Hy-Tec Industries Pty Limited

ABN: 90 070 100 702

Documentation Supporting an Application for Director-General's Requirements

for the

Austen Quarry Stage 2 Project, Hartley

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

August 2013

This page has intentionally been left blank

Hy-Tec Industries Pty Limited

ABN: 90 070 100 702

Austen Quarry
Stage 2 Project, Hartley

Documentation Supporting an Application for Director-General's Requirements

Prepared for:

Hy-Tec Industries Pty Limited
ABN: 90 070 100 702
Unit 4, Gateway Business Park
63-79 Parramatta Road
SILVERWATER NSW 2128

Telephone: (02) 9647 2866
Facsimile: (02) 9647 2924
Email: darryl.thiedeke@hy-tec.com.au

Prepared by:

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

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

Telephone: (02) 9985 8511
Facsimile: (02) 9985 8208
Email: brooklyn@rwcorkery.com

Orange Office:
62 Hill Street
ORANGE NSW 2800

Telephone: (02) 6362 5411
Facsimile: (02) 6361 3622
Email: orange@rwcorkery.com

Brisbane Office:
Suite 5, Building 3
Pine Rivers Office Park
205 Leitchs Road
BRENDALE QLD 4500

Telephone: (07) 3205 5400
Facsimile: (02) 9985 8208
Email: brisbane@rwcorkery.com

Ref No. 652/21

August 2013

This Copyright is included for the protection of this document

CONTENTS

Page **Page**

FIGURES

CONTENTS

Page **Page**

TABLES

PLATES

COMMONLY USED ACRONYMS IN THIS DOCUMENT

AHD	–	Australian Height Datum
ANFO	–	Ammonium Nitrate and Fuel Oil
DGRs	–	Director-General's Requirements
DPI	–	Department of Primary Industries (includes Office of Agricultural Sustainability & Food Security, Catchments and Lands and others within the Department of Trade & Investment, Regional Infrastructure and Services)
DP&I	–	Department of Planning and Infrastructure
DRE	–	Division of Resource and Energy (within DTIRIS)
DSEWPaC	–	Department of Sustainability, Environment, Water, Population and Communities
DTIRIS	–	Department of Trade & Investment, Regional Infrastructure and Services
EIS	–	Environmental Impact Statement
EPA	–	Environment Protection Authority
EP&A Act	–	*Environmental Planning & Assessment Act 1979*
EPBC Act	–	*Environment Protection and Biodiversity Conservation Act 1999*
HN-CMA	–	Hawkesbury-Nepean Catchment Management Authority
LCC	–	Lithgow City Council
LGA	–	Local Government Area
NPW Act	–	*National Parks & Wildlife Act 1974*
NOW	–	NSW Office of Water
OEH	–	Office of Environment and Heritage
PAC	–	Planning Assessment Commission
PFM	–	Planning Focus Meeting
RAP	–	Registered Aboriginal Parties
RMS	–	Roads and Maritime Services
RWC	–	R.W. Corkery and Co Pty Limited
TSC Act	–	*Threatened Species Conservation Act 1995*

This page has intentionally been left blank

SUMMARY OF KEY FACTS AND STATISTICS

<table>
<tr><td>Applicant</td><td>• Hy-Tec Industries Pty Limited</td></tr>
<tr><td>Application Area / (Site)</td><td>• Total area of the Application Area or Site = 144ha</td></tr>
<tr><td>Area of Disturbance[1]</td><td>• Quarry Access Road (3.1km x 12m) = 3.7ha
• Stage 1 Extraction area (including the primary crushing station) = 12.1ha
• Stage 2 Extraction area = 17.7ha
• Stage 1 Overburden Emplacement = 6.8ha
• Stage 2 Overburden Emplacement extension = 5.8ha
• Processing area (stockpile areas, processing plant, offices, amenities and workshops) = 6.1ha
• Yorkeys Creek stockpile area = 4.4ha
• Ancillary operational areas ~2ha
• Total proposed disturbance = 57.7ha</td></tr>
<tr><td>Project Overview</td><td>• Rhyolite (hard rock) resource
• Project Application sought for 30 years beyond 2020
• Proven Reserve of 39 million tonnes of recoverable rhyolite
• Approximately 6 million tonnes of overburden
• Production of hard rock aggregates, road construction materials, landscaping products and other specialty products
• Extraction by drill and blast, load and haul methods
• No changes to current processing operations proposed
• Maximum production rate of 1.1 million tpa (no increase proposed)
• Access to the Site via a sealed Quarry Access Road off Jenolan Caves Road (no change proposed)
• Estimated employment: 20 full-time persons (an increase of 4 persons)
• Hours of Operation minor proposed change)
<table>
<tr><th></th><th>Monday to Friday</th><th>Saturday</th><th>Sundays / Public Holidays</th></tr>
<tr><td>Blasting</td><td>9:00am to 5:00pm</td><td>No Activity</td><td>No Activity</td></tr>
<tr><td>Extraction and Processing</td><td>6:00am to 10:00pm</td><td>6:00am to 3:00pm</td><td>No Activity</td></tr>
<tr><td>Loading Trucks and Product Despatch</td><td>5:00am to 10:00pm</td><td>5:00am to 3:00pm</td><td>No Activity</td></tr>
<tr><td>Maintenance</td><td colspan="3">24 hours/day – Any day</td></tr>
</table></td></tr>
<tr><td>Capital Investment Value</td><td>• $2.2M (for the purchase of two additional haul trucks [$800 000 per truck] and one additional front-end loader [$600 000])</td></tr>
</table>

[1] The areas quoted are preliminary and subject to modification following further project planning.

This page has intentionally been left blank

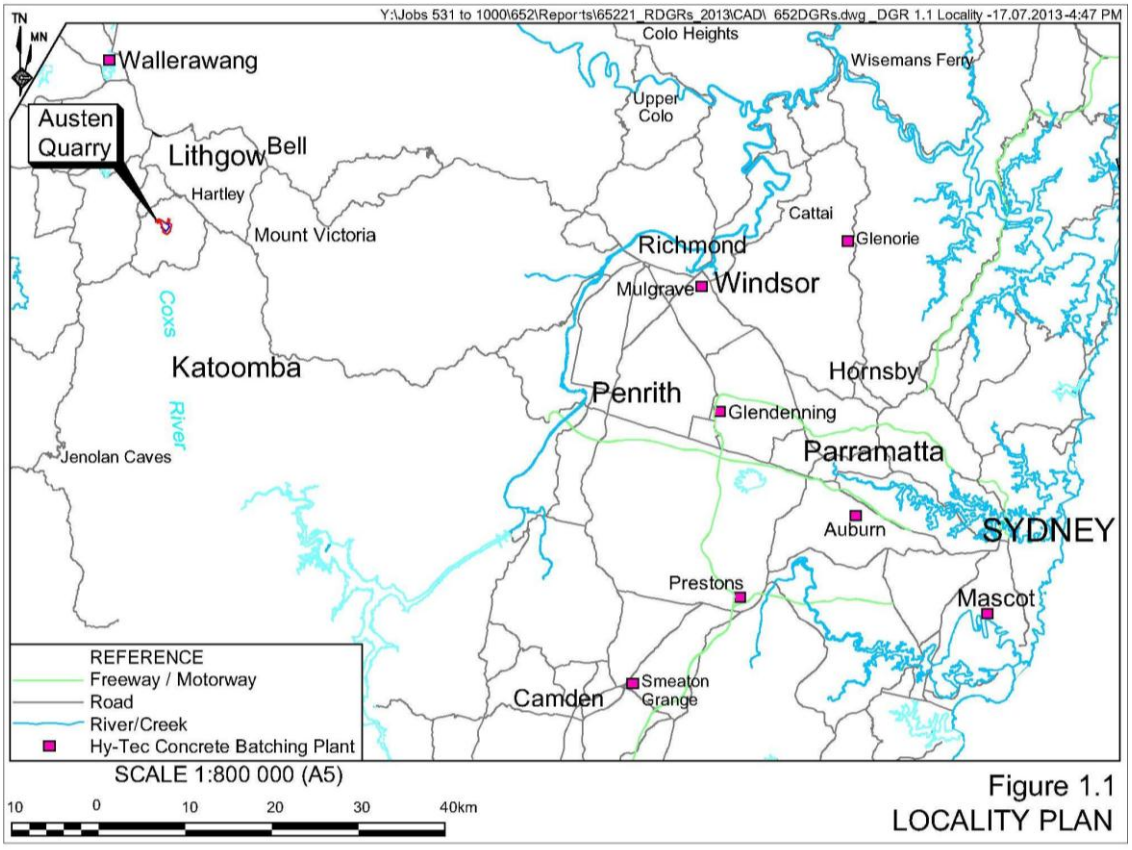
1. INTRODUCTION

1.1 SCOPE

Hy-Tec Industries Pty Limited ("the Applicant") currently operates the Austen Quarry, ("the quarry"), located approximately 3.5km south-southwest of the village of Hartley and 10km south of Lithgow (see **Figure 1.1**). The quarry is operated under Development Consent No. 103/94 (DA 103/94) originally issued by the Council of the City of Greater Lithgow (now Lithgow City Council) in March 1995 on Lot 1, DP1005511, owned by the Hartley Pastoral Corporation Pty Ltd (HPC). A modification to DA 103/94 approved by Lithgow City Council in November 2012 approved an extension of operations at the quarry until March 2020.

The extraction of the hard rock resource is currently approved on Lot 1, DP 100551 ("Stage 1") and the Applicant proposes an extension of the extraction area and overburden emplacement covering approximately 25.5ha within Lots 1 and 2, DP1005511 and Lot 31, DP1009967[2] ("Stage 2 Extension"). The boundaries of the approved and extended extraction area and overburden emplacement are displayed on **Figure 1.2**. All existing and proposed extraction, processing, stockpiling and transportation operations are located in an area leased by the Applicant from HPC and referred to throughout this document as "the Site" (see **Figure 1.2**).

