>a. ensure that the extraction of mineral resources and associated activities have a minimal impact on:</p> <p>i. water quality of receiving streams;</p> <p>ii. ecological values of the land and surrounding land;</p> <p>iii. amenity of surrounding uses; and</p> <p>v. the visual landscape character.</p>	<p>The proposal is consistent with these objectives. Each item is considered in Chapter 5 of the EIS</p>
<p>The secondary objectives are to:</p> <p>b. preserve and enhance the ecological integrity of the native vegetation;</p>	<p>The proposal includes a requirement to preserve and enhance the natural vegetation along the watercourse.</p>
<p>c. consider the impact on the amenity of adjoining land uses; and</p>	<p>The impact of the proposal on adjoining land uses and appropriate safeguards is discussed in Chapter 5.</p>
<p>d. co-ordinate site rehabilitation plans with the adjoining quarrying activities.</p>	<p>Co-ordination of rehabilitation work with quarrying is discussed in Chapter 3</p>
<p>Clause 32C. Provisions for Extractive Industry</p> <p>(2) In considering an application for extractive industry, the Council is to have regard to an Environmental Management & Site Rehabilitation Plan which addresses the following matters:</p> <p>a best practice guidelines and other current methods for measuring and minimising all associated environmental impacts;</p>	<p>This EIS contains an outline of an environmental management and rehabilitation plan that will be finalised when the requirements of development consent and licence are available.</p> <p>Best practice methods to be employed are as described in this EIS.</p>
<p>b social impacts including the amenity of nearby residents;</p>	<p>Social and amenity impacts are addressed in chapter 5 of the EIS.</p>
<p>c. the visual impact on the landscape including the ability for the development to be seen from public places and nearby houses;</p>	<p>Visual impact is addressed in Chapter 5.</p>
<p>d. noise, dust and airborne pollution;</p>	<p>These issues are addressed in Chapter 5</p>
<p>e. protection and enhancement of areas of native vegetation;</p>	<p>This matter is addressed in Chapter 5</p>
<p>f. seismic impacts on surrounding buildings;</p>	<p>Vibration impacts from blasting are assessed in Chapter 5</p>

Matter for Consideration	Consistency of Proposal
g. <i>hydrology impacts and the implications on the water quality and flow rates in the catchment;</i>	These issues are addressed in Chapter 5
h. <i>the desirability of ownership of the buffer area by the quarrying company within which environmental impacts are measurable and affect the amenity of any nearby residents;</i>	It is desirable for a quarrying company to own or control any part of its buffer area where recommended amenity criteria for the existing receptors are exceeded. Such criteria are not exceeded in the case of the nearest occupied residence.
i. <i>access for quarry vehicles and the environmental impacts associated with the transport of extractive materials;</i>	Vehicular access is described in Chapter 3 and assessed in Chapter 5.
j. <i>rehabilitation of the site and co-ordination with any proposed or approved site rehabilitation on adjoining land; and</i>	Site rehabilitation is described in Chapter 3. Co-ordination with the neighbouring quarry controlled by Readymix is proposed.
k. <i>staging and coordination of extraction to minimise environmental impacts and allow for the orderly rehabilitation of the site.</i>	Extraction staging is described in Chapter 3.
<p>Clause 80. Development in the vicinity of a heritage item</p> <p>(1) <i>Before granting consent to development in the vicinity of a heritage item, Council must assess the impact of the proposed development on the heritage significance of the heritage item and of any heritage conservation area within which it is situated.</i></p>	<p>“The Hill” is a heritage item in the vicinity of the proposed quarry extension. The impact of the proposal on “The Hill” is considered in Chapter 5.</p>

Matter for Consideration	Consistency of Proposal
<p>Clause 88. Areas of high conservation value</p> <p><i>(4) The Council shall not consent to development within areas of high conservation value unless it is satisfied that:</i></p> <p><i>a. the development has been designed to minimise disturbance to existing vegetation communities including the habitat and corridor values of the land;</i></p> <p><i>b. opportunities for the management and enhancement of local native vegetation, wetlands and buffers that contribute to biodiversity conservation values have been considered; and</i></p> <p><i>c. opportunities for planting local native plant species on the land have been considered along with opportunities to restore or enhance wildlife or riparian corridors.</i></p>	<p>The southern boundary of the quarry has been defined to remain clear of the continuous band of vegetation along the creek.</p> <p>The existing band of native vegetation along the creek will be fenced from the development and stock will be kept out. This area will be managed and enhanced as a permanent riparian corridor.</p> <p>It is proposed to plant indigenous vegetation to infill the grassy areas between the southern boundary and the riparian corridor.</p>
<p><i>(5) The Council may decline to consent to development within an area of high conservation value until it has considered a site plan of an appropriate scale clearly and accurately showing the boundary of any vegetation edge and stands of remnant vegetation on the subject land to enable it to properly assess the impact of the proposed development on that vegetation and the biodiversity it supports.</i></p>	<p>Diagrams contained in this EIS show the quarry boundary superimposed on an aerial photograph where the relationship to the vegetation boundary and isolated patches of vegetation within the site can be seen.</p>

Matter for Consideration	Consistency of Proposal
<p>(6) <i>The Council must not consent to development on land adjoining an area of high conservation value if the Council considers that, because of the proposed development, the objectives of the area will not be met.</i></p> <p>[The objectives are set out in subsection (1) as follows]</p> <p>(1) <i>The objectives are to:</i></p> <p>a. <i>encourage and promote vegetation management to enhance biodiversity conservation;</i></p> <p>b. <i>provide for the conservation and management of native vegetation including riparian and wildlife corridors;</i></p> <p>c. <i>prevent the inappropriate clearing of vegetation from land with high conservation value; and</i></p> <p>d. <i>to encourage the revegetation of land, and the rehabilitation of land, with appropriate native vegetation.</i></p>	<p>The proposal preserves and enhances the main area of remnant native vegetation on the site including two endangered ecological communities. The loss of some smaller regrowth patches within the quarry area does not conflict with the objectives.</p> <p>The proposal will protect existing significant vegetation and provide infill planting.</p> <p>The proposal is consistent in that the riparian corridor will be conserved and maintained.</p> <p>Inappropriate clearing will be prevented by fencing and managing the conservation area.</p> <p>The proposal includes infill planting of former grazing land with native vegetation.</p>
<p>Clause 89 Clearing of vegetation</p> <p>(4) <i>The Council shall not consent to the application for clearing unless the applicant has addressed or demonstrated that:</i></p> <p>i. <i>there is no reasonable alternative to the removal of that vegetation;</i></p> <p>ii. <i>the proposed development will not have an unacceptable visual impact on the scenic quality of the area;</i></p> <p>iii. <i>the amount of the vegetation proposed to be removed is minimal;</i></p> <p>iv. <i>opportunities for planting local endemic plant species elsewhere on the land have been considered;</i></p> <p>v. <i>the proposed development will not threaten the integrity of any unbroken natural tree canopy cover or create smaller discrete parcels of vegetation from an existing stand; and</i></p> <p>vi. <i>the amount of vegetation proposed to be removed is as little as possible.</i></p>	<p>Vegetation clearing is confined to progressive removal over 30 years of some small isolated patches of regrowth rainforest in the gullies and several fig trees on the higher slopes.</p> <p>If the quarry is to proceed as planned there is no alternative to the removal of this vegetation</p> <p>Most of the vegetation to be removed is at lower elevations where it will not be seen. Visual impact is addressed in Chapter 5.</p> <p>The proposal is consistent.</p> <p>A replanting scheme has been incorporated in the project.</p> <p>The proposal is consistent. The unbroken canopy along the creek will be retained and enhanced.</p> <p>The proposal is consistent.</p>

Matter for Consideration	Consistency of Proposal
<p>Clause 91. Watercourses</p> <p>(3) <i>In considering an application for development on land forming the bed of a lake, river, lagoon, creek or any other natural watercourse including intermittent watercourses, the Council must have regard to the:</i></p> <p><i>a impact on water quality, potential to improve water quality and water flow above and below development;</i></p>	<p>The proposed quarry extension involves work affecting the bed of the watercourse passing through the site.</p> <p>The quality of water released from the site will be monitored to meet specified criteria. Flow monitoring and controlled release is proposed.</p>
<p><i>b provision of a vegetated riparian corridor to buffer any impacts from development or activities and to maintain watercourse integrity;</i></p>	<p>The vegetated corridor to the main creek on the site will be maintained..</p>
<p><i>c impact on and potential to improve any native aquatic and terrestrial vegetation, particularly riparian corridor vegetation;</i></p>	<p>It is proposed to fence and revegetate areas along the creekside, to enhance the rainforest community.</p>
<p><i>d impact on and potential to improve fish habitat and fish passage, including, but not limited to, endangered fish species and their habitat requirements;</i></p>	<p>The main creek will not be disturbed and water releases will be arranged to mirror natural flows.</p>
<p><i>e the potential for erosion and bank instability;</i></p>	<p>There is no potential for this to occur in the main creek outside the quarry site.</p>
<p><i>f opportunities to remove or up-grade existing stock or access crossings from watercourses to minimise impact on fish habitat potential and fish passage have been considered.</i></p>	<p>Not relevant to this proposal as all stock crossings within the quarry area will be removed and stock will be excluded from the creekside area.</p>
<p>Clause 100. Landscape Management</p> <p>(2) <i>When considering a development application for any works or building construction, within the rural zones, Council must have regard to the visual impacts of the proposal including the visual impacts of ancillary uses like driveways, fencing and the provision of electricity and other services to the development.</i></p>	<p>Visual impacts are considered in Chapter 5.</p>

Matter for Consideration	Consistency of Proposal
<p>(3) <i>In assessing visual impacts consideration shall be given to the following:</i></p> <p>a. <i>important visual features and the landscape character of the subject site and surrounding land;</i></p> <p>b. <i>minimising the visual impact of the proposal within the view shed from public areas, including public roads;</i></p> <p>c. <i>siting buildings below visually prominent ridgelines;</i></p> <p>d. <i>reducing the visual impact of driveways and the provision of services to the development;</i></p> <p><i>reducing the visual impact of proposed buildings by ensuring that external finishes are non-reflective and of a colour that blends in with the surroundings; and</i></p> <p>f. <i>ensuring fencing and building styles are compatible with the visual character of the area.</i></p>	<p>The appearance of the Wentworth Hills as green farming land is an important feature of the region. Measures to minimise visual impact are considered in Chapter 5.</p> <p>Not relevant as there are no buildings. The quarry is below the visually prominent ridgeline.</p> <p>Not relevant.</p> <p>Not relevant.</p>

Appendix G

ENVIRONMENT PROTECTION LICENCE

Environment Protection Authority

Environment Protection Licence

Section 55 Protection of the Environment Operations Act 1997

- ♦ Licence number: 299
- ♦ File number: 280102
- ♦ Licence Anniversary Date: 30-September
- ♦ Review date not later than 01-Jul-2002

Licence Type

Premises

Licensee

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

Licensed Premises

CLEARY BROS (BOMBO) PTY LTD
LOT 3 PRINCES HIGHWAY
ALBION PARK RAIL NSW 2527

Fee Based Activity

Concrete Batching (30)
Hard-Rock Gravel Quarrying (36)
Mining (Other than Coal) (64)

Scale

> 13000 - 25000 m3 produced
> 100000 - 500000 T obtained
> 100000 - 500000 T obtained

EPA Region

South Coast
Level 3, NSW Govt Offices, 84 Crown Street
WOLLONGONG NSW 2500
Phone: 02 4226 8100
Fax: 02 4227 2348

PO Box 513 WOLLONGONG EAST
NSW 2520

INFORMATION ABOUT THIS LICENCE	4
Dictionary	4
Responsibilities of licensee	4
Transfer of licence	4
Variation of licence conditions	4
Duration of licence	4
Licence review	4
Fees and annual return to be sent to the EPA	5
Public register and access to monitoring data	5
1 ADMINISTRATIVE CONDITIONS	6
A1 What the licence authorises and regulates	6
A2 Premises to which this licence applies	6
A3 Other activities	7
A4 Information supplied to the EPA	7
2 DISCHARGES TO AIR AND WATER AND APPLICATIONS TO LAND	7
P1 Location of monitoring/discharge points and areas	7
3 LIMIT CONDITIONS	8
L1 Pollution of waters	8
L2 Load limits	9
L3 Concentration limits	9
L4 Volume and mass limits	9
L5 Waste	10
L6 Noise Limits	10
4 OPERATING CONDITIONS	10
O1 Activities must be carried out in a competent manner	10
O2 Maintenance of plant and equipment	10
O3 Dust	11
O4 Effluent Re-use	11
5 MONITORING AND RECORDING CONDITIONS	11
M1 Monitoring records	11
M2 Requirement to monitor concentration of pollutants discharged	11
M3 Testing methods - concentration limits	12
M4 Recording of pollution complaints	13
M5 Telephone complaints line	13
M6 Requirement to monitor volume or mass	13
M7 Requirement to monitor blasting	13
6 REPORTING CONDITIONS	14
R1 Annual return documents	14
R2 Notification of environmental harm	15
R3 Written report	15

R4 Reporting of blasting monitoring	16
GENERAL CONDITIONS	16
G1 Copy of licence kept at the premises	16
POLLUTION STUDIES AND REDUCTION PROGRAMS	17
SPECIAL CONDITIONS	17
E1 Not applicable.	17
DICTIONARY	17
General Dictionary	17

Information about this licence

Dictionary

The licence contains a dictionary, which defines terms used in the licence. It is found at the end of the 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).
- Report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Transfer of licence

Transfer of the licence to another person may be requested by the licensee using the form for this purpose available from the EPA.