This document has been assembled by R.W. Corkery & Co. Pty Limited (RWC) on behalf of the Applicant to provide the NSW Department of Planning & Infrastructure (DP&I) and other relevant government agencies with sufficient information to enable the Director-General's Requirements (DGRs) for an Environmental Impact Statement (EIS) to be issued for the Stage 2 Extension of the Austen Quarry ("the Proposal").



[2] Also owned by HPC.

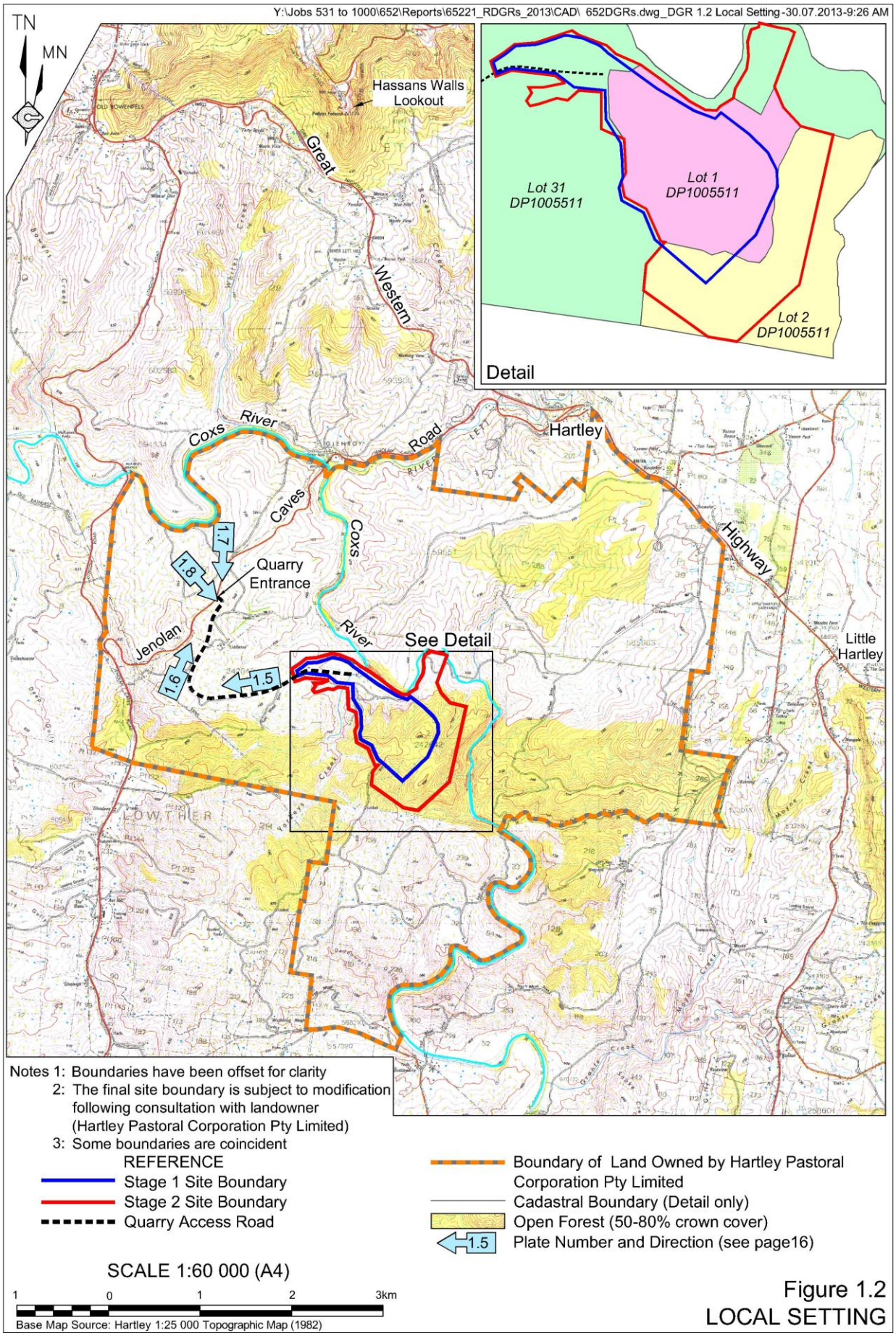


Figure 1.2
LOCAL SETTING

It is noted that investigations potentially influencing the final location and design of various components of the Proposal, e.g. ecological, archaeological and hydrological investigations, are ongoing. The proposed layout of the Stage 2 quarry (see Section 2.4) represents the most likely arrangement of the quarry components, however, should modifications be required to accommodate environmental or operational constraints, these will be identified in the EIS.

1.2 DOCUMENT FORMAT

This document has been prepared in seven sections in order to provide the specific information nominated for submission with an application for DGRs on the DP&I's online lodgement portal of the website: http://majorprojects.planning.nsw.gov.au/application/SSD.

Section 1: introduces the Proposal, the Applicant and Application Area. Background information and an overview of the existing operations is provided together with a review of the approvals process, consultation completed and planned, and the management of initial investigations.

Section 2: describes the Applicant's objectives and proposed operations throughout Stage 2 of the Proposal. This section focusses on the components within the quarry that would be modified during Stage 2. The feasible alternatives considered by the Applicant during the design of the Proposal are also described.

Section 3: identifies the key planning considerations for the Proposal, along with confirmation of permissibility.

Section 4: reviews, based on a preliminary risk assessment to identify the environmental factors most likely to be affected by the Proposal, the range of features of the environment within and surrounding the Stage 2 Extension that would or could be impacted during and/or beyond the life of the Proposal. The specific issues to be considered

A brief description is provided of the existing environment, together with discussions of the investigations already undertaken, underway or planned. Where relevant, information on safeguards and management measures to be adopted by the Applicant are identified. This section also provides a preliminary assessment of each environmental issue.

This section concludes with a review of any possible cumulative impacts of the Proposal with other local industry or activities.

Section 5: provides a conclusion relating to the feasibility and acceptability of the Proposal.

Section 6: lists the various source documents referred to for information and data used during the preparation of this document.

Table 1.1 presents where specifically requested information, listed on the DP&I website, is covered in this document.

The information provided in this document will ultimately be incorporated and expanded upon within a comprehensive EIS to be prepared in accordance with the provisions of Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Table 1.1
Coverage of Information Requested to Accompany Application for DGRs

Request	Comments	Coverage
Site Details	Provide high-quality aerial photographs, maps or figures that clearly depict the following: • the local and regional context of the proposal; • surrounding development and any potentially affected properties; and • the location of key infrastructure and environmental features	**Figures 1.1** and **1.2**
Development description	Provide a clear and concise summary of the proposal that describes the types of activities that will be undertaken during each stage of the development.	Sections 2.4 to 2.10
Permissibility and Strategic Planning	Identify the strategic planning documents, environmental planning instruments and key development standards applying to the development, including any development standards not being met.	Section 3.1
Impact identification and assessment	Identify and prioritise the expected environmental impacts (positive and negative) associated with the development, based on a preliminary risk assessment. Briefly outline any strategies to address the impacts identified.	Section 4
Justification	Explain why the site was chosen for the proposal and briefly discuss the alternatives considered. Outline the strategic context for the proposal, including the benefits it would bring to the wider region and/or State.	Section 5
Consultation	Outline any consultation (with the community, local councils, other Government agencies) already undertaken and proposed to be carried out for the proposal	Section 1.7
Capital Investment Value	Provide an accurate estimate of the cost of carrying out the proposal.	Summary of Key Facts and Statistics & Section 2.4

1.3 THE APPLICANT AND THE APPLICATION AREA

1.3.1 The Applicant

Hy-Tec Industries Pty Limited is a fully owned subsidiary of Adelaide Brighton Ltd (Adelaide Brighton), a leading integrated construction materials and lime producing group of companies focused on the engineering, infrastructure and resource sectors. The group's principal activities are the production and marketing of clinker, cement and lime products, premixed concrete and aggregates, and concrete products.

Adelaide Brighton originated in 1882 and is an S&P/ASX200 company with 1 600 employees and operations in all Australian States and Territories. Adelaide Brighton has a modest position in the premixed concrete markets through Hy-Tec in Victoria, New South Wales and Southeast Queensland. The Company has an emerging position in aggregate supply with strategic reserves at the Austen Quarry, in northern New South Wales and southeast Queensland.

The Applicant operates seven concrete batching plants throughout the Sydney metropolitan area and one plant at Wallerawang (see **Figure 1.1**).

1.3.2 The Application Area

The Application Area for the Proposal, which is referred to throughout this document as "the Site", generally corresponds to those areas of Lots 1 and 2, DP1005511, Lot 31 DP1009967 and Lot 4, DP876394, leased by the Applicant from the Hartley Pastoral Company Pty Ltd. The final boundary of the Site will be the subject of ongoing negotiations between the Applicant and the land owner, however, will contain the existing extraction, processing and associated activities at the Austen Quarry, together with:

- the proposed Stage 2 extension of the extraction area which would increase the current limit of disturbance by approximately 19.7ha;
- the proposed Stage 2 extension of the overburden emplacement by approximately 5.8ha; and
- a range of buffers to surrounding undisturbed areas.

The Application Area displayed on **Figure 1.2** also includes the sealed Quarry Access Road between the processing area and Jenolan Caves Road and existing internal roads (although no modification to the existing internal road network is proposed as part of the Proposal).

The approved and ongoing transport route from the quarry would include Jenolan Caves Road, between the quarry entrance and the Great Western Highway, with distribution via the Great Western Highway depending on customer locations.

1.4 BACKGROUND TO THE PROPOSAL

In 1994, AUS10 Rhyolite Pty Ltd sought and obtained development consent for a hard rock quarry within the property owned by HPC. The original development application was accompanied by an EIS prepared in August 1994 by Sinclair Knight Merz (SKM, 1994). Lithgow City Council issued development consent (with a deferred commencement) for DA 103/94 on 24 November 1994 for the development and operation of the quarry and ultimately endorsed the development consent on 22 March 1995 for a term of 20 years. As noted in Section 1.1, the term of DA 103/94 was extended for a further 5 years (to March 2020) following of a modification to the development consent in November 2012. The Applicant entered into a lease to become the operator of the quarry in early 2002 and commenced the sale of aggregates and other quarry products in 2005.

The resource extracted, rhyolite, is an extrusive, volcanic rock which is blasted, crushed and screened to produce high quality aggregates and roadbase products for sale to regional and Sydney markets. The rhyolite resource within the Site has inferred total reserves of approximately 100 million tonnes (Mt). DA 103/94 provides for the extraction of almost 9.5Mt of rhyolite at a production rate up to 1.1 million tonnes per year noting approximately 15% of the rhyolite is unsuitable for the production of saleable products and is referred to as "overburden".

The Applicant recently completed an exploration program confirming the continuation of the rhyolite resource beyond the approved extent of the Stage 1 extraction area. This resource is of equivalent quality to that of the Stage 1 extraction area and can be economically extracted. The defined proven reserves within the Site are now approximately 45 million tonnes (Source: Don Reed & Associates). The Stage 2 Extension would therefore allow for a significant increase in the operational life of the Austen Quarry and provide for continued supply of the construction materials to Sydney and surrounding regions. The Applicant estimates that between 50% and 75% of current production from the Austen Quarry supplies the Applicant's seven concrete batching plants in the Sydney metropolitan area (see **Figure 1.1**).

In addition to providing certainty of supply of high quality construction materials, the extended operation of the quarry would also continue to generate the economic and social benefits already experienced in the local community. These benefits relate principally to the direct employment of 16 people and indirect employment of a further 40 people together with Hy-Tec's local purchases, particularly in the greater Lithgow region.

1.5 THE EXISTING OPERATION

1.5.1 Existing Approvals

The quarry is operated with the following development consent and licence.

1. Development Consent DA 103/94 issued by the Council of the City of Greater Lithgow (now Lithgow City Council) on 22 March 1995, most recently modified by Lithgow City Council on 27 November 2012.
2. Environment Protection Licence 12323 Issued by the NSW Environment Protection Authority (EPA). This licence is renewed annually with the anniversary date being 1 July.

The Applicant has recently lodged on application with the NSW Office of Water (NOW) for a Controlled Activity Approval under the *Water Management Act 2000* for the ongoing activities within 40m of the Coxs River.

1.5.2 Extraction Operations

1.5.2.1 Extraction Area and Waste Rock Emplacement

Extraction Area

Figure 1.3 presents the approved extraction limit and other activities areas within the Stage 1 Quarry. The Stage 1 extraction area is approved to a depth of 730m AHD and covers approximately 12.1ha. Benches have been developed at between 10m and 15m vertical intervals with the extraction faces being 70° or steeper (see **Plate 1.1**).

Overburden Emplacement

In line with the 1994 EIS, the overburden emplacement has been developed immediately adjacent to the extraction area (to the south), partially in-filling the head of a gully between the 730m AHD and 780m AHD elevations (see **Figure 1.3**). It is noted that the volume of overburden contained within the emplacement is currently greater than originally forecast due to the identification in 2004 of a dyke of non-rhyolitic material through the middle of the Stage 1 extraction area. Covering an area of approximately 6.8ha, the outer slopes of the overburden emplacement have been progressively rehabilitated through direct seeding and tube stock planting. **Plate 1.2** displays the form of the overburden emplacement and the extent of progressive revegetation completed to date.

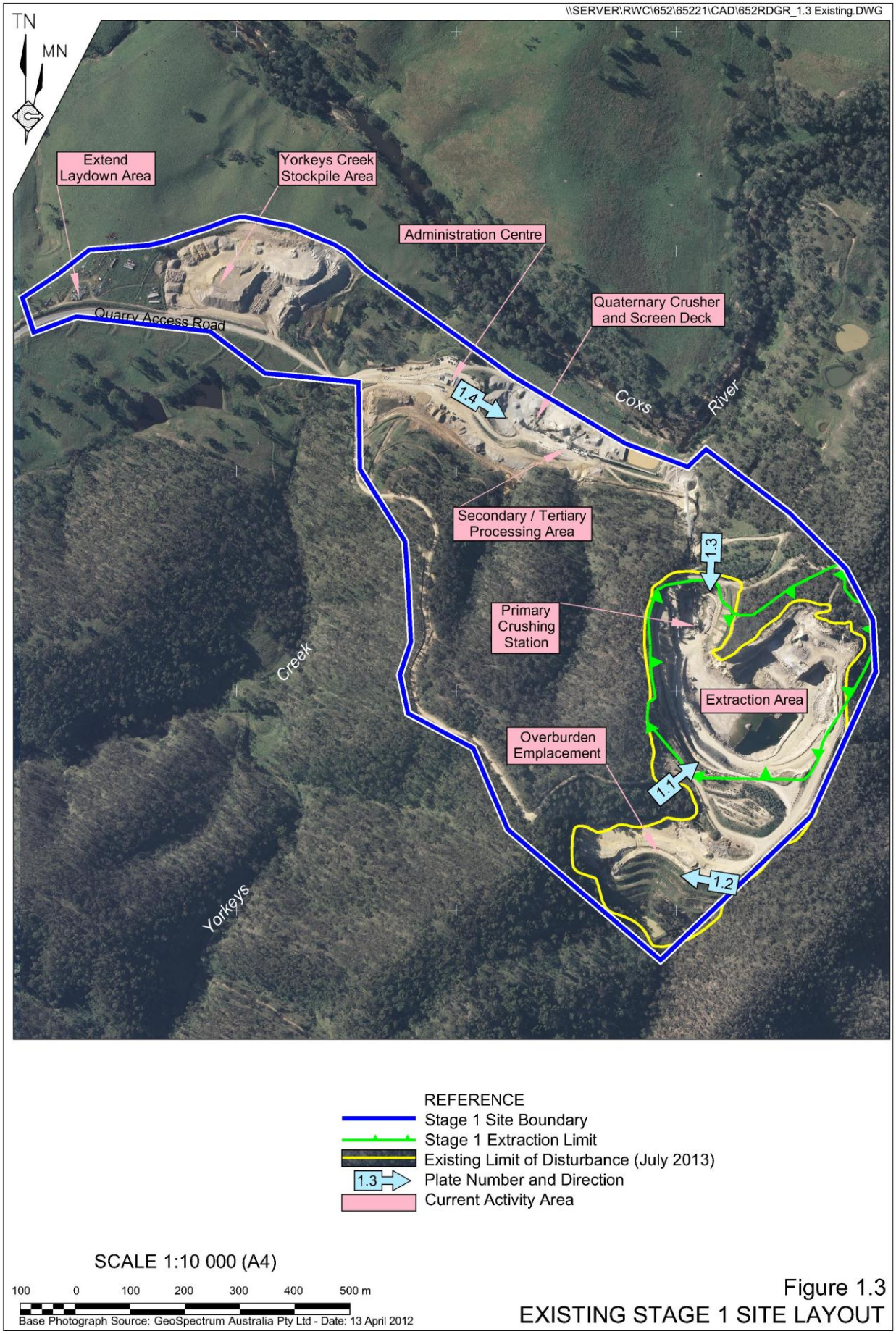


Figure 1.3
EXISTING STAGE 1 SITE LAYOUT

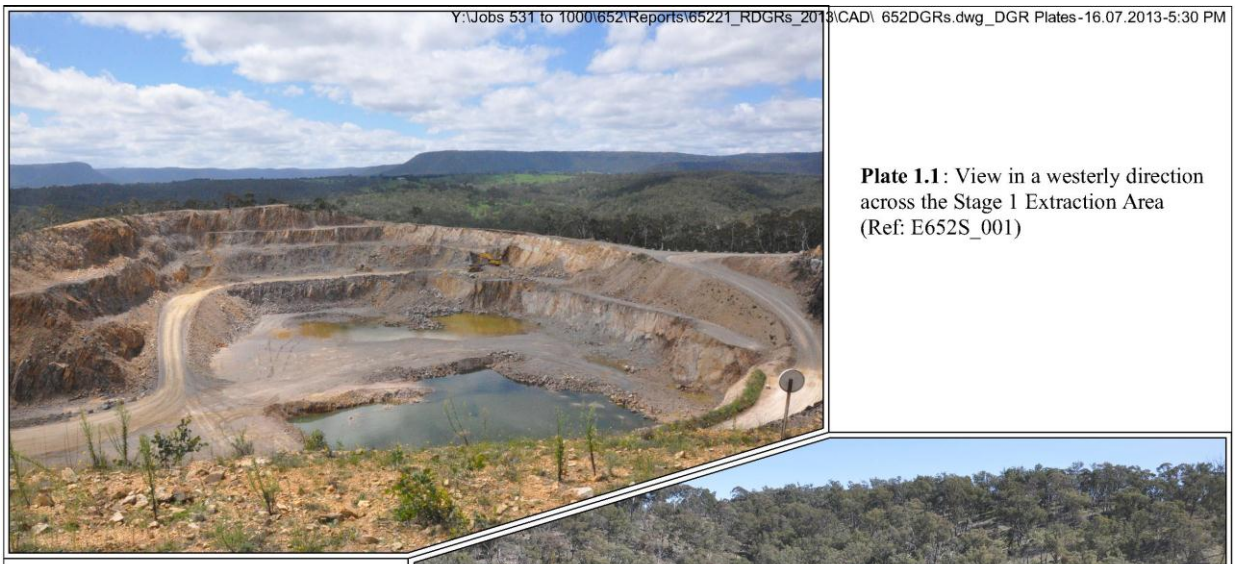


Plate 1.1: View in a westerly direction across the Stage 1 Extraction Area
(Ref: E652S_001)