Variation of licence conditions

Variations to the conditions of this licence may be requested by the licensee using the form for this purpose available from the EPA. The EPA may also vary a 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 3 years after the issue of the licence, as

set out in Part 3.6 of the Act. You will receive advance notice of the licence review. For licences held immediately before 1 July 1999, the first review will take place before 1 July 2002.

Fees and annual return to be sent to the EPA

The licence requires you to forward to the EPA an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints).

The Annual Return must be submitted within 60 days after the end of each reporting period. Where a licence is transferred, surrendered or revoked, a special reporting period applies.

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Usually the licence fee period is the same as the reporting period.

See condition R1 and the accompanying form regarding the Annual Return requirements.

The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees.

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

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.

Licence anniversary date

30-September

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, fee-based activity classification and the scale of the operation.

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

Premises Details**ALBION PARK RAIL****NSW****2527****LOT 3 DP 858245, LOT 1 DP 359108**

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.

Air

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location
1	Dust deposition monitoring		APD 1 - approximately 200 metres west of the crushing and screening plant and labelled as APD1 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
2	Dust deposition monitoring		APD 2 - approximately 100 metres east of quarry area and labelled as APD2 on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
3	Dust deposition monitoring		APD 3 - approximately 150m south east of main holding and sedimentation dam and 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 identification no.	Type of monitoring point	Type of discharge point	Description of location
4	Effluent Quality Monitoring - Discharge to waters	Effluent Quality Monitoring - Discharge to waters	Outlet of main holding and sedimentation pond and labelled as 'sampling DP1' on drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.
5	Effluent Quality Monitoring - Discharge to waters	Effluent Quality Monitoring - Discharge to waters	See drawing No ESA PQ011 (Rev 1) titled "Water Pollution Control Plan" for Lic 299.

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	mg/L				50

POINT 5

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile Concentration Limit
Oil and Grease	mg/L				30
Total Suspended Solids	mg/L				50
Biochemical Oxygen Demand	mg/L				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

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:

- (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	g/m2/month	Monthly	Australian Standard 3580.10.1-1991
Insoluble solids	g/m2/month	Monthly	Australian Standard 3580.10.1-1991

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Ash	g/m2/month	Monthly	Australian Standard 3580.10.1-1991
Insoluble solids	g/m2/month	Monthly	Australian Standard 3580.10.1-1991

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Ash	g/m2/month	Monthly	Australian Standard 3580.10.1-1991
Insoluble solids	g/m2/month	Monthly	Australian Standard 3580.10.1-1991

POINT 4

Pollutant	Units of measure	Frequency	Sampling Method
Total Suspended Solids	mg/L	Each overflow event	Grab sample

POINT 5

Pollutant	Units of measure	Frequency	Sampling Method
Biochemical Oxygen Demand	mg/L	Quarterly	Grab sample
Oil and Grease	mg/L	Quarterly	Grab sample
Total Suspended Solids	mg/L	Quarterly	Grab sample

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:

- any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
- 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
- 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 Clean Air (Plant & Equipment) Regulation 1997 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 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?

- 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:
- (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; and
 - (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;
 - (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 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 limit]	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 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
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
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
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
reprocessing of	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act

waste	1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
treatment of waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TSP	Means total suspended particles
TSS	Means total suspended solids
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

Regional Manager Southern Tablelands

(By Delegation)

Date of this edition - 11-Aug-2002

End Notes

-
- | | |
|---|---|
| 1 | Licence varied by notice 1003792, issued on 17-Jul-2002, which came into effect on 11-Aug-2002. |
|---|---|
-

Appendix H

OWNER'S CONSENT

Canda Nominees Pty Ltd
ACN: 45 000 142 478

The General Manager
Shellharbour City Council

19 March 2002

Dear Ms Cooper

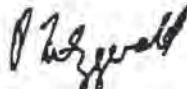
Cleary Bros (Bombo) Pty Ltd application for Rezoning and Development of lands previously owned by Mr & Mrs Cody

We wish to confirm that Canda Nominees is the registered owner of Lot 1 DP 858245 at Albion Park.

We also confirm that we have no objection to:

- i. The submission of a rezoning application affecting the above lands, or
- ii. The lodgement of Cleary Bros (Bombo) Pty Ltd of a development application for the extension to their hard rock quarry.

Yours sincerely
Canda Nominees



Peter J Fitzgerald
Director

Appendix I

GEOLOGY OF LOT 1

CLEARY BROS. (BOMBO) PTY LIMITED

A BRIEF REPORT ON THE GEOLOGY OF THE CODY PROPERTY

PREPARED BY:

R.W. Corkery & Co Pty Limited
Geological & Environmental Consultants
75 Kite Street
ORANGE N.S.W. 2800
A.C.N.: 002 033 712

Telephone: (02) 63625411
Facsimile: (02) 63613622

September 1997

ON BEHALF OF:

Cleary Bros. (Bombo) Pty Limited
39 Five Islands Road
PO Box 210
PORT KEMBLA N.S.W. 2505
A.C.N: 000 157 808

Telephone: (042) 75 1000
Facsimile: (042) 74 1125

Report No. 322rpt.doc



R.W. CORKERY & CO. PTY LIMITED

1.0 INTRODUCTION

This report has been prepared by R.W. Corkery & Co. Pty Limited on behalf of Cleary Bros. (Bombo) Pty Limited (the "Company") to briefly outline the geology of the Cody Property, which is adjacent to the Company's Albion Park Quarry. The geological information presented is based largely on the geological logging and interpretation of two diamond drill holes and 19 percussion drill holes. The location of these drill holes is shown on **Figure 1**.

2.0 REGIONAL GEOLOGY

According to the Wollongong Geological Sheet (SI 56-9) the rocks in the vicinity of the Cody Property and the Albion Park Quarry belong to the Bumbo Latite member, a component of the widespread Gerringong Volcanics. These rocks are invariably underlain by the Budgong Sandstone and together form part of the Shoalhaven Group. The Bumbo Latite is commonly referred to as "basalt" and, due to its relative resistance to erosion, forms the cap for much of the spur extending from Stockyard Mountain (approximately 6 km to the south-west) to Bass Point (approximately 8 km to the east-south-east).

3.0 LOCAL GEOLOGY

Across the Cody Property and in the vicinity of the Albion Park Quarry, the Bumbo Latite comprises two distinct flows separated by a tuffaceous agglomerate. A summary of the geological succession is shown in **Table 1** whilst three geological sections (A-A', B-B' and C-C') noted on **Figure 1** are presented on **Figure 2**.

The lower of the two flows is referred to locally as the "lower flow" and is essentially an andesite, latite or trachyandesite. The rock is mid grey in colour, is moderately well jointed and exhibits minor alteration evident by secondary mineralisation. The base of the lower flow across the property varies from approximately 75 m, AHD to 35 m, AHD and the top of the flow varies from 90 m, AHD to 58 m, AHD. Underlying the lower flow across the property is a mid grey tuffaceous sandstone which invariably has been contact metamorphosed by the overlying latite.

The upper of the two flows is referred to locally as the "upper flow" and is essentially an andesite, latite or trachyte. The rock is mid grey in colour and exhibits minor jointing and secondary mineralisation. Across the property, the base of the upper flow varies from 104 m, AHD to 74 m, AHD and the top of the flow varies from 125 m, AHD to 100 m, AHD. As shown on **Figure 2**, the upper flow is not present across the entire property, being absent within the valley areas. Overlying the upper flow is variably weathered latite and soil and is referred to as "overburden" on the accompanying geological sections.



The intervening tuffaceous agglomerate is light to mid grey with abundant pink and cream secondary mineralisation indicating that this unit has undergone extensive hydrothermal alteration. Secondary mineralisation includes clays, siderite, zeolites and carbonates. As with the upper flow, the agglomerate is not present in the topographically lower areas of the property. Where present, the agglomerate has a fairly uniform thickness of between 9 m and 15 m.

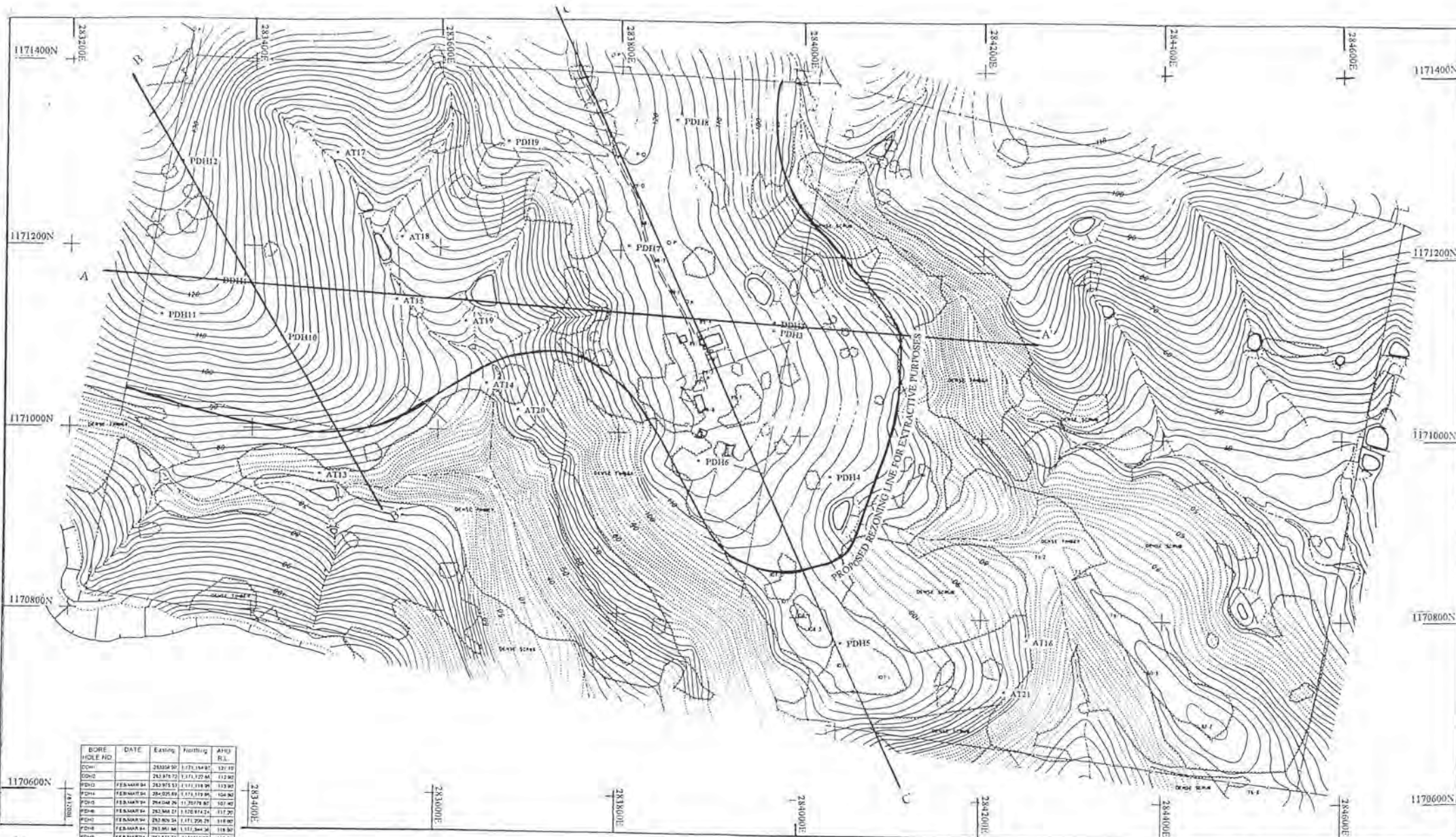


TABLE 1 - SUMMARY OF GEOLOGICAL SUCCESSION

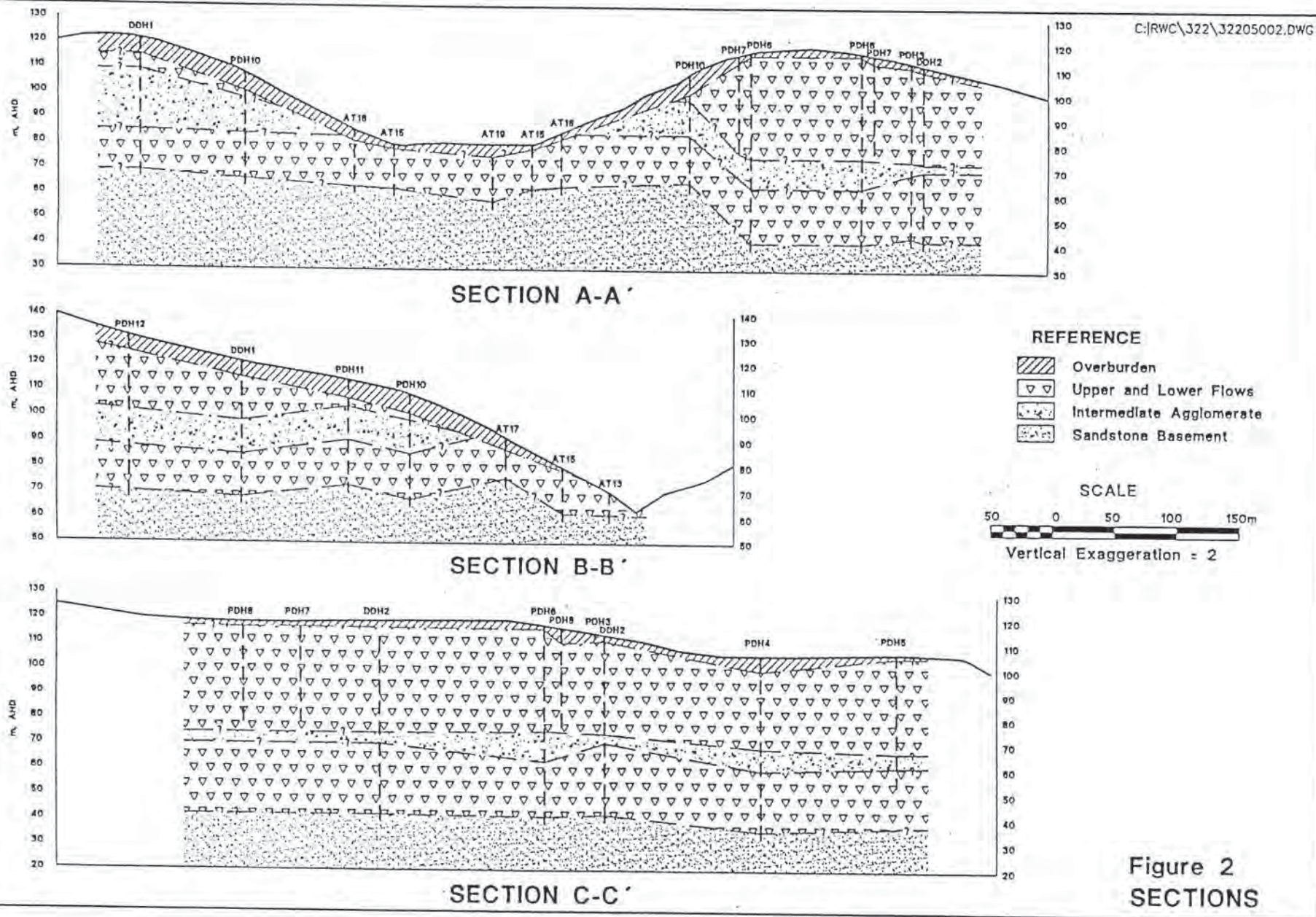
Bore No.	Collar Height (m, AHD)	Top of Upper Flow (m, AHD)	Base of Upper Flow (m, AHD)	Thickness of Upper Flow (m)	Top of Agglomerate (m, AHD)	Base of Agglomerate (m, AHD)	Thickness of Agglomerate (m)	Top of Lower Flow (m, AHD)	Base of Lower Flow (m, AHD)	Thickness of Lower Flow (m)
DDH 1	121.10	114.7	98.3	16.4	98.3	85.3	13	85.3	68.3	17
DDH 2	112.9	111	74	37	74	70.4	3.6	70.4	41.8	28.6
PPH 3	113.20	111.20	74.2	37	74.2	69.2	5	69.2	43.2	26
PDH 4	104.80	99.8	67.8	32	67.8	58.8	9	58.8	34.8	24
PDH 5	107.40	105.4	67.4	38	67.4	61.4	6	61.4	>54.4	>7
PDH 6	117.20	116.2	75.2	41	75.2	63.2	12	63.2	41.2	22
PDH 7	116.60	112.6	>76.6	>36						
PDH 8	116.50	110.5	>77.5	>33						
PDH 9	113.90	109.9	85.9	24	85.9	76.9	9	76.9	57.9	19
PDH 10	108.10	100.1	98.1	2	98.1	84.1	14	84.1	66.1	18
PDH 11	114.50	106.5	103.5	3	103.5	90.5	13	90.5	72.5	18
PDH 12	131.60	125.6	102.6	23	102.6	87.6	15	87.6	69.6	18
AT 13	70.10							70.10	60.95	9.15
AT 14	69.00							69.00	56.15	12.85
AT 15	80.00							78.15	61.7	16.45
AT 17	92.20							86.65	75.65	11
AT 18	85.00							81.3	>63	>18.3
AT 19	75.20							75.20	56.9	18.3
AT 20	72.00							68.00	52.00	16
AT 21	88.30							86.3	74.3	12
AT 21A										10

A/rwc/322/misc/322sumta





CLEARY BROS(BOMBO) PTY LTD
ALBION PARK QUARRY OPERATIONS
CODY' S & LINDSAY LANES PROPERTIES
REZONING APPLICATION



Appendix J

HYDROGEOLOGICAL STUDY

Golder Associates Pty Ltd A.C.N. 006 107 857
WOLLONGONG OFFICE

Unit 1, 6 Marshall Street
Dapto, NSW 2530 Australia
Telephone (042) 61 4822
Fax (042) 61 1003



Report

Preliminary Hydrogeological Study Proposed Rezoning Area Cleary Bros Albion Park Quarry



Prepared for
Davron Engineering
PO Box 1194
Wollongong NSW 2521

98622068.A
March 1998

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION	1
2. INFORMATION SOURCES.....	1
3. GEOLOGY	2
4. RAINFALL.....	3
5. COMMENTS ON FIELD OBSERVATIONS	4
6. INTERPRETATION OF THE HYDROGEOLOGY	6
6.1 General Interpretation.....	6
6.2 Specific Aspects of Field Observations.....	6
6.3 Interpretation	6
7. CONCLUSIONS	7

Appendix A	Monthly Rainfall Data - Albion Park Post Office
Appendix B	Important Information about your Geotechnical Engineering Report

Drawing No. 822068/1	Locality Plan
Drawing No. 822068/2	Hydrogeological Map

1. INTRODUCTION

This report presents a preliminary hydrogeology study for a proposed area of extraction at the Cleary Bros. Albion Park Quarry. It represents Stage 1 of a suggested study approach as outlined in our proposal P975303, dated 28 November 1997. Stage 2 was envisaged to involve the setting up of a groundwater monitoring programme.

Cleary Bros. propose to extract latite from the northern side of the valley to the south of their present quarrying operations. The purpose of this report is to provide a preliminary assessment of the influence of the proposed extraction on the creek flow within the valley and on groundwater within the soil and rock underlying the slopes between the proposed quarry area and the creek. We understand the primary concern is the maintenance of vegetation within the gully and the flow in the creek during and following the quarry development. In order to make this preliminary assessment the first stage of investigation involved the preparation of a conceptual geological/hydrogeological model based on available information and surface inspection of the site.

The location of the site and catchment boundaries is presented in Drawing No.822068/1. The proposed extraction area is confined within the one valley catchment. Existing CSR/Readymix quarry pits also occur at the head of this valley.

This work was commissioned by Davron Engineering Pty Ltd by facsimile Ref.9704-82a.y, dated 23 February 1998, and Cleary Bros. (Bombo) Pty Ltd purchase order 09201.

2. INFORMATION SOURCES

The current study has included the following :-

- Review of topographic, orthophotomaps and regional geological maps;
- Review of aerial photographs available at Shellharbour Council (1948, 1955, 1966,1990);
- Review of rainfall records;
- Review of the results of exploration drilling carried out in the mid 1980's, along with

interpretative sections from R W Corkery and Co. Pty Ltd;

- Discussions with David Slack (Davron Engineering Pty Ltd), Cleary Bros and CSR/Readymix personnel, and Richard Cody (from Cody's Property).
- Fieldwork by a senior engineering geologist on 27 February 1998 including surface observations within the catchment area of the proposed extraction.

3. GEOLOGY

The site is located on an undulating plateau area with ground elevations rising to 173m AHD near the southwest of the site. The plateau principally drains to the west to Frazers Creek, which flows north to Lake Illawarra, and to the southeast to Rocklow Creek, which flows to Minnamurra River.

The regional geology is described in The Geology of NSW, edited by G H Packham (1969), and the 1:50,000 Kiama Geological Series Sheet 9028-1. Rocks of the Gerringong Volcanics and Budgong Sandstone underlie the site, which are part of the Late Permian Shoalhaven Group of sediments within the Sydney Sedimentary Basin. The Gerringong Volcanics consist of a succession of submarine latite lava flows interbedded with volcanic-derived marine sediments, which together form the Budgong Sandstone formation.

Soft sediment deformation structures, the absence of block inclusions, and pillow lavas have been recorded in the latites. These structures indicate a submarine flow origin and a contemporaneous deposition with the associated sediments. The regional dip of these Sydney Basin rocks is less than about 5° to the west or northwest.

The site geology at the Albion Park quarry area has been interpreted by others (e.g. R W Corkery and Co.), as illustrated in Drawing No.822068/2. The overburden clayey soils and highly weathered rock are about 2m to 8m thick. The volcanic rocks are part of the Bumbo Latite Member, which is an aphanitic to porphyritic latite, mid grey to black in colour. Two latite flows are present, Upper Flow (up to 41m thick) and Lower Flow (up to 28.6m thick), separated by an agglomerate (5m to 15m thick, which also has been referred to as a breccia). The agglomerate layer contains altered brecciated latite, as well

as irregularly shaped zones of deuterically-altered latite and rubbly zones of weathered vesicular latite¹. The underlying basement rock consists of grey, fine grained sandstone.

The dip of these rock units, as indicated by the sandstone outcrop and geological sections (constructed by R W Corkery), is assessed to be less than 5° to the east or southeast. This is the opposite direction to the regional dip.

4. RAINFALL

Annual Rainfall over the last 5 years for the Albion Park Post Office weather station, is indicated in Table 1, along with the long term figures for the period 1892 to 1998. The monthly rainfall data from the Bureau of Meteorology for this station between 1979 and 1998 is presented as Appendix A.

TABLE 1 - Annual Rainfall

Year	1993	1994	1995	1996	1997	Long Term Annual Rainfall		
						Lowest	Average	Highest
Rainfall (mm)	765	566	1190	933	860	469	1101	2640

Below average rainfall has occurred in 4 of the last 5 years. Rainfall during the previous three months is indicated in Table 2. November and December were well below the average recorded over the last 100 years. February rainfall data was not available for Albion Park for this report.

TABLE 2 - Summary of Total Annual Rainfall - 1892 to 1998

Month	November, 1997	December, 1997	January, 1998
Rainfall (mm)	14.6	15.7	77.1

¹ Baker C J (1983). Planning for the Future Management of Blue Metal Quarrying in the Illawarra Area, NSW. In collected Case Studies in Engineering Geology Hydrogeology and Environmental Geology. Ed. Knight, Minty and Smith.