Plate 1.2: View in a westerly direction across the existing revegetated overburden emplacement
(Ref: E652P_026)

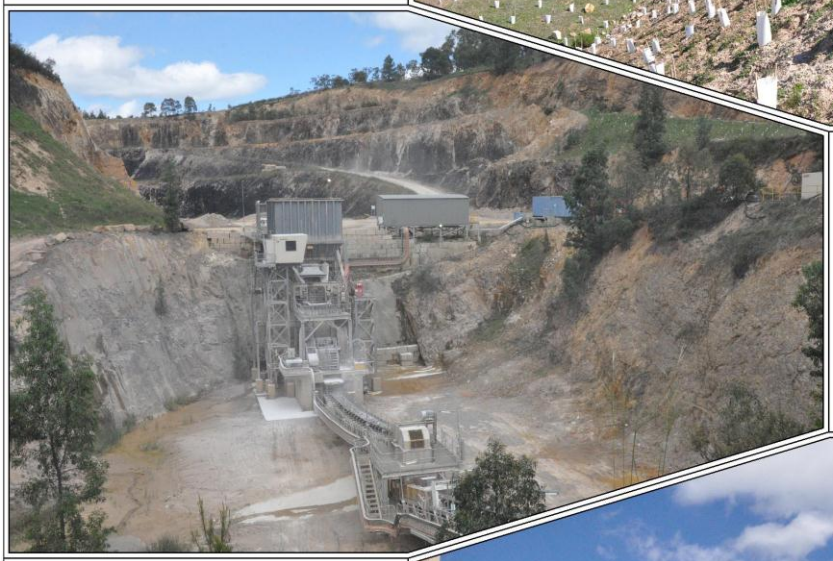


Plate 1.3: View in a southerly direction towards the Primary Crushing Station and Conveyor to the Primary Feed Stockpile
(Ref: E652S_033)

Plate 1.4: Section of the Processing Plant - Quaternary crusher is located in the left foreground
(Ref: E652S_041)

1.5.2.2 Extraction Activities

Extraction of the rhyolite is undertaken using conventional drill and blast, load and haul methods. Surface vegetation is first cleared by bulldozer and stockpiled for placement over sections of the quarry to be rehabilitated. Any available soil resources are then stripped and stockpiled for spreading over rehabilitated slopes of the overburden emplacement, or other areas of the quarry to be rehabilitated. Any rippable rock below the soil and above the rhyolite is ripped, loaded to haul trucks and placed within the rock emplacement.

Non-rippable waste rock and rhyolite is blasted (using ANFO) to fragment the material such that it can either be loaded and hauled to either the overburden emplacement or the primary crusher located on the 750m AHD level within the extraction area for crushing and delivery (by conveyor) to the remaining crushing and screening operations. Current blast sizes vary according to the location within the extraction area but generally vary from 10 000t through to 100 000t (with an average of approximately 60 000t).

1.5.2.3 Mobile Equipment

The Applicant currently operates the following mobile equipment within the extraction area and on the overburden emplacement.

- 1 x 85t excavator;
- 2 x 40t articulated haul trucks; and
- 1 x bulldozer.

Two front-end loaders are also operated at the quarry with their use shared between the extraction area, processing area and various stockpiles.

Depending on production rates, the above mobile equipment is supplemented by the hire of a second excavator and up to two additional haul trucks.

1.5.2.4 Extraction Sequence

In response to initial concerns over the visibility of the Stage 1 extraction area from locally significant lookout points within Lithgow City LGA, particularly Hassans Walls lookout (see **Figure 1.2**), the western-most benches within the extraction area were generally developed in a north-south orientation, behind a retained slope along the western and northern side of the Stage 1 extraction area.

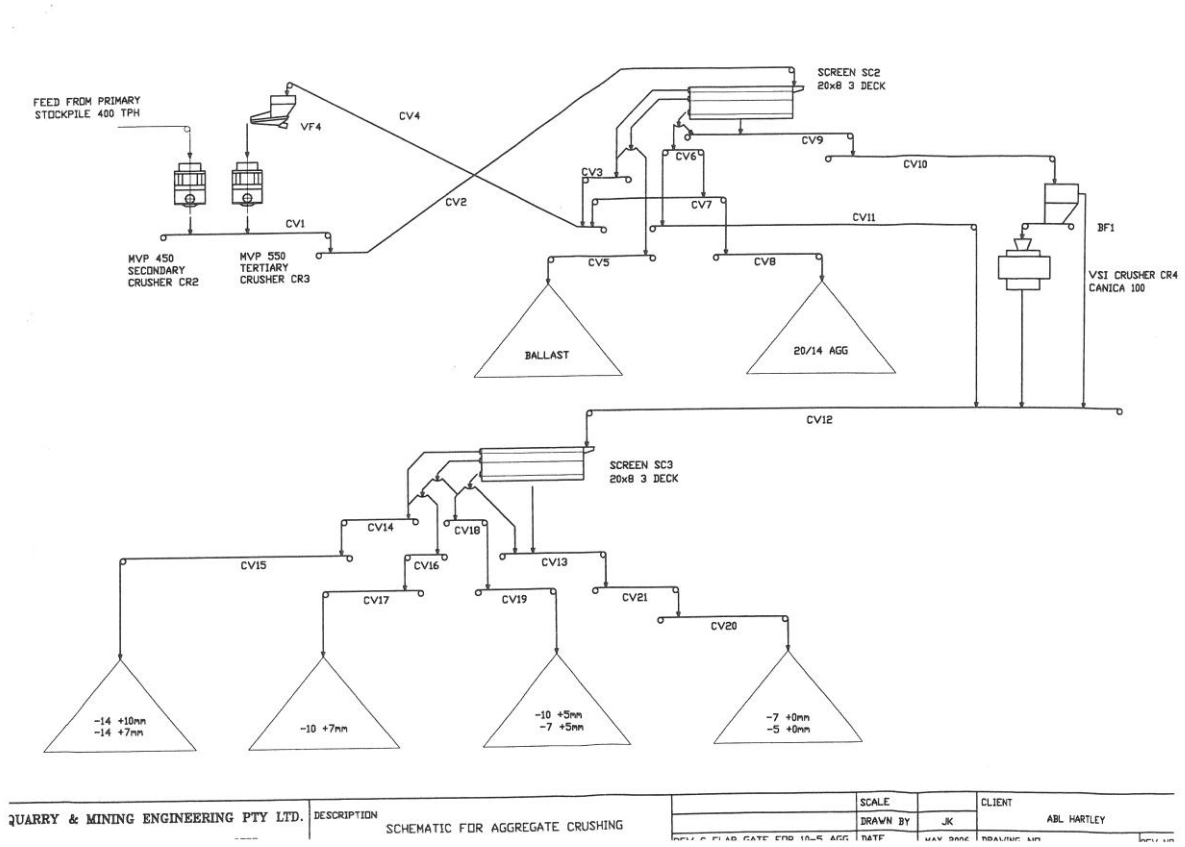
As the Stage 1 extraction area has been developed progressively deeper, these south-north benches have been expanded to the east towards the eastern perimeter of the approved extraction area. The current floor of the Stage 1 extraction area is at approximately 745m AHD, i.e. approximately 15m above the current approved 730m AHD depth limit.

1.5.3 Processing Operations and Stockpiling

1.5.3.1 Processing Operations

The processing operations involve the use of a series of crushers and screens to separate the rhyolite into various size aggregates and to blend some products to produce customised roadbase products.

The blasted or fragmented rock is transported by off-road haul truck to the primary crushing station located on the northern side of the Stage 1 extraction area at approximately 750m AHD (**Plate 1.3**). After crushing to <150mm the rhyolite is conveyed from a primary crusher located on the 750m AHD level within the extraction area (see **Plate 1.3**), to the Primary Feed Stockpile within the processing area adjacent to the Coxs River. The further three stages of crushing and screening are undertaken in a 4ha area on the southern side of the Coxs River. A 1.5m bund is maintained on the northern side of the processing area to clearly define the area for trucks entering the area and to contain all runoff within the area. **Figure 1.4** presents the process flow chart illustrating the movement of the rhyolite from the extraction area to the various product stockpiles.



Source: Hy-Tec Industries Pty Limited

Figure 1.4
PROCESSING FLOW SHEET

The primary crushed rhyolite is retrieved from the base of the Primary Feed Stockpile, and conveyed to a secondary, then tertiary crusher (if required) to further reduce the size of the rock. Scalps and fines removed during processing are conveyed to a temporary stockpile located on the southern edge of the processing area and periodically transported to the Yorkeys Creek Stockpile Area to the west of Yorkeys Creek (see **Figure 1.3**). The crushed rhyolite is conveyed to a screen deck where oversize rock is removed and stockpiled for sale as rail ballast or gabion material (>40mm). All <14mm crushed rock through the screens is conveyed to a quaternary crusher from where the material is either passed to a second screen deck or returned to the first screen deck. The second screen deck separates the crushed rhyolite into various size classes to satisfy customer specifications.

1.5.3.2 Products and Stockpiles

The Applicant produces a wide range of aggregates (40mm, 20mm, 14mm, 10mm and 7mm), rail ballast, gabion material, blended roadbase products, manufactured sand, select fill, and drainage materials. A number of products are customised to meet the customers' individual specifications hence a number of smaller stockpiles are maintained for these products.

Stockpiles of the various aggregates and blended products are maintained within the processing area with road trucks entering, loaded by front-end loader and despatched from the quarry. Up to approximately, 40 000 loose m^3 of products can be stored within the processing area.