5. COMMENTS ON FIELD OBSERVATIONS

Rainfall in the area was low prior to our field inspection. Kiama rainfall data indicated 41.2mm in February, with little or no rain in the 9 days preceding our inspection.

The relationship of the geology and the locations of groundwater outflows is illustrated on Drawing No.822068/2. Moist ground or greener grass above small farm dams indicated the location of groundwater outflows or seepages.

Groundwater Seepage and the Agglomerate Layer-

Our observations suggest that the majority of the groundwater seepages observed are associated with the agglomerate (Drawing No.822068/2). No measurable flows were observed from the seepage areas. The farm dams below these areas were below full capacity, indicating that evaporation rates, combined with leakage from the dams, were higher than the seepage rates.

CSR/Readymix personnel have indicated that the agglomerate layer is regarded as more permeable than the latite. This seems a reasonable interpretation.

Latite/Sandstone Basement Contact

A waterfall occurs in the creek in question at the contact of the lower latite flow and the underlying sandstone basement (see Drawing No.822068/2). The waterfall is about 5m high with sandstone in the lower 2m. The contact is marked by:-

- undercutting of the latite by the sandstone up to about 1m into the face and up to about 200mm high;
- closed spaced, irregular jointing over a large part of the latite;
- wider spaced joints in the sandstone;
- undulating contact surface;

This contact can be traced particularly in the north and northwest of the site, from regional geology and on aerial photographs. It is marked by a treeline, generally steeper slopes, and probably also by the presence of groundwater seepage. Aerial photos show that tree clearing had been carried out in the Albion Park area prior to 1948, however this treeline was present in the 1948 photographs.

Consistent groundwater seepage occurs along a part of this contact, which is exposed in Cleary Bros sandstone pit (Drawing No.822068/1). No seepage was observed from the contact at the waterfall during our field inspection.

Latite Rock Structure

The dominant jointing is near vertical in the latite flows. The joints are mainly less than 1m spaced, generally continuous through the flow and coated with calcite (indicated in the CSR/Readymix pits). Iron staining of joints below the upper weathered zone is rare, as indicated in the core of the two available diamond drill holes.

Observed Contribution to Creek Flow above the Latite/Sandstone Contact

The water flow in the creek at the waterfall (Drawing No.822068/2) was judged to be about 5 to 10 litres/minute. At times in the past the creek has not flowed (Richard Cody pers. comm.), presumably during dry periods in summer months. The major contribution to the creek flow during our field observations appeared to be from a gully on the southern side of the valley below the CSR/Readymix Eastern ridge pit. The flow was estimated in the order of 5 to 10 litres/minute. Spoil embankments are located at the head of this gully, and rainfall can collect in the drain at the northern part of the pit behind the gully.

We infer that the source of this flow is partly from the spoil embankment, which is considered to have a relatively high groundwater storage capacity. Additional contribution is also likely from seepage through the agglomerate, which is at the present base of the CSR/Readymix pit.

CSR/Readymix Pit - (western end of the valley)

Runoff in this pit is collected in a sump and then pumped into the creek after sedimentation of fines. CSR/Readymix advise that due to low rainfall there has been no pumping this year.

One area of seepage was observed in this pit, as indicated by damp patches in the northwest corner. This appears to be near the location of a gully containing a farm dam which existed in this area prior to quarrying. The farm dam was probably being fed by groundwater seepage.

6. INTERPRETATION OF THE HYDROGEOLOGY

6.1 General Interpretation

The study area appears to be one in which rainwater infiltrates on hilltops and valley slopes, with some reappearing as springs and seepages where the creek lines are deeply incised. This is a typical groundwater recharge and discharge situation which is not unusual in hilly terrain. It is likely, but not demonstrated, that the local water table is close to the elevation of the main creek beds, and that the occasional period of no creek flow is caused by the water table falling below creek level.

The area to be developed is steep and largely cleared of native vegetation. This suggests that runoff would be rapid and that there would be little persistence of flow to the drainage lines except by groundwater discharge, whereas before the native vegetation was cleared, runoff would have been slower with a persistent flow in creeks after individual rainfall events. The quarry which is proposed for the area would presumably provide a slightly more extreme pattern of runoff than the present land use, with greater peak discharges into the creek and little or no persistence of flow, unless the base of the quarry after its completion were designed to retain runoff in a settlement/flood control pond.

Some particular discharges appear to be localised along the contact between the volcanic sequence and the underlying sandstone, inferring that the sandstone may have a lower permeability.

6.2 Specific Aspects of Field Observations

The fieldwork was carried during a relatively prolonged dry period. Aerial photographs allowed the assessment of other possible areas of groundwater seepage at different climatic periods, in addition to those observed in the field. The areas of groundwater seepage shown on Drawing No.822068/2 are considered to be representative of long term groundwater movements. Following prolonged rainfall higher seepage rates are likely in the short term, and additional areas of seepage may occur.

6.3 Interpretation

Indications of hydrogeological conditions are given by our assessment of the geological model of the area along with field observations of surface features. We infer the origin of

groundwater as follows:-

- Infiltration of rainfall through the overburden and along vertical joints in the latite within the surface catchment area. Outflow occurs along the higher horizontally permeable zones associated with the agglomerate layer and the latite/sandstone contact.
- Lateral movement of groundwater from outside the catchment area but within the hilly quarried area only. The probable flow direction is from the west, following the bedding dip. It is possible that this flow is providing some contribution to the deeper latite/sandstone contact zone.

Other geological features such as highly permeable vertical fractured zones, which are expected to occur, but which have not been identified by geological investigations to date, are expected to have a local influence on the groundwater movement and to control the positions of some springs and seepage.

The source of the flow in the creek is rainfall runoff from the catchment with long term flow provided by groundwater outflow/seepage.

7. CONCLUSIONS

A summary of our conclusions is presented below

- **Rainfall runoff** from part of the catchment area to the creek will be intercepted over the surface of the proposed extraction and we assume that this will be directed to a pit sump for sedimentation and release to the creek.
- **Rainfall infiltration** may be increased in the area during the period of the proposed extraction following the removal of the overburden and if water ponds in the final pit floor. Consequently, we consider that this source of groundwater flow to the creek may not be significantly affected.
- **Groundwater seepages from the agglomerate layer** are being collected by farm dams and are unlikely to be providing a significant contribution to the creek flow. The proposed extraction area will cut off this flow path, however, we assume that these

small flows will be collected in the pit sump and released to the creek.

- **Groundwater seepages from the latite/sandstone contact zone** are likely to be influenced when the latite is extracted to this depth. Once the rock is quarried to this zone the pit will cut off seepage and collect it in the pit sump. This source of water to the creek is also likely to be affected by the CSR/Readymix pits as indicated below. A monitoring programme could assess the quantity of water contributing to the creek flow, and the changes over time.
- **CSR/Readymix pits** at the western and southern part of the valley are proposed to be developed into one pit with extraction down to the latite/sandstone contact. This proposed future expansion is likely to eliminate the major source of water as observed during the fieldwork. We have no knowledge of groundwater flow in this area prior to quarrying. However, the likely increased rainfall infiltration over the pit area, and the groundwater storage capacity of the spoil embankment may have increased the potential for long term groundwater seepage during the present depth of quarry operations.

The future expansion of these pits is also likely to affect the groundwater seepage to the creek along the latite/sandstone contact zone, if groundwater flow is towards the east as inferred. A monitoring programme would also be required to assess flow quantities, and the changes over time.

- **Surface Water Monitoring** is recommended to assess the contributions of the various sources to the creek flow. This could comprise V notch weirs with a pressure transducer data logger connected to each weir to measure creek flow at a minimum of three locations. This would be set up prior to quarrying operations and continued during extraction.
- **Groundwater Monitoring** is recommended to establish a baseline for groundwater flows close to the treelined watercourse gully in question. This would comprise the installation of groundwater monitor bores at a minimum of two locations between the proposed quarry workings and the creek. The bores would be drilled into the sandstone below the floor of the creek and by use of casing and grouting techniques, flows from the key strata (latite, agglomerate and sandstone) could be monitored. This would be set up prior to quarrying operations and continued during extraction.

Your attention is drawn to Appendix B, Important Information about your Geotechnical Engineering Report, which should be read in conjunction with this report.

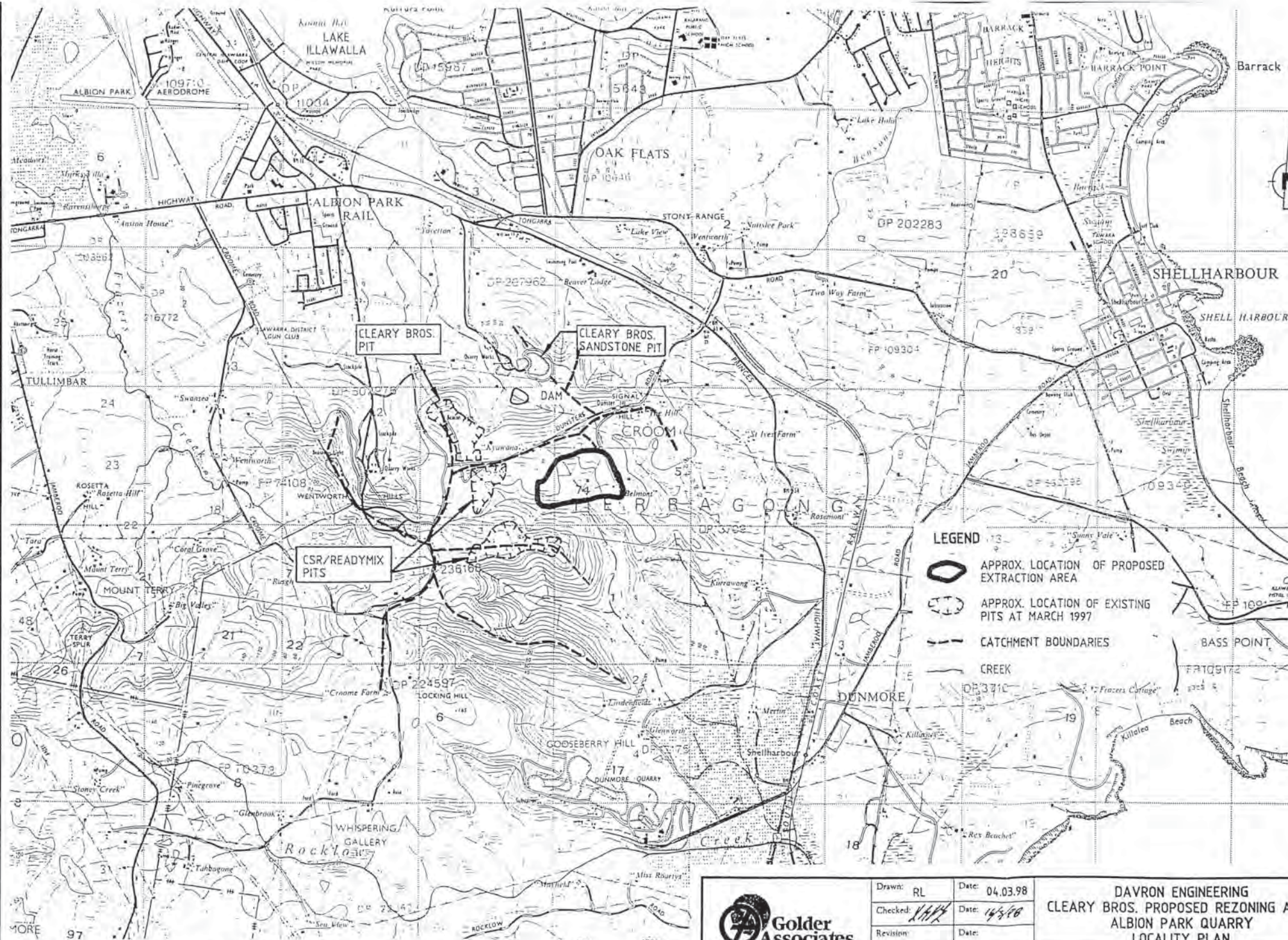
GOLDER ASSOCIATES PTY LTD



for Les McQueen CPEng
Senior Engineering Geologist

Jon P Thompson
Senior Geotechnical Engineer

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Source : ALBION PARK Topographic map 9028-1-N 1:25000