The bulk of the landscaping materials, manufactured sands, select fills, drainage materials and road construction materials are stockpiled within the Yorkeys Creek Stockpile Area (see **Figure 1.3**).

1.5.4 Product Despatch

The Austen Quarry has approval to despatch up to 1.1 million tonnes per year of products via the public road network, although it is currently operating below this approved maximum limit, despatching an average of approximately 750 000tpa. The maximum production level was confirmed in correspondence from Lithgow City Council to the NSW Environment Protection Authority following an application by the Applicant to increase the activity threshold of EPL 12323 (to 500 000tpa – 2 000 000tpa). Products are despatched between 5:00am and 10:00pm Monday to Friday and 5:00am to 3:00pm on Saturdays.

For the production of approximately 750 000tpa, the quarry generates an average of approximately 83 truck loads or 166 movements per day up to a maximum of 150 laden truck departures. It is anticipated that at maximum production (1.1Mtpa), an average of 125 laden trucks would depart the quarry each day up to a maximum of 250 laden trucks. These trucks, predominantly articulated truck and dog trailer combinations or B-Doubles, pass over a weighbridge before travelling the 3.1km distance on the sealed Quarry Access Road (see **Plates 1.5** and **1.6**) to Jenolan Caves Road. At the priority-controlled intersection with the Quarry Access Road, Jenolan Caves Road is widened to provide an auxiliary right turn (AUR) treatment from the Quarry Access Road and auxiliary left turn (AUL) treatment, which allows through traffic on Jenolan Caves Road to pass vehicles slowing to turn into the quarry (see **Plates 1.7** and **1.8**).

All trucks travelling to and from the quarry use Jenolan Caves Road, an approved 24 hours per day, 7 days per week, B-Double truck route with a single travel lane in each direction, marked centre lines and edge lines. Jenolan Caves Road joins the Great Western Highway at a four-way priority-controlled intersection. A left turn deceleration lane and a right turn bay are provided on the Great Western Highway for vehicles turning into Jenolan Caves Road. The majority of laden trucks turn right at the Great Western Highway and travel towards Sydney.

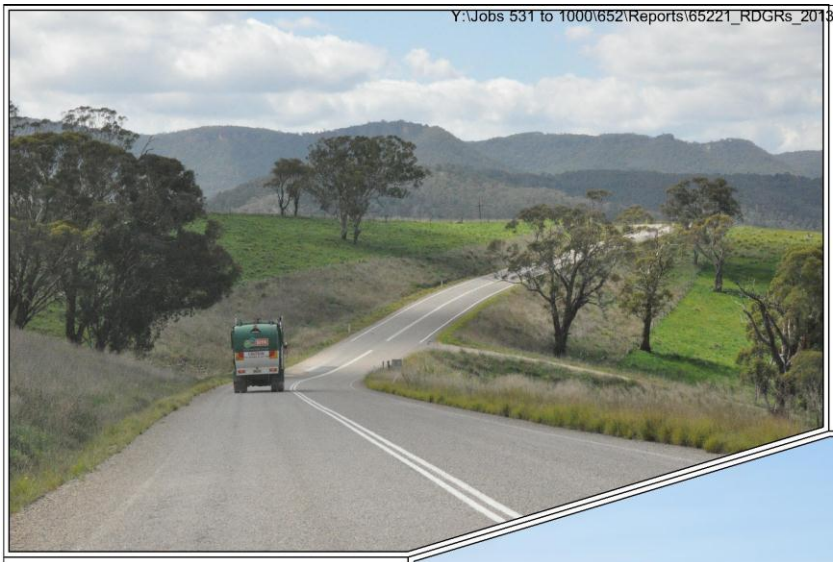


Plate 1.5: View westward along the Quarry Access Road
(Ref: E652S_089)

Plate 1.6: View in a northerly direction along the Quarry Access Road towards the Quarry Entrance
(Ref: E652P_056)

Plate 1.7: Deceleration lane on Jenolan Caves Road approaching the Quarry Entrance
(Ref: E652P_063)

Plate 1.8: Landscaped Quarry Entrance to Austen Quarry
(Ref: E652P_059)

1.5.5 Hours of Operation

Table 1.2 presents the current approved hours of operation.

Table 1.2
Approved Quarry Operating Hours

	Monday to Friday	**Saturday**	**Sundays / Public Holidays**
Extraction and Processing	6:00am to 6:00pm	7:00am to 3:00pm	No Activity
Blasting	9:00am to 5:00pm	No Activity	No Activity
Product Loading and Transportation	5:00am to 10:00pm	5:00am to 3:00pm	No Activity

1.5.6 Infrastructure and Services

Figure 1.3 displays the key infrastructure within the quarry which includes the following.

1. A hardstand area located to the immediate west of the processing operations on which the following has been constructed.
    a. An administration centre incorporating demountable offices, amenities block and weighbridge.
    b. An enclosed workshop constructed over a concrete floor.
    c. An enclosed fuel storage building, constructed over a concrete bunded floor. Separate bunds are maintained within the structure for fuel, oils and lubricants.
    d. Parking facilities for employees and visitors.
    e. A meteorological station.
2. A network of unsealed roads, tracks and erosion and sediment control structures.
3. A sealed Quarry Access Road from the Jenolan Caves Road to the quarry weighbridge (see **Plates 1.5** and **1.6**). This includes a centre-line the length of the road between the intersection with Jenolan Caves Road and a substantial culvert crossing of Yorkeys Creek to the immediate west of the weighbridge.
4. Electrical power for all quarry operations is supplied by diesel powered generators. One large generator (1 000kVA) provides power to the primary crushing station, two large generators (1 000kVA) provide power to the secondary and tertiary crushing and screening operations and a fourth smaller generator provides power to the offices, workshops and amenities.

1.5.7 Employment

A total of 16 people are currently directly employed at the Austen Quarry. It is estimated that indirect employment, i.e. through transport operations, maintenance and other supply industries, of at least 40 people is also generated by the quarry.

1.6 APPROVALS REQUIRED AND APPROVALS PROCESS

1.6.1 Approvals Required

Based upon the current design and understanding of relevant environmental issues, the Proposal for Stage 2 of the quarry's operation would require the following approvals.

1. Development consent under the EP&A Act. As the Proposal is an extractive industry that would continue to produce more than 500 000 tonnes of products per year, it is recognised as State Significant Development under *State Environmental Planning Policy (State and Regional Development) 2011* for which approval is required (in accordance with Division 4.1 of the EP&A Act) from the Minister for Planning and Infrastructure or as delegated by the Minister to the Planning Assessment Commission, the Director-General or to another public authority.

   Subject to the receipt of a satisfactory development consent, covering the entire Site, the Applicant would relinquish DA 103/94.
2. Modification to Environment Protection Licence 12323 under the *Protection of the Environment Operations Act 1997*. The issuing authority would be the Environment Protection Authority (EPA).
3. An Approval for a Controlled Activity has been sought under the *Water Management Act 2000*. Approval is required as the Proposal involves an extractive activity near the Coxs River watercourse that flows immediately north of the Site and would therefore be a controlled activity.

The Applicant will also refer the Proposal to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) to establish whether the Proposal is deemed to represent a controlled action under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. Floristic surveys have established the presence of the threatened plant *Eucalyptus pulverulenta* (silver-leaved mountain gum) on and surrounding the Site. As such, there is a potential that the Proposal will be determined to be a controlled action under the EPBC Act, and an approval required from the Commonwealth Minister for SEWPaC. Further discussions relating to *Eucalyptus pulverulenta* is included in Section 4.6.

1.6.2 Approvals Process

Table 1.3 presents the component stages of the approvals process under the EP&A Act for the Proposal and provides an indicative timetable currently being followed by the Applicant. It is noted that where an activity refers to those managed by DP&I that the timing nominated is based on previous approvals issued for similar projects.

Table 1.3
Approvals Process for the Proposal and the Applicant's Indicative Timing

Indicative Timing*	Activity
Ongoing	Extensive project planning and local and wider community consultation
Early August 2013	Submit Request for Director-General's Requirements and supporting documentation to the Department of Planning and Infrastructure
Early August 2013	Refer the Proposal to the Commonwealth Government in accordance with the requirements of the EPBC Act 1999
August 2013	Planning Focus Meeting
September 2013	Commonwealth Government determines if the Proposal is a controlled action under the EPBC Act 1999
Early September 2013	Department of Planning and Infrastructure issues Director-General's Requirements for the Environmental Impact Statement
Mid to late October 2013	Lodge Environmental Impact Statement with Department of Planning and Infrastructure for assessment prior to exhibition
December 2013	Finalise Environmental Impact Statement based upon feedback from DP&I on adequacy
January – February 2014	Department of Planning and Infrastructure places the Development Application and Environmental Impact Statement on public exhibition
February – March 2014	Provide responses and clarification of issues arising from the exhibition of the Environmental Impact Statement to the Department of Planning and Infrastructure so that the Department can prepare its Assessment Report
March – April 2014	Department of Planning and Infrastructure completes assessment report
April – May 2014	Determination of development application
May 2014	Lodge application to modify the existing Environment Protection Licence and lodge applications for other approvals required under various other Acts.
* Based on best estimates of the Applicant and RW Corkery & Co Pty Ltd.	

1.7 CONSULTATION

The Applicant has discussed the Stage 2 extension of the quarry with Lithgow City Council personnel, however, in order to ensure information provided to surrounding landowners, community stakeholders and other government agencies is consistent with this document, the Applicant has refrained from any formal consultation with these groups to date.

Following lodgement of the request for DGRs, the Applicant will commence a program of consultation with local landowners, community (including Aboriginal) stakeholders, Council personnel and relevant government agencies.

1.8 MANAGEMENT OF INVESTIGATIONS

The preliminary assessment has been prepared by Mr Alex Irwin, B.Sc (Hons), Senior Environmental Consultant with R.W. Corkery & Co Pty Limited, Mr Rob Corkery, M.Appl.Sc., B.Sc (Hons), Principal of R.W. Corkery & Co Pty. Limited and Mr Nicholas Warren B.Sc., M.Bus (Marketing), M. Env. Sc., Environmental Consultant with R.W. Corkery & Co Pty Limited.

Details of the Austen Quarry have been provided by Messrs Darryl Thiedeke and Lee Attard of the Applicant.

A range of environmental investigations have been initiated to identify the environmental constraints that need to be taken into account by the Applicant during the detailed design of the Proposal. These studies are being undertaken by a team of specialist consultants managed by R.W. Corkery & Co Pty Ltd including the following key individuals and companies

- Mr Ken Hollyoak and Ms Penny Dalton of GTA Consultants (GTA): Traffic Impact Assessment.

  The Traffic Impact Assessment (TIA) will consider traffic data collected by the Applicant, as well as traffic counts completed by the NSW Roads and Maritime Services (RMS) and any other publically available data. The TIA will consider impacts on the key distribution route for quarry products, namely Jenolan Caves Road and the Great Western Highway through the Blue Mountains..

- Mr Felipe Torres and Mr Daniele Albanese of Benbow Environmental: Noise Impact Assessment.

- Mr Dick Benbow and Duke Ismael of Benbow Environmental: Air Quality Impact Assessment.

  Both the Noise Assessment and Air Quality Assessment will incorporate meteorological data collected from the Lithgow and Mount Boyce meteorological stations and an on-site meteorological station operated by Hy-Tec.

- Mr Frank Lemckert, Mr Rhidian Harrington and Mr Nathan Smith of Niche Environment and Heritage (Niche): Biodiversity Impact Assessment.

  Niche's biodiversity assessment will build upon earlier surveys completed by the same company in 2012, field survey completed by Gingra Ecological Consultants in the 1990s and field survey completed between 2004 and 2008 by Biosis Research Pty Ltd.

- Ms Amanda Atkinson of Niche Environment and Heritage (Niche): Cultural Heritage Assessment incorporating both Aboriginal and historic heritage elements.

- TBC - Surface Water and Soil Impact Assessment.

  The soil and surface water assessment will incorporate water monitoring data collected from the Coxs River on a monthly basis for the last 10 years by the Applicant.

- Mr James Morrow of Ground Doctor: Groundwater Impact Assessment.

Section 4 incorporates the interim or preliminary assessments of these consultancies aimed at identifying key constraints and assessment requirements. Complete impact assessments will be completed by these and possibly additional consultancies following the issue of DGRs. As noted in Section 1.1, the design and/or layout of the Proposal could be modified as a consequence of constraints identified by any of the assessments noted above and will be identified in the EIS.

2. DESCRIPTION OF THE PROPOSAL

2.1 INTRODUCTION

This section of the document provides an overview of the Proposal for Stage 2 of the Austen Quarry in sufficient detail to give the reader an understanding of the type and scale involved. A more detailed description will be included in the EIS.

2.2 OBJECTIVES

The principal objectives of the Proposal are to:

- secure an adequate resource volume, through extension to the approved limit of extraction, for the long term operation of the quarry;
- design and construct an overburden emplacement for the long-term storage of overburden or non-rhyolitic material;
- maintain the maximum production limit (1.1 million tpa) and provide for supply up to this limit to meet the demands of existing and potential markets;
- progressively rehabilitate the disturbance area to provide for long-term nature conservation with minor grazing following completion of operations;
- develop and implement a biodiversity offset and rehabilitation to ensure no net loss of biodiversity values as a consequence of the Proposal;
- undertake all activities in an environmentally responsible manner to ensure compliance with relevant criteria/goals or reasonable community expectations; and
- achieve the above objectives in a cost-effective manner to ensure the Proposal is viable.

2.3 NEED FOR THE PROPOSAL

The quarry is currently producing approximately 750 000t of products annually to supply the construction markets and roadwork requirements within the greater Sydney metropolitan area, Blue Mountains and surrounding region. The demand for these products, used in the manufacture of concrete, preparation and management of construction sites, road construction, rail works and landscaping is unlikely to decrease in the foreseeable future. In fact, as existing quarry operations within and surrounding Sydney exhaust current resources, demand for these materials from quarries with long-term resources is expected to increase.

As discussed in Section 1.4, a proven resource of approximately 45 million tonnes of rhyolite has been defined within the Stage 1 and Stage 2 extraction areas at the Austen Quarry. Considering this, as well as the fact that extraction and processing operations are already well established, the quarry is located with direct access to the Great Western Highway (providing a distribution route to Sydney), and is relatively isolated from surrounding residential development, the Austen Quarry will remain a key supply point for construction materials to Sydney for at least the next 30 years.

Considered from the reverse angle, should the quarry extension not proceed, and the defined resources not be recovered to supply Sydney with construction materials, the demand would still remain. This would necessitate the development of another greenfield site or sites, or the extension of other quarries which may have greater (or less certain) environmental or social impacts.

The need for the Proposal is therefore demonstrated both by the ongoing demand for the high quality products of the quarry and minimisation of environmental impacts associated with this supply, as provided by the Austen Quarry.

2.4 OVERVIEW OF THE PROPOSAL

Figure 2.1 provides an illustration of the proposed Stage 2 Site layout including the following.

- An extension to the Stage 1 extraction area that comprises a ridge to the southeast and east of the existing extraction area.
- An extension of the overburden emplacement to the south and west.

Other components of the quarry which would remain consistent with current operations include:

- rhyolite crushing, screening and stockpiling operations within the processing area;
- stockpiling and management of surplus select fill, road base, manufactured sand and other products within the Yorkeys Creek stockpile area;
- use of the established infrastructure and services located on the elevated terrace to the west of the processing area;
- capture and movement of water between a series of sediment and storage dams (with any discharge to the Coxs River as required and in compliance with EPL 12323); and
- product transportation from the Processing area via a weighbridge, and the sealed Quarry Access Road to Jenolan Caves Road.

The current production limit of 1.1 million tpa would not be increased, however, it is anticipated that annual production levels would rise from a current average of approximately 750 000tpa to closer to the maximum production limit. Quarry products would continue to be transported via Jenolan Caves Road and the Great Western Highway to markets (predominantly) within the Greater Sydney Metropolitan Region, although products would be transported to other destinations via the Great Western Highway as dictated by demand.

As the existing processing plant will continue to operate in its current configuration, for the purposes of quantifying the value of the modifications from Stage 1 to Stage 2, the Applicant estimates the Capital Investment Value (CIV) for Stage 2, reflecting the purchase of two additional articulated haul trucks and a front-end loader, would be approximately $2.2M.

The following sections provide a more detailed description of the key activities to be undertaken within the Stage 2 quarry.

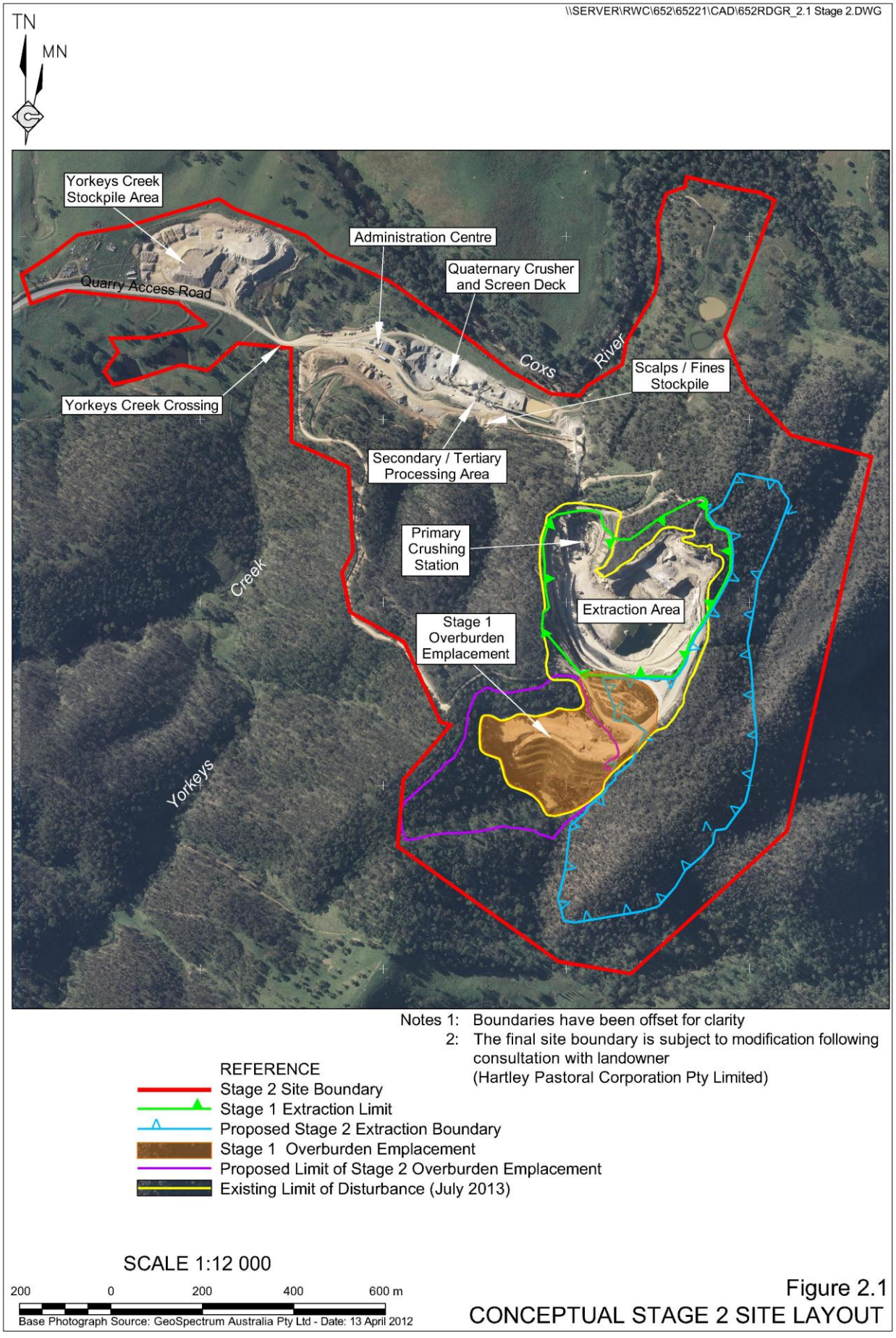


Figure 2.1
CONCEPTUAL STAGE 2 SITE LAYOUT

2.5 EXTRACTION OPERATIONS

2.5.1 Extraction Area Design

The proposed Stage 2 limit of extraction is presented on **Figure 2.1**. The proposed extraction area encompasses the existing approved Stage 1 extraction area and extends approximately 100m to the east and 500m to the south. Extraction is proposed to a depth of 685m AHD, approximately 60m deeper than the current extraction area floor (745m AHD) and 55m deeper than the footings of the primary crushing station (740m AHD).