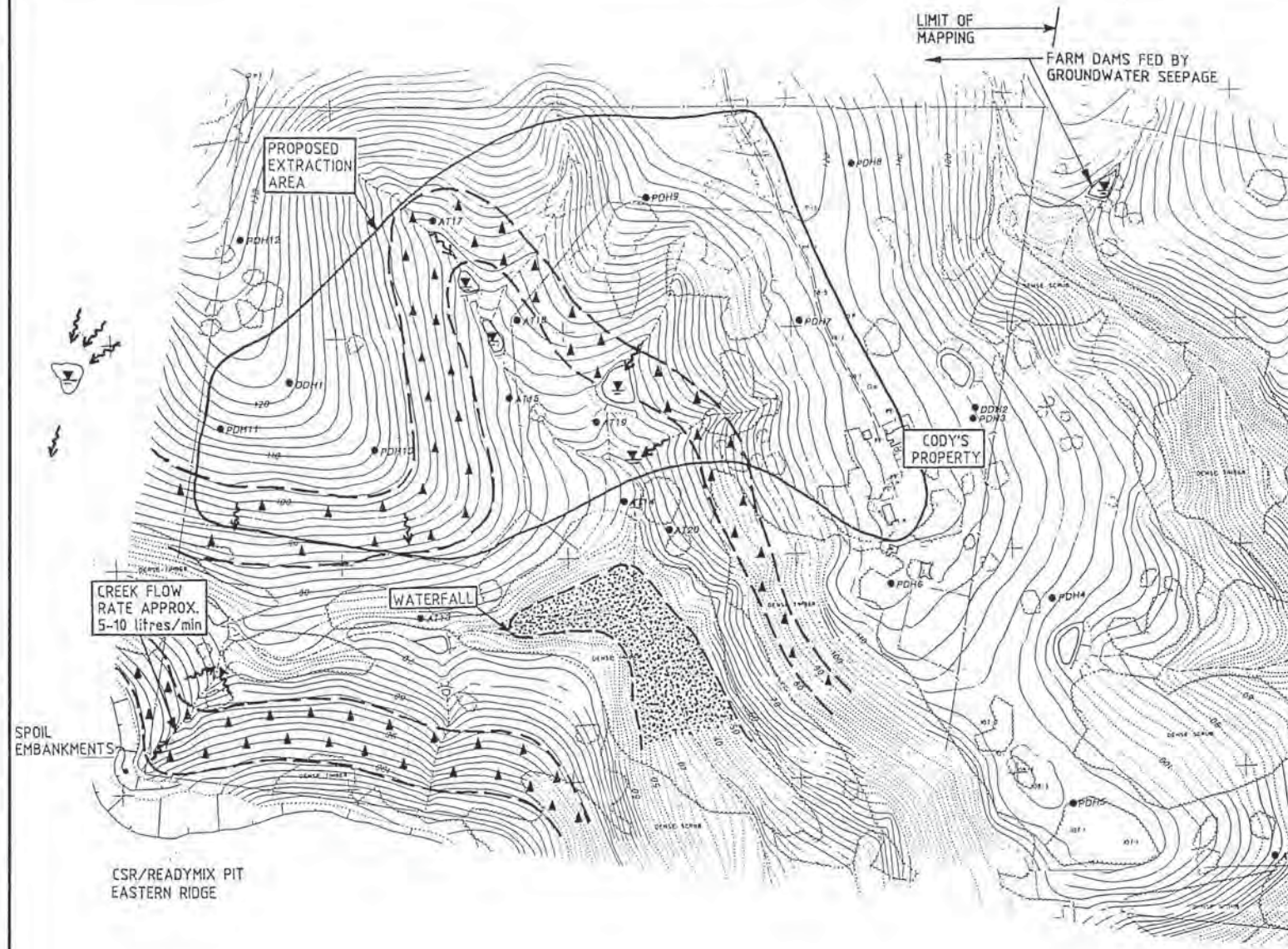


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DAVRON ENGINEERING
CLEARY BROS. PROPOSED REZONING AREA
ALBION PARK QUARRY
LOCALITY PLAN

Project No: 98622068

Drp No: 822068/1



Sources :
 GEOLOGY : INTERPRETATION BASED ON R.W. CORKERY & CO. PTY. LTD.
 PLAN : CLEARY BROS. (BOMB0) Pty. Ltd. Drg APQ-CODY-002 Rev 1 dated 27/01/94

0 50 100 150
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Drawn: RL	Date: 04.03.98
Checked: <i>[Signature]</i>	Date: 16/3/98
Revision:	Date:
Scale: 1 : 4,000	A3

DAVRON ENGINEERING CLEARY BROS. PROPOSED REZONING AREA ALBION PARK QUARRY HYDROGEOLOGICAL MAP	
Project No.: 98622068	Drg No.: 822068/2

APPENDIX A

Monthly Rainfall Data - Albion Park Post Office

Monthly Data for ALBION PARK POST OFFICE

Site Number 068000 Latitude 34°34'20"S Longitude 150°46'30"E Elevation 8 metres Opened Jan 1892 Still Open

Total Monthly Precipitation (mm)

Rain Days (number)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1979	23.9 6	12.5 5	224.4	17.9 5	117.3	101.5	25.8	5.6	14.8	60.1	64.4	9.4 3	677.6
1980	106.6	101.0	84.7	19.1	173.6	32.6	24.2	4.2	18.2	13.7	26.3	52.2	656.4
1981	76.1	158.8	12.8	211.4	98.6	37.5	18.6	14.5	8.9	143.4 8	245.0 13	55.0 6	1080.6
1982	41.5	18.6 5	93.2	27.6	1.0	51.1	15.8	1.8 1	261.7 4	21.8	23.7	20.0	577.8
1983	21.3	86.2	212.9	29.0	228.8	55.9	16.8	31.4	33.4	314.1	85.0	77.1	1191.9
1984	140.8	363.0	129.9	92.2	37.8	44.7	129.6 11	10.9	38.7	28.7	210.0	37.8	1264.1
1985	48.0 5	43.8 7	134.2	216.7	116.8	58.2	51.3 7	18.0 9	124.8 12	178.2 11	95.1 12	252.5	1337.6
1986	161.0 13	54.4 6	1.2 1	129.2	31.7 8	5.6 1	10.4 3	270.8 7	93.4 7	70.0 7	182.5	16.0 4	1026.2
1987	33.4 2	54.0	69.5	18.3	78.6	23.9	49.0	206.6	9.6	206.6	79.8	74.8 8	904.1
1988	49.4	65.9	74.8	445.8	156.6	35.4	87.8	21.8	46.8	5.8	127.4	107.8	1225.3
1989	195.4	82.6	134.4	336.6	131.4	191.0	17.9	22.1 8	3.5 3	10.1 5	139.6	84.0	1348.6
1990	68.8 8	325.6	64.0	328.0	236.0	52.0	41.4	337.0	88.8	31.0	22.8	64.2	1659.6
1991	65.8	38.6	6.2	46.0	80.2	747.4	80.4	7.4	17.4	5.6	38.4	290.6	1424.0
1992	137.0	399.6	48.8	113.6	46.0	73.2	18.6	8.6 4	22.8	82.2	125.6 14	177.2	1253.2
1993	68.2	80.4	148.6	4.6	14.8	19.6	54.6	53.7	172.2	77.4	45.4 6	25.8 6	765.3
1994	27.6 10	125.2	133.3	70.7 6	23.6 7	54.6 6	3.3 2	10.6 3	8.4 5	30.8 10	34.8 7	43.2 8	566.1
1995	148.4 19	67.2 13	146.2 17	10.4 6	223.7 21	39.2 12	2.6 4	0.0 0	252.3 18	96.4 20	142.6 19	60.8 19	1189.8 168
1996	80.2 18	48.4 18	32.4	35.0 8	178.2 14	54.0 13	48.2 9	114.0 8	188.4 10	38.8 14	83.0 15	33.0 16	933.6
1997	138.2 12	85.6 18	85.9	3.2 9	111.6 22	132.4 16	40.2 13	17.2 4	140.0 23	75.8 7	14.6 10	15.7 14	860.4 161
1998	77.1 21												

Summary of Total Monthly Precipitation using available data between 1892 and 1998

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	107.5	121.9	128.3	103.4	98.1	108.2	71.1	65.8	62.6	78.0	83.2	80.7	1101.3
Median	74.3	80.4	85.5	64.3	47.3	57.1	41.7	31.4	38.7	54.6	64.4	56.1	1058.2
Highest	543.7	635.8	694.6	490.4	725.2	747.4	458.3	417.8	337.8	546.1	774.6	376.2	2640.3
Lowest	2.5	0.0	0.5	2.0	0.0	0.0	0.0	0.0	0.0	3.4	0.0	0.0	469.3
Number	102	101	100	101	104	104	103	103	103	103	103	103	100

Summary of Rain Days using available data between 1892 and 1998

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean	8.8	8.4	9.0	7.0	7.1	7.0	6.0	6.2	7.2	7.4	7.9	7.7	92.2
Median	8.0	8.0	9.0	6.0	6.0	5.0	5.0	5.0	7.0	7.0	8.0	7.5	91.5
Highest	28	20	25	16	22	20	19	21	23	20	19	19	168
Lowest	1	0	1	1	0	0	0	0	0	1	0	0	38
Number	85	76	75	79	80	73	83	85	81	80	86	80	50



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 Prepared by Climate and Consultancy Section in the New South Wales Regional Office of the Bureau of Meteorology
 Contact us by fax on 02 9296 1567, or by email on reqnsw@bom.gov.au
 We have taken all due care but cannot provide any warranty nor accept any liability for this information.

APPENDIX A

APPENDIX B

Important Information about your Geotechnical Engineering Report

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

As the client of a consulting geotechnical engineer, you should know that site subsurface conditions cause more construction problems than any other factor. ASFE/The Association of Engineering Firms Practicing in the Geosciences offers the following suggestions and observations to help you manage your risks.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Your geotechnical engineering report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. These factors typically include: the general nature of the structure involved, its size, and configuration; the location of the structure on the site; other improvements, such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask your geotechnical engineer to evaluate how factors that change subsequent to the date of the report may affect the report's recommendations.

Unless your geotechnical engineer indicates otherwise, do not use your geotechnical engineering report:

- when the nature of the proposed structure is changed, for example, if an office building will be erected instead of a parking garage, or a refrigerated warehouse will be built instead of an unrefrigerated one;
- when the size, elevation, or configuration of the proposed structure is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership; or
- for application to an adjacent site.

Geotechnical engineers cannot accept responsibility for problems that may occur if they are not consulted after factors considered in their report's development have changed.

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time of subsurface exploration. Do not base construction decisions on a geotechnical engineering report whose adequacy may have been affected by time. Speak with your geotechnical consultant to learn if additional tests are advisable before construction starts. Note, too, that additional tests may be required when subsurface conditions are affected by construction operations at or adjacent to the site, or by natural events such as floods, earthquakes, or ground water fluctuations. Keep your geotechnical consultant apprised of any such events.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL JUDGMENTS

Site exploration identifies actual subsurface conditions only at those points where samples are taken. The data were extrapolated by your geotechnical engineer who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your geotechnical engineer can work together to help minimize their impact. Retaining your geotechnical engineer to observe construction can be particularly beneficial in this respect.

A REPORT'S RECOMMENDATIONS CAN ONLY BE PRELIMINARY

The construction recommendations included in your geotechnical engineer's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Because actual subsurface conditions can be discerned only during earthwork, you should retain your geotechnical engineer to observe actual conditions and to finalize recommendations. Only the geotechnical engineer who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid and whether or not the contractor is abiding by applicable recommendations. The geotechnical engineer who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Consulting geotechnical engineers prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your geotechnical engineer prepared your report expressly for you and expressly for purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the geotechnical engineer. No party should apply this report for any purpose other than that originally contemplated without first conferring with the geotechnical engineer.

GEOENVIRONMENTAL CONCERNS ARE NOT AT ISSUE

Your geotechnical engineering report is not likely to relate any findings, conclusions, or recommendations

about the potential for hazardous materials existing at the site. The equipment, techniques, and personnel used to perform a geoenvironmental exploration differ substantially from those applied in geotechnical engineering. Contamination can create major risks. If you have no information about the potential for your site being contaminated, you are advised to speak with your geotechnical consultant for information relating to geoenvironmental issues.

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical engineering report. To help avoid misinterpretations, retain your geotechnical engineer to work with other project design professionals who are affected by the geotechnical report. Have your geotechnical engineer explain report implications to design professionals affected by them, and then review those design professionals' plans and specifications to see how they have incorporated geotechnical factors. Although certain other design professionals may be familiar with geotechnical concerns, none knows as much about them as a competent geotechnical engineer.

BORING LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Geotechnical engineers develop final boring logs based upon their interpretation of the field logs (assembled by site personnel) and laboratory evaluation of field samples. Geotechnical engineers customarily include only final boring logs in their reports. Final boring logs should not under any circumstances be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimize the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes, and unanticipated costs are the all-too-frequent result.

To minimize the likelihood of boring log misinterpretation, give contractors ready access to the complete geotechnical engineering report prepared or authorized for their use. (If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared and that developing construction cost esti-

mates was not one of the specific purposes for which it was prepared. In other words, while a contractor may gain important knowledge from a report prepared for another party, the contractor would be well-advised to discuss the report with your geotechnical engineer and to perform the additional or alternative work that the contractor believes may be needed to obtain the data specifically appropriate for construction cost estimating purposes.) Some clients believe that it is unwise or unnecessary to give contractors access to their geotechnical engineering reports because they hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems. It also helps reduce the adversarial attitudes that can aggravate problems to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because geotechnical engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against geotechnical engineers. To help prevent this problem, geotechnical engineers have developed a number of clauses for use in their contracts, reports, and other documents. Responsibility clauses are not exculpatory clauses designed to transfer geotechnical engineers' liabilities to other parties. Instead, they are definitive clauses that identify where geotechnical engineers' responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your geotechnical engineering report. Read them closely. Your geotechnical engineer will be pleased to give full and frank answers to any questions.

RELY ON THE GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Most ASFE-member consulting geotechnical engineering firms are familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a construction project, from design through construction. Speak with your geotechnical engineer not only about geotechnical issues, but others as well, to learn about approaches that may be of genuine benefit. You may also wish to obtain certain ASFE publications. Contact a member of ASFE or ASFE for a complimentary directory of ASFE publications.

ASFE THE ASSOCIATION
OF ENGINEERING FIRMS
PRACTICING IN THE GEOSCIENCES
8811 COLESVILLE ROAD/SUITE G106/SILVER SPRING, MD 20910
TELEPHONE: 301/565-2733 FACSIMILE: 301/589-2017

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Appendix K

WATER QUALITY INVESTIGATION

Golder Associates Pty Ltd
A.B.N. 64 006 107 857

88 Chandos Street
St Leonards, NSW 2065 Australia
(PO Box 1302, Crows Nest, NSW 1585 Australia)
Telephone (02) 9439 3611
Fax (02) 9436 0693
<http://www.golder.com>



4th June 2003

03623055/002r

Cleary Bros Pty Ltd
Environmental Engineering and Contracts Division
39 Five Islands Rd
PORT KEMBLA NSW 2505

Attention: Mr Graeme Granger

Dear Graeme

RE: RESULTS OF THE WATER SAMPLING AND ANALYSIS AT ALBION PARK QUARRY

INTRODUCTION

Golder Associates (Golder) is pleased to present this letter report for works completed for the area of the proposed Albion Park Quarry (hereafter referred to as the Site) on the 26th May 2003 (see Figure 1). Golder was commissioned by T.W. Perram and Partners Pty Ltd on behalf of the project owners, Cleary Bros., on the 21st May 2003 to carry out works in accordance with our proposal (P032097) dated 15th May 2003.

OBJECTIVES OF THE INVESTIGATION

Golder understands that Cleary Bros is seeking to extend the operations of the quarry. However, to fulfil the DA requirements baseline surface water quality monitoring is necessary. This baseline sampling is the purpose of the investigation.

The Site is located within the Rocklow Creek catchment. It is the purpose of these investigations to establish the pre-development surface water quality in the creeks which occur within this catchment and which might become impacted by the proposed new quarrying operations.

SITE INFORMATION

The site of the proposed new quarry is located to the South of Dunsters Lane, which intersects the Princes Highway from the west, in Albion Park (Figures 1 and 2).

For the purpose of this investigation, the creeks which drain the Rocklow Creek catchment have been divided into two separate watercourses (Watercourse 1 and Watercourse 2) for the sake of sample identification and classification (refer to Figure 2).

Watercourse 1 drains the area of the proposed quarry extension and runs in a south easterly direction towards its confluence with Watercourse 2. The current landuse surrounding this creek is cattle grazing and most of the original dense riparian zone vegetation has been removed.



The Association of
Consulting Engineers
Australia

OFFICES IN ADELAIDE, BRISBANE, CAIRNS, MAROOCHYDORE, MELBOURNE, PERTH, SYDNEY, INDONESIA, HONG KONG, CHINA, THAILAND, PHILIPPINES, NEW ZEALAND
OFFICES ACROSS NORTH AMERICA, SOUTH AMERICA, EUROPE, ASIA, AUSTRALASIA.



AUSTRALIAN
ENGINEERING
ACHIEVERS
GROUP

Approximately 50 metres away from the confluence of the two watercourses a stone dam acts as a barrier to the flow of water. A large portion of the water flowing through this watercourse appears to be fed by groundwater seepage. Watercourse 1 is not currently disturbed by quarrying activities.

Watercourse 2 drains eastward from the westernmost catchment divide of the Rocklow Creek catchment. Two active CSR/Readymix quarries operate on or close to the edge of the catchment divide (Figure 2). Surrounding land use further downstream of the quarries is again cattle grazing and most of the original dense riparian zone vegetation (generally a rainforest assemblage) remains intact along the banks for the full horizontal extent of the watercourse. Watercourse 2 appears to be disturbed by quarrying activities.

The soil surrounding the watercourses in most parts is shallow and the character and morphology of the two watercourses appear dominated by the surrounding and underlying bedrock in the sense that the watercourses are significantly confined by the bedrock. Very little (if any) incision of the banks or substrate of the watercourses appear to have taken place even where the riparian vegetation is not present in Watercourse 1. Closer to the confluence of the two watercourses, the grade increases and the bedrock is fully exposed producing throughput reaches where rapids and cascades are present. Near to the point of confluence between the two watercourses the channels run into a large deep bedrock gully.

According to the 1:50,000 Kiama Geological Series Sheet (9028-1), the geology of the Site is comprised of the Blow Hole Latite (aphanitic to porphyritic latite), a member of the Gerringong Volcanic Facies. This facies overlies the Budgong Sandstone (red-brown and grey volcanic sandstone). These geological formations are part of the Shoalhaven Group and are of Permian Age (approximately 225 to 280 million years old).

SCOPE OF WORKS

Based on Cleary Bros' objectives, Golder proposed, and carried out, the following scope of work:

- Visit the Site and inspect the catchment and the creeks which drain it, and based on observations, select 4 appropriate surface water sampling sites;
- Collect field parameters of the surface waters for temperature, pH, electrical conductivity and Redox potential at four locations, using calibrated field instruments (to verify the laboratory tests/analyses);
- The collection of surface water samples from four locations (refer to Figure 2) using industry best standards methods:
 - ◆ *SP1* – downstream of the junction of Watercourse 1 and Watercourse 2, at a location where the joint creek (after Watercourse 1 and 2 meet) leaves the subject Site.
 - ◆ *SP2* – downstream of the proposed Cleary Bros Quarry extents on Watercourse 1, at a location immediately upstream of the junction of with Watercourse 2;
 - ◆ *SP3* – upstream of the junction of Watercourse 1 and Watercourse 2 on Watercourse 2.
 - ◆ *SP4* – at the top end of Watercourse 2, upstream of SP3 on Watercourse 2, and downstream of the catchment divide which separate the two CSR/Readymix quarries to the west from the Site (to assess the quality of surface water running onto the Site, and potentially impacted by the CSR/Readymix quarries).
- One quality control sample (a duplicate) will be collected to verify the laboratory results;

- The water samples will be sealed in appropriately clean, sterilised and preserved sample jars, stored on ice for transport and then submitted to a NATA accredited laboratory under chain of custody protocols for analysis of the parameters defined in the LES, namely:
 - pH,
 - turbidity,
 - total suspended solids, and
 - total dissolved heavy metals (Al, As, Ba, Cd, Co, Cr, Cu, Fe, Mn, Ni, Pb, Se, Sn, V and Zn) concentrations (unfiltered);
- Label Sampling Point SP1 in the field for use as an ongoing sampling point; and
- Assessment of results and compilation of a factual letter report presenting the tabulated field and laboratory results, and comparing the latter with the applicable ANZECC2000 guidelines.

FIELD METHODOLOGY

Surface water sampling locations were decided prior to arrival onsite to achieve appropriate Site coverage and provide a greater understanding of the current condition of the two watercourses. These predetermined locations had to be modified once onsite conditions were assessed, due to the presence of dense vegetation and deep rock gullies present at several locations onsite.

The samples were collected onsite by hand from as close to the middle of the channel as practicable to reduce the possibility of sample contamination from bank sediments.

Field analyses of water samples were undertaken using a pH, temperature and electrical conductivity meter. Golder initially planned to analyse for redox potential in the water also, however we were unable to gain access to the required meters. Field parameter readings are recorded in Table 2.

It is of note that the period immediately prior to collecting the surface water samples was one of light to moderate rainfall.

Laboratory Analysis

All four primary surface water samples (unfiltered) and intra-laboratory duplicate collected from the two channels were sent to Amdel Laboratory, a NATA accredited laboratory for the analytical tests performed. The tests performed by the laboratory included metals (As, Cd, Cr, Cu, Ni, Pb, Zn and Hg), suspended solids, turbidity and pH (Table 1). The results of the laboratory analysis are summarised in Tables 3 and 4.

Quality Assurance/Quality Control

Samples were collected as close to the middle of the channel as practicable with disposable nitrile gloves and placed in the appropriate jars as supplied by the laboratory, which were stored in a cooler with ice bricks. Field QA/QC procedures included the collection of 1 duplicate.

Field Duplicate

During sampling one duplicate sample was collected (see Table 5), DUP1 was designated as an intra-laboratory duplicate and sent to Amdel Laboratories in Asquith. The laboratory is NATA accredited for the analyses performed. Of the 11 primary/duplicate sample pairs that were analysed, 6 relative percentage differences (RPD's) could be calculated. Of these RPD's, 3 were within the acceptable limit (<50%). Of the remaining 3 RPD's which exceeded the data quality objectives (DQO's) for field duplicates, 2 were calculated from pairs where one of the samples was below the laboratory detection limits.

These results show that the tests were capable of producing accurate results and that sampling and analytical processes were adequate.

Laboratory QA/QC

Laboratory QA/QC tests showed that the results were within acceptable limits (70% to 130%) and laboratory procedures were adequate for maintaining consistency and accuracy.

RESULTS OF THE INVESTIGATIONS

Results of Field Analyses of Surface Water Samples

The water at the four sampling locations was tested in the field for a set of parameters which included temperature, pH and electrical conductivity (EC). Table 2 presents a summary of the results of the analyses.

pH

The pH of the water at the sampling locations ranged from 6.1 to 7.0. The lowest pH reading came from the sample locations SP1 and SP2 and the highest pH reading came from the location of SP4.

Temperature

The temperature of the water at the sampling locations ranged from 15.4°C to 16.5°C. The lowest temperature came from the sample location SP3 and the highest temperature readings came from SP1 and SP2.

Electrical Conductivity

The EC of the water at the sampling locations ranged from 170 µS/cm to 450 µS/cm. The lowest EC came from the sample location SP1 and the highest EC came from the sample location SP3.

Results of Laboratory Analyses of Surface Water Samples

The surface water samples collected at the four locations were analysed for heavy metals, pH, turbidity and suspended solids (Table 1). Tables 3 and 4 present a summary of the results of the laboratory analysis for the investigation.

Metals

The concentration of the heavy metals suite analysed were compared with the ANZECC 2000 Guidelines for Aquatic Ecosystems (Freshwater 95% Trigger), which were adopted for the purpose of comparison for this investigation.

The following water samples exceeded the criteria for:

- **Cu** - copper concentrations ranged from 15µg/L in SP1 to 39µg/L in SP4 (ANZECC 2000 trigger level is 1.4µg/L);
- **Zn** - zinc concentrations ranged from <10 µg/L¹ in SP1 to 20 µg/L in SP2 and SP3 (ANZECC 2000 trigger level is 8.0µg/L); and

¹ The laboratory detection limits exceeded the adopted criteria for the analytes: zinc and mercury.