Although subject to modification based on geological formation or development sequence (e.g. location of quarry ramps or sumps), the following general design criteria of the Stage 2 extraction area would be adopted.

- Operational Face Height: 15m
- Operational Bench Width: 100m
- Final Bench Width: 5-10m
- Face Angle: 70° to 90°

The proposed maximum 70° face angle would be subject to further geotechnical investigation throughout the life of the quarry to ensure a safe and stable landform.

The extraction rate would vary annually in response to product sales and the volume of overburden material encountered each year.

2.5.2 Extraction Activities

Extraction activities within the Stage 2 Extension would be a continuation of those currently implemented at the quarry. The following provides a brief overview of these activities.

Land Preparation

Vegetation would continue to be cleared by bulldozer, or chainsaw on steeper slopes or more densely vegetated areas. The cleared vegetation would be stockpiled for future placement, selectively mulched or immediately placed on prepared sections of the overburden emplacement (see Section 2.10.2). Specific vegetation clearing protocols would be developed to minimise and mitigate the potential disturbance to native fauna.

While limited due to the outcropping nature of the rock, any soil resources would be stripped using a bulldozer, loaded into trucks and either stockpiled for future placement, or immediately placed on prepared sections of the overburden emplacement.

Land preparation activities would be limited to areas required for quarry development for the subsequent 6 to 12 months and then the area cleared at any one time would be confined to an area that can be shaped and profiled such that all runoff from the cleared area is back into the extraction area.

Quarry Development

Following the removal of soil, any rippable rock that is not product would be ripped using the tynes of a bulldozer, loaded to haul trucks and placed on the overburden emplacement. Overburden above the rhyolite too hard to be ripped would be drilled and blasted before the material is loaded and hauled to the overburden emplacement. These development blasts would generally be smaller (10 000t to 30 000t) due to the proximity to surface and associated potential for noise and fly-rock impacts.

Current quarry planning indicates approximately 6Mt of overburden (including non-rhyolitic material which may be encountered following exposure of the rhyolite) is to be removed. It is anticipated that the volume of overburden removed each year would vary depending on the development activities undertaken during that year, however, would generally be between 100 000t and 400 000t annually.

Extraction

The exposed rhyolite would be drilled and blasted with the fractured material rock loaded into haul trucks and tipped into the hopper of the primary crushing station. On average, each production blast would remove approximately 60 000t, although larger blasts of 100 000t or more may be planned subject to compliance with noise and vibration criteria.

2.5.3 Extraction Sequence

Figure 2.2 provides a conceptual illustration of the development sequence. Initial extraction would be to the north and east off the Stage 1 extraction area until the proposed limit of extraction is reached. The extraction area would be developed down to the maximum depth (685m AHD) before extending to the south.

Notably, the hill slope across the northwestern perimeter of the approved extraction area is proposed to be retained for the life of the quarry to provide a visual barrier to vantage points to the north and northwest, though it is recognised that this action will sterilize in excess of 2 million tonnes of high quality rhyolite.

2.5.4 Extraction Equipment

The Applicant would continue to operate the same or equivalent mobile equipment as described in Section 1.5.2.3, with the addition of one or two haul trucks to account for the increased overburden movement and production up to the maximum approved limit. In addition, the Applicant would also operate one or more water carts / tankers between the Extraction area and Processing area and a fleet of light and maintenance vehicles.

A drill rig would continue to be brought in on a contract basis for drilling blast holes.

2.6 OVERBURDEN MANAGEMENT

2.6.1 Design

Figure 2.3 presents the proposed extent of the overburden emplacement, the primary features of which are as follows.

- Extension to the southeast to the 720m AHD contour (the toe of the existing overburden emplacement is at the 735m AHD contour).