- **Hg** - mercury concentrations were found to be below the laboratory detection limit of $<1\mu\text{g/L}$.

Golder believes that the elevated concentrations of copper and zinc are a reflection of the geology comprising the catchment. Volcanic rock types commonly have elevated concentrations of leachable metals in their mineralogy. It is therefore unlikely that the zinc and copper concentrations observed here can be definitively related to the disturbance of the watercourse by existing quarrying operations.

pH

The adopted criteria for assessing the analytical results for pH are the ANZECC 2000 Fresh and Marine Water Quality Guidelines (Upland Rivers). All samples fell within the acceptable limits as indicated by the adopted criteria. The pH readings described by the laboratory follow a similar pattern to the field analysis of pH, however, they differ from the readings collected during field analysis. The probable reason for this discrepancy is the time between sampling and the laboratory analysis for the samples undergoing pH analysis. Chemical changes occur over time during storage of the sample which together with fluctuations in temperature can alter pH considerably.

Turbidity and Suspended Solids

Turbidity readings ranged from 12 ntu (SP1) to 55 ntu (SP4), and total suspended solids (TSS) readings ranged from 1 mg/L (SP1) to 54 mg/L (SP4). No criteria are available for comparison of individual turbidity or TSS analyses.

It is apparent that the turbidity and TSS content in Watercourse 2 is greater than in Watercourse 1. This was evidenced in the field where it was noted from general observation that water in Watercourse 2 was more turbid (cloudy) than in Watercourse 1. However, it appears that turbidity/TSS decreases further downstream, as noted in SP3.

Conclusions

Observations taken in the field and results of the laboratory analysis lead Golder to the following conclusions:

- Elevated copper and zinc concentrations were noted in all surface water samples. It is probably that these concentration represent background concentration, largely arising from the volcanic rocks which comprise the catchment. The zinc and copper concentration exceed the adopted ANZECC 20000 criteria; and
- It is apparent that the turbidity and TSS measurement in Watercourse 2 is considerably greater than those in Watercourse 1. This confirms general field observations where the flowing waters in Watercourse 2 were noted to be more turbid than in Watercourse 1. However, it appears that turbidity/TSS decreases further downstream as noted in SP3.

Limitations

This report has been prepared in accordance with the agreement between Cleary Bros Pty Ltd and Golder Associates Pty Ltd (Golder Associates). The services performed by Golder Associates have been conducted in a manner consistent with the level of quality and skill generally exercised by members of its profession and consulting practice. No warranty or guarantee of site conditions is intended.

This report is solely for the use of Cleary Bros Pty Ltd and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objective than those set out in the report, except where written approval with comments are provided by Golder Associates.

The information in this report is considered to be accurate at the date of issue in accordance to the current conditions of the site. Surface water conditions can vary across a particular site, which cannot be explicitly defined by investigation. Therefore, it is unlikely that the results and estimations expressed in this report will represent the extremes of conditions within the Site. Surface water conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is used after a significant delay in time.

Attached is a document entitled "Important Information About Your Environmental Site Assessment" which should be read in conjunction with this report. We would be pleased to answer any questions about this important information.

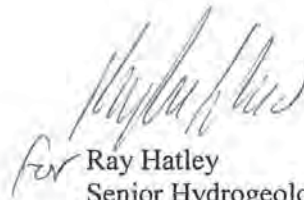
Should you have any further queries please do not hesitate to contact Ray Hatley or myself.

Yours sincerely,

GOLDER ASSOCIATES PTY LTD



Jonathon Hilliard
Environmental Scientist



Ray Hatley
Senior Hydrogeologist

JAH:RKH:jah

Attachments : Tables 1 to 5
Figures 1 and 2
Laboratory Certificates
"Important Information About Your Environmental Site Assessment"

J:\03PROJ\051-100\03623055_CLEARY_ALBION PARK\055_002R_ALBION PARK.DOC

Test Location	Sample Depth (m)	Sample Date	Sample Type	Analysis			
SP1	-	26/05/2003	Water	Metals	Suspended Solids	pH	Turbidity
SP2	-	26/05/2003	Water	Metals	Suspended Solids	pH	Turbidity
SP3	-	26/05/2003	Water	Metals	Suspended Solids	pH	Turbidity
SP4	-	26/05/2003	Water	Metals	Suspended Solids	pH	Turbidity
<i>QAQC</i> DUP1	-	26/05/2003	Water	Metals	Suspended Solids	pH	Turbidity

TABLE 1
ANALYTICAL PROGRAMME

Cleary Bros.
Surface Water Sampling
Rocklow Creek Catchment, Albion Park

Test Location	Sample Depth	Sample Date	Sample Type	Temperature (degrees Celsius)	pH	EC (µS/cm)
SP1	surface	26/05/2003	Water	16.5	6.1	170
SP2	surface	26/05/2003	Water	16.5	6.1	170
SP3	surface	26/05/2003	Water	15.4	6.3	450
SP4	surface	26/05/2003	Water	15.5	7.0	440

TABLE 2
INDICATOR PARAMETERS - FIELD

Cleary Bros.
Surface Water Sampling
Rocklow Creek Catchment, Albion Park

Test Location	Sample Depth	Sample Date	Sample Type	Suspended Solids mg/L	pH	Turbidity ntu
SP1	surface	26/05/2003	Water	1.0	7.3	12
SP2	surface	26/05/2003	Water	2.0	7.3	14
SP3	surface	26/05/2003	Water	19.0	7.8	42
SP4	surface	26/05/2003	Water	54.0	7.9	55
ANZECC 2000 Fresh and Marine Water Quality (Upland Rivers)					6.5-8.0	

Notes

Figures in bold italics exceed the ANZECC 2000 Fresh and Marine Water Quality (Upland Rivers) Guidelines

TABLE 3
INDICATOR PARAMETERS - LABORATORY

Cleary Bros.
Surface Water Sampling
Rocklow Creek Catchment, Albion Park

Test Location	Sample Depth	Sample Date	Sample Type	Lab	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury
SP2	surface	26/05/2003	Water	Amdel	<1	<0.2	<1	17	<1	<1	20	<1
DUP1	surface	26/05/2003	Water	Amdel	<1	<0.2	<1	16	9	<2	<10	<1
<i>Relative Percent Difference (RPD)</i>					<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>6.1</i>	<i>160.0</i>	<i>N/A</i>	<i>66.7</i>	<i>N/A</i>

Test Location	Sample Depth	Sample Date	Sample Type	Lab	Suspended Solids	pH	Turbidity ntu
SP2	surface	26/05/2003	Water	Amdel	2	7.3	14
DUP1	surface	26/05/2003	Water	Amdel	1	7.3	14
<i>Relative Percent Difference (RPD)</i>					<i>66.7</i>	<i>0.0</i>	<i>0.0</i>

Notes

All results are expressed as µg/L unless otherwise specified

Relative Percent Difference is estimated by $[(S1-S2)/(S1+S2)]*200$

TABLE 5 SUMMARY OF ANALYTICAL RESULTS QUALITY ASSURANCE

Cleary Bros.

Surface Water Sampling

Rocklow Creek Catchment, Albion Park

Test Location	Sample Depth	Sample Date	Sample Type	Arsenic	Cadmium	Chromium	Copper	Nickel	Lead	Zinc	Mercury
SP1	surface	26/05/2003	Water	<1	<0.2	<1	<i>15</i>	<1	<1	<i><10</i>	<i><1</i>
SP2	surface	26/05/2003	Water	<1	<0.2	<1	<i>17</i>	<1	<1	<i>20</i>	<i><1</i>
SP3	surface	26/05/2003	Water	<1	<0.2	<1	<i>36</i>	<5	2	<i>20</i>	<i><5</i>
SP4	surface	26/05/2003	Water	<1	<0.2	<1	<i>39</i>	<5	2	<i>10</i>	<i><5</i>
ANZECC 2000 Guidelines for Aquatic Ecosystems (Freshwater 95% Trigger)				13.0	0.2	1.0	1.4	11.0	3.4	8.0	0.6

Notes

All results are expressed as µg/L unless otherwise specified
 Figures in bold italics exceed the Fresh Water Criteria

TABLE 4

SUMMARY OF ANALYTICAL RESULTS

METALS - GROUNDWATER

Cleary Bros.
 Surface Water Sampling
 Rocklow Creek Catchment, Albion Park



LEGEND:



SURFACE WATER SAMPLE LOCATIONS



CLIENT CLEARY BROTHERS		PROJECT ALBION PARK QUARRY	
DRAWN SA	DATE 04.06.03	TITLE SAMPLE LOCATION PLAN	
CHECKED	DATE		
SCALE NTS	A4	PROJECT No 03623055	FIGURE No FIGURE 2



This Laboratory is accredited by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its terms of accreditation. This document shall not be reproduced except in full.
NATA Accredited Laboratory Number: 1464

INDUSTRIAL SERVICES DIVISION

ABN 30 008 127 802

Correspondence to:
PO Box 514
HORNSBY NSW 1630

5 Kelray Place
ASQUITH NSW 2077
Telephone: (02) 9482 1922
Facsimile: (02) 9482 1734

CERTIFICATE OF ANALYSIS

Contents :

1. Cover Pages (2)
2. Analysis Report Pages
3. QA/QC Appendix
4. Additional Reports - External (if applicable)
5. Chain of Custody (if applicable)

Report No. : 3E2374
Attention : Mr Ray Hatley
Client : Golder Associates
: PO Box 1302
: CROWS NEST NSW 1585
:
Samples : 5
Reference/Order : 03623055
Project : ALBION PARK
Received Samples : 26/05/03 Instructions : 26/05/03
Date Reported : 02/06/03

PLEASE SEE FOLLOWING PAGE FOR METHOD LISTING

RESULTS

All samples were analysed as received. This report relates specifically to the samples as received. Results relate to the source material only to the extent that the samples as supplied are truly representative of the sample source. This report replaces any preliminary results issued. Note that for methods indicated with "+", NATA accreditation does not cover the performance of this service. Three significant figures (or 2 for <10PQL) are reported for statistical purposes only. Where "Total" concentrations are reported for organic suites of compounds this is the summation of the individual compounds and the PQL is noted for reporting purposes only. This report has been auto-authorized by NATA signatories for PDF format. Refer to the method descriptions for further information.

PLEASE SEE ATTACHED PAGES FOR RESULTS

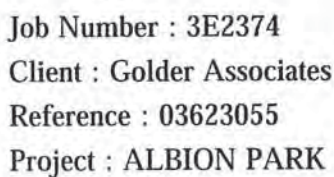
R. Mooney B.Sc.(Hons)Dip. FDA
Technical Services Manager Sydney



Report No. : 3E2374

Please note: Where samples are collected/submitted over several days, the date on which the last samples were analysed or extracted is reported.
Unless Ferrous Iron is determined on site, the possibility of a ferrous-ferric ratio change may occur.

<u>Method</u>	<u>Description</u>	<u>Extracted</u>	<u>Analysed</u>	<u>Authorised</u>
E2670	Suspended Solids	29/05/03	30/05/03	NSA 101
E2600	pH	27/05/03	27/05/03	NSA 101
E2790	Turbidity	27/05/03	27/05/03	NSA 101
E4970	Total Metals by ICP-MS	02/06/03	02/06/03	RMO 093
E4950	Mercury	28/05/03	29/05/03	RMO 093



Page 1 of 2
plus Cover Page

[illegible]

PQL = Practical Quantitation Limit

LNR = Samples Listed not Received

$$nd = \langle PQL$$

-- = Not Applicable

Refer to Amdel standard laboratory qualifier codes for comments.

Soils : mg/kg (ppm) dry weight unless otherwise specified

Waters : mg/L (ppm) unless otherwise specified in Method Header

Leachates : mg/L (ppm) in leachate unless otherwise specified in
Method Header

Job Number : 3E2374
Client : Golder Associates
Reference : 03623055
Project : ALBION PARK

Page 2 of 2
plus Cover Page

[illegible]

PQL = Practical Quantitation Limit

LNR = Samples Listed not Received

$$nd = \angle PQL$$

-- = Not Applicable

Refer to Amdel standard laboratory qualifier codes for comments.

Soils : mg/kg (ppm) dry weight unless otherwise specified

Waters : mg/L (ppm) unless otherwise specified in Method Header

Leachates : mg/L (ppm) in leachate unless otherwise specified in
Method Header



AMDEL INTERNAL QUALITY ASSURANCE REVIEW.

Page 1

Job No. 3E2374

General

1. Laboratory QA/QC including Method Blanks, Duplicates, Matrix Spikes, Laboratory Control Samples or CRM's are included in this QA/QC appendix. (Where applicable)
2. Inter-Laboratory proficiency trial results are available upon request.
3. PQLs are matrix dependent and are increased accordingly where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spike or surrogate recoveries.
5. Where 3 and 2 significant figures are reported for $>10\times$ PQL and $<10\times$ PQL respectively, the last figure is uncertain and is provided for statistical purposes only.
6. Samples duplicated or spiked are from this job only and are identified in the following QA/QC report.
7. SVOC analyses on waters are performed on homogenized, unfiltered samples, unless noted otherwise.

Maximum Holding Times for Soils, Sediments and Waters

Parameter	Holding Times
<u>Soils</u>	
Volatile and Semi-Volatile Organic Analysis.	Extracted in 14 days, analysed within 40 days.
Metals	Extracted and analysed within 28 days-6 months.
Inorganics*	Extracted and analysed within 7-28 days.
TCLPs*	Extracted and analysed within 14 days, (Zero Headspace-TCLP 7 days).
<u>Waters</u>	
Volatile Organic Analysis	Analysed within 7 days (USEPA requires 14 days).
Semi-Volatile Organic Analysis	Extracted in 7 days, analysed within 40 days.
Inorganics*	Analysed within 24 hrs-28 days.
Metals (dissolved metals should be supplied field filtered)	Prepared and analysed within 28 days.

* Please refer to 'Preservation Information Chart for Soils, Sediments & Waters' for further information. (ISFORM.098). Holding times may be extended with the use of preservation bottles and/or freezing samples. Holding times can be calculated from dates reported in the body of the report. Tests clearly exceeding holding times will be noted when sufficient information is provided.
Reference: USEPA SW846 and AMDEL SPM-01 (incorporating NEPM Guidelines).

Chain of Custody and Sample Integrity

	<u>Yes/No/NA</u>
Chain of Custody / instructions received with samples	Yes
Custody seals were received intact, if used	NA
Samples were received chilled and in good condition	Yes
Samples received appropriately preserved for all tests	Yes
VOC/SVOC samples were received in teflon lined containers	NA
Samples received with Zero Headspace	NA
Chain of Custody completed and attached (if applicable)	Yes

Chromatography Calibration/Acceptance Criteria (if applicable)

Retention time window meets acceptance criteria (+/-2%)	NA
Reference standard meets acceptance criteria (+/-10%)	NA
Recalibration standard meets acceptance criteria (+/-15%)	NA
Internal standard recovery acceptable.	NA

AMDEL INTERNAL QUALITY ASSURANCE REVIEW Cont..

Page 2

Amdel QA/QC Compliance Assessment

Compliance

Surrogates performed on all appropriate GC analyses and meet acceptance limits (70% - 130% recovery*).

Please see body of report

Matrix Spikes performed once per process batch and at least 1 in 20 samples (Results meet acceptance limits - 70% - 130% recovery* or 80% - 120% recovery* for inorganics in water.)

Please see body of report

Laboratory Control samples performed once per process batch and at least 1 in 20 samples (Results meet acceptance limits - 70% - 130% recovery* in soil or 70%-130%/90-110% recovery* for waters.)

Yes

Laboratory Duplicate samples performed once per process batch and at least 1 in 10 samples

Yes

Laboratory duplicates meet acceptance criteria
 < 4 PQL - +/- 2 PQL
 4-10 PQL - 25-50 or 50% RPD
 > 10 PQL - 10-30 or 30% RPD

Please see body of report

Method Blanks performed once per process batch and at least 1 in 20 samples (Results not detected at the PQL).

Yes

N/A=Not Applicable.

* Phenols 50% - 130% recovery

* SVOCs 60% - 130% recovery

* Phenoxy Acid Herbicides 60% - 140% recovery

QA/QC Appendix

Please refer to the following pages for the QA/QC data.

For further information on samples or non-conformance in QC protocols please see notations in the body of the report plus comments on the following page.

Additional Comments

R. Mooney

R. Mooney B.Sc.(Hons) Dip. FDA
Technical Services Manager Sydney

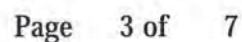


AMDEL STANDARD LABORATORY QUALIFIER CODES.

Page 3

Job NO. 3E2374

<u>Qualifier Codes</u>	<u>Description</u>
*	PQLs are raised due to matrix interference.
@	PQLs are raised due to insufficient sample provided for analysis.
\$	The mass imbalance indicates the presence of other ions not measured as part of this procedure.
nd	< PQL
--	Not applicable
LNR	The sample was listed on the COC, but not received.
IS	Insufficient sample was supplied to conduct this analysis.
AN	The analysis indicates the presences of an analyte that has been 'tentatively' identified, and the associated numerical value represents it's approximate concentration.
A	Sample results are reported on an 'as received' basis (not moisture corrected).
B	The sample was not received in a suitable timeframe to allow completion within the recommended holding time.
C	This sample was received with headspace.
D	This sample was received with the incorrect preservation for this analysis.
E	The raw data indicates the absence of 0.055g of Copper Sulphate in the sample.
F	This sample contained significant amounts of solids and was therefore analysed by settling and decanting the aqueous phase to avoid including the solid in the analysis portion.
G	This test was performed outside the recommended holding time.
H	This sample contained significant material >5mm which was removed prior to analysis.
ISD	Insufficient sample was supplied to conduct duplicate analyses.
ISM	Insufficient sample was supplied to conduct matrix spike analyses.
I	The spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference.
J	The duplicate %RPD is outside the recommended acceptance criteria. Further analysis indicates sample heterogeneity as the cause.
K	The matrix spike concentration is less than five times the background concentration in the sample, and therefore the spike recovery can not be determined.
L	The surrogate recovery is outside of the recommended acceptance criteria, due to matrix interference.
M	The surrogate recovery is outside of the recommended acceptance criteria. Insufficient sample remains to perform re-analysis.
N	Results are expressed in mg/L (ppm) due to the high concentration of the analyte.
O	The results reported are 'recoverable organics' for this fraction, as the chromatogram and peak shape indicates the presence of a significant concentration of polar compounds.
P	The concentration reported is mainly due to a single peak.
Q	Samples contain volatile halogenated oxygenated or other compounds that are not quantitated as part of TPH C6-9.
R	Theoretically the total result should be greater or equal to the dissolved concentration. However the difference reported is within the uncertainty of the individual tests.
S	The mass imbalance was equal to or less than 0.2 milli-equivalents.
T	During Kjeldahl digestion, nitrate (>10mg/L) can oxidise ammonia resulting in a negative TKN interference, which may have occurred for this sample.
U	Theoretically the TKN result should be greater or equal to ammonia concentration. However the difference reported is within the uncertainty of the individual tests.
V	This sample contained significant amounts of sediment which was included in the analysis portion as requested.
SUR	Surrogate recoveries could not be determined due to the dilution required to quantify the analyte.

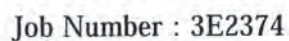


QAQC : Method Blank(s)

PQL = Practical Quantitation Limit
nd = <PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified

[illegible]



QAQC : Method Blank(s)

PQL = Practical Quantitation Limit
nd = <PQL
-- = Not Applicable

(S) Soils : mg/kg (ppm) dry weight
(W) Waters : mg/L (ppm) unless otherwise specified



CHAIN OF CUSTODY

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ST LEONARDS NSW 2065

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Page 1
of 1

LAB: Amdel

Job Number: <u>03623055</u>					GC/MS Scan (TPH, PAH, Phenolics)	Metals I (As Cd Cr Cu Hg Pb Zn Ni)	Metals II (Ba Co Mn Sb Se Sn)	Suspended Solids	pH	Total Recoverable Hydrocarbons (TRH)	STEX	Polycyclic Aromatic Hydrocarbons (PAH)	Phenolics	Organochlorine Pesticides (OCP)	Polychlorinated Biphenyls (PCB)	Halogenated Volatile Organics	Cyanide	Turbidity
Location/Job: <u>Albion Park</u>																		
Order No.:																		
Sampled By: <u>JAH</u>																		
Job Contact: <u>Ray Hatley</u>																		
SAMPLE No.	SAMPLE DEPTH (m)	MEDIA	No. of Vessels	SAMPLE DATE														
SP1	E47808	Water	3	26-5-03														
SP2	09	Water	3	↓														
SP3	10	Water	3															
SP4	11	Water	3															
DUP1	12	Water	3															



Special Instructions: 72 hour turnaround

Relinquished by: JAH Date: 26-5-03
Organisation: Golder Associates Time: _____
Received by: G. ANDERSON Date: 26/5/03
Organisation: Amdel Time: 7pm

Relinquished by: _____ Date: _____
Organisation: _____ Time: _____
Received by: _____ Date: _____
Organisation: _____ Time: _____

Important Information About Your Environmental Site Assessment

These notes have been prepared by Golder Associates Pty Ltd using guidelines prepared by ASFE; The Association of Engineering Firms Practising in the Geosciences, of which Golder Associates Pty Ltd is a member. They are offered to help you in the interpretation of your Environmental Site Assessment (ESA) report.

Reasons For Conducting An ESA

ESA's are typically, though not exclusively carried out in the following circumstances :

- as pre-acquisition assessments, on behalf of either purchaser or vendor, when a property is to be sold;
- as pre-development assessments, when a property or area of land is to be redeveloped or have its use changed, for example, from a factory to a residential subdivision;
- as pre-development assessments of greenfield sites, to establish "baseline" conditions and assess environmental, geological and hydrogeological constraints to the development of, for example, a landfill; and
- as audits of the environmental effects of an ongoing operation.

Each of these circumstances requires a specific approach to the assessment of soil and groundwater contamination. In all cases, however, the objective is to identify and if possible quantify the risks which unrecognised contamination poses to the proposed activity. Such risks may be both financial, for example, clean-up costs or limitations on site use, and physical, for example, health risks to site users or the public.

The Limitations of An ESA

Although the information provided by an ESA can reduce exposure to such risks, no ESA, however diligently carried out, can eliminate them. Even a rigorous professional assessment may fail to detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled.

An ESA Report Is Based On A Unique Set of Project Specific Factors

Your environmental report should not be used :

- When the nature of the proposed development is changed, for example, if a residential development is proposed instead of a commercial one;

- When the size or configuration of the proposed development is altered;
- when the location or orientation of the proposed structure is modified;
- When there is a change of ownership; or
- For the application to an adjacent site.

To help avoid costly problems, refer to your consultant to determine how any factors which have changed subsequent to the date of the report may affect its recommendations.

ESA "Findings" Are Professional Estimates

Site assessment identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of contamination, its likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than a report indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise its impact. For this reason, owners should retain the services of their consultants through the development stage, to identify variations, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Subsurface Conditions Can Change

Subsurface conditions are changed by natural processes and the activity of man. Because an ESA report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on an ESA report whose adequacy may have been affected by time. Speak with the consultant to learn if additional tests are advisable.

ESA Services Are Performed For Specific Purposes And Persons

Every study and ESA report is prepared in response to a specific Brief to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. A report should not be used by other persons for any purpose, or by the client for a different purpose. No individual other than the client should apply a report even apparently for its intended purpose without first conferring with the consultant. No person should apply a report for any purpose other than that originally contemplated without first conferring with the consultant.

An ESA Report Is Subject To Misinterpretation

Costly problems can occur when design professionals develop their plans based on misinterpretations of an ESA. To help avoid these problems, the environmental consultant should be retained to work with appropriate design professionals to explain relevant findings and to review the adequacy of their plans and specifications relative to contamination issues.

Logs Should Not Be Separated From The Engineering Report

Final borehole or test pit logs are developed by environmental scientists, engineers or geologists based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples.

Only final logs are customarily included in our reports. These logs should not under any circumstances be redrawn for inclusion in site remediation or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimise the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To reduce the likelihood of boring log misinterpretation, the complete report must be available to persons or organisations involved in the project, such as contractors, for their use. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing all the available information to persons and organisations such as contractors helps prevent costly construction problems and the adversarial attitudes which may aggravate them to disproportionate scale.

Read Responsibility Clauses Closely

Because an ESA is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are not exculpatory clauses designed to foist liabilities onto some other party. Rather, they are definitive clauses which identify where your consultant's responsibilities begin and end. Their use helps all parties involved recognise their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your ESA report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

Appendix L

NOISE AND BLASTING ASSESSMENT