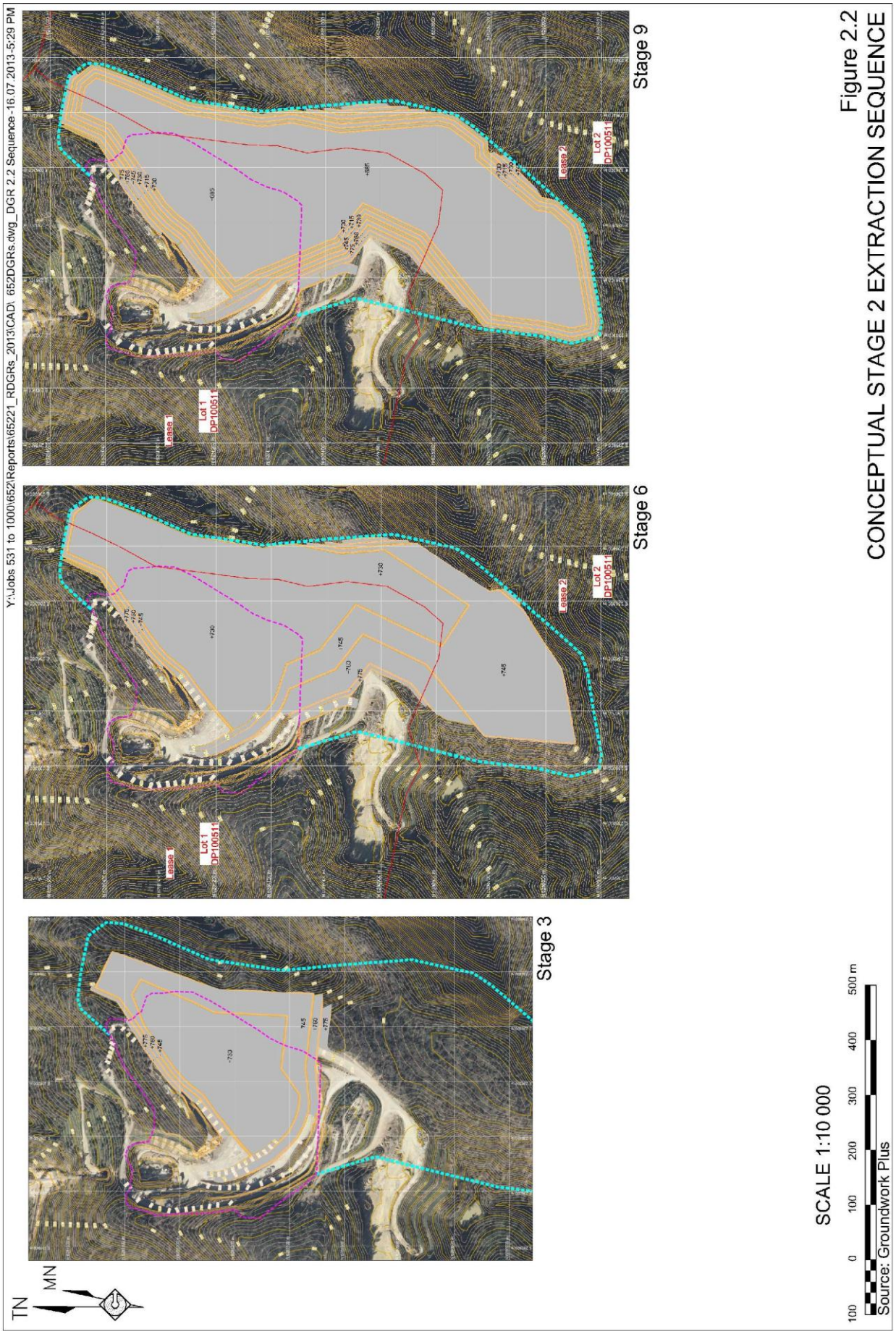


Figure 2.2
CONCEPTUAL STAGE 2 EXTRACTION SEQUENCE

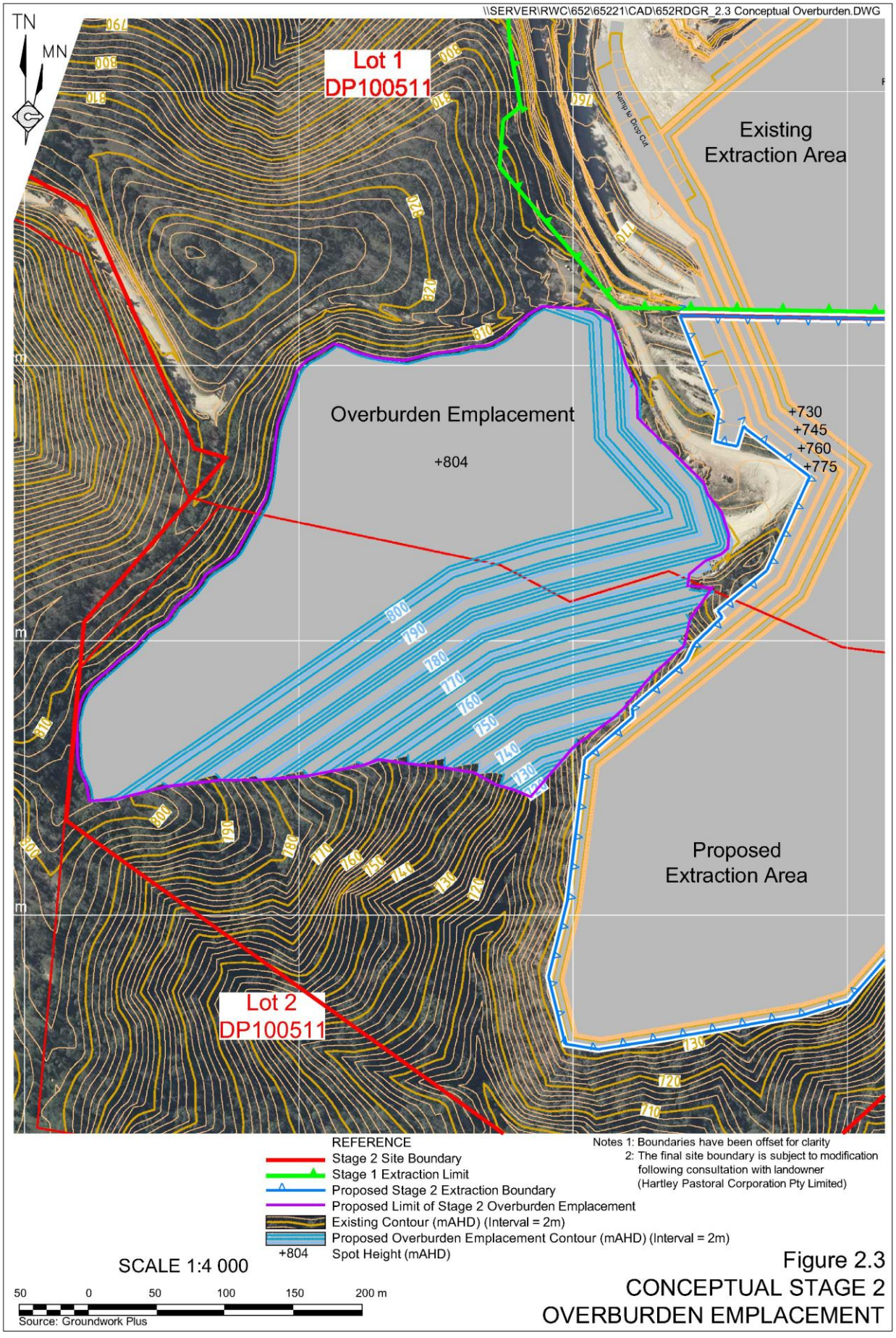


Figure 2.3
CONCEPTUAL STAGE 2
OVERBURDEN EMPLACEMENT

- Extension of the existing benches (constructed at 10m vertical intervals) to the next gully to the southwest.
- Construction of an additional two or three lifts of the emplacement to an elevation of between 800m AHD and 810m AHD.
- Each batter slope would be profiled on completion to provide for a 1:3 (V:H) slope (~18°).

The Applicant proposes to review the opportunity to place a proportion of the overburden into completed areas of the extraction area as extraction progresses through Stage 2.

Clean water diversion banks or channels would be constructed up-slope of the extended overburden emplacement and each bench would be contoured to retain run-off. A sediment basin would be constructed at the base of the overburden emplacement, designed, constructed and maintained in accordance with Volumes 1 and 2E of the Blue Book[3] (Landcom, 2004 & DECCW, 2008).

2.6.2 Construction Sequence

As overburden is removed from the extraction area, it would be initially hauled to the base of the existing overburden emplacement to construct the 720m AHD – 730m AHD bench which will form the toe of the emplacement. A bulldozer would then be used to push and profile the material.

On reaching the final extent, the material would be compacted and the outer batter slope profiled in preparation for rehabilitation. Overburden would then be placed on the 730m AHD – 740m AHD bench, which would be extended to the west until reaching the extent illustrated on **Figure 2.3**. This bench would then be compacted, the outer batter profiled and prepared for rehabilitation.

The overburden emplacement would be progressively constructed in this manner until the volume of overburden generated by the extraction area is exhausted or the extent of the emplacement as presented on **Figure 2.3** is reached.

2.7 PRODUCT TRANSPORTATION

2.7.1 Product Transport Routes

Product transportation would be consistent with current practices. All products would be loaded into road registered trucks within the Processing area or Yorkeys Creek stockpile area by a front-end loader. Trucks would exit the site via the Quarry Access Road, with virtually all of the trucks turning right onto Jenolan Caves Road and continuing to the intersection with the Great Western Highway. The majority of movements would then be to the right towards the Blue Mountains and Sydney. Depending on demand for construction materials, there are likely to be periods when trucks will turn left at the Jenolan Caves Road – Great Western Highway intersection to supply markets in Lithgow or other destinations to the west.

[3] *Managing Urban Stormwater: Soils and Construction*, referred to as the Blue Book, provide guidelines on design of erosion and sediment control for quarries and other development,

All product trucks would be weighed using the on-site weighbridge prior to exiting the quarry with any overweight vehicles directed to unload a portion of their load prior to being permitted to leave the quarry.

2.7.2 Heavy Vehicle Types

Product trucks entering and leaving the Site are typically truck and dog trailer combinations and some 19m B-Doubles , although other trucks such as smaller rigid vehicles do make up a small proportion of quarry traffic. The average pay load capacity would be approximately 30t taking into account the capacity of smaller rigid vehicles carrying material from the quarry.

2.7.3 Heavy Vehicle Movements

For the production of approximately 750 000tpa, the quarry generates an average of approximately 83 truck loads or 166 movements per day, up to maximum of approximately 150 truck loads or 300 movements per day (where one load generates two movements). These average and maximum vehicle movements are based on up to 302 operational days per year.

Assuming the same proportion of vehicle types, and therefore the same average pay load capacity, with operations 6 days per week (and excluding public holidays), i.e. 302 days per year, the average number of heavy vehicle loads would be 125 per day with a maximum of 250 heavy vehicle loads per day. It is anticipated that periods corresponding to maximum traffic days would correspond with the campaign requirements of the NSW RMS (which preferentially uses smaller capacity rigid vehicles for supply, therefore requiring more frequent lower tonnage loads each day).

During the short-term campaigns to supply RMS road works, when smaller capacity rigid trucks of [average] 15t capacity dominate movements to and from the Site, a maximum of 25 truck loads or 50 movements per hour is anticipated. For more standard production and delivery periods, when the dominant vehicle types entering and exiting the Site are truck and dog trailer combinations or B-Doubles, a maximum of 20 truck loads or 40 movements per hour is anticipated.

2.8 EMPLOYMENT

The Applicant proposes that direct employment at the quarry would increase from 16 to approximately 20 persons based on the requirement for additional truck and mobile equipment operators and potentially additional operators within the Processing area to account for the extension of planned increase in production (up to the current approved maximum level).

2.9 HOURS OF OPERATION AND LIFE OF THE PROPOSAL

2.9.1 Hours of Operation

Blasting and product despatch would be undertaken within the current approved operational hours as presented in **Table 1.2** of Section 1.5.5. The Applicant does however propose to increase the period during which extraction and processing would be undertaken, particularly during busy periods. **Table 2.1** lists the proposed hours of operation.

Table 2.1
Proposed Hours of Operation

	Monday to Friday	Saturday	Sundays / Public Holidays
Blasting	9:00am to 5:00pm	No Activity	No Activity
Extraction and Processing	6:00am to 10:00pm	6:00am to 3:00pm	No Activity
Loading Trucks and Product Despatch	5:00am to 10:00pm	5:00am to 3:00pm	No Activity
Maintenance	24 hours/day – Any day		

2.9.2 Life of the Proposal

The Stage 2 Extension would increase the proven resources available for extraction by approximately 39 million tonnes. At a maximum production rate of 1.1Mt, this would extend the approved quarry life by at least 30 years, i.e. until at least 2050.

2.10 REHABILITATION

2.10.1 Rehabilitation Objectives

The Applicant's objectives for rehabilitation are centred upon the progressive restoration of areas of disturbance through the creation of a final landform, soil substrate and vegetative cover suitable for a level of agricultural productivity similar to existing levels, and/or passive nature conservation. The specific objectives for the long term rehabilitation program are to:

- blend the created landforms and vegetation established on the post-mining landform with that of the surrounding topography;
- provide a low maintenance, geotechnically stable and safe landform with minimal erosion, particularly within the Stage 2 extraction area and overburden emplacement; and
- re-instate the pre-disturbance soil and land capability in the area used for the Processing area and Yorkeys Creek stockpile area.

The Applicant would also implement a program of interim rehabilitation of disturbed/constructed areas in order to:

- reduce the visibility of extraction and overburden placement activities from surrounding properties and the local road network;
- where possible, conserve all topsoil and if not immediately used in rehabilitation, stockpile in an appropriate manner and location;
- minimise the areas of exposed surfaces that would otherwise be potential sources of windblown dust; and
- ensure interim slopes are stable.

2.10.2 Extraction Area

Terminal faces of the Stage 2 extraction area would be retained at 70° with overburden and previously cleared vegetation spread over the final benches where safe to do so. A seed mix of locally endemic trees and shrubs would be spread on the final benches.

A layer of weathered overburden would be placed over the final floor to create a water holding substrate, with available soil spread over the weathered material to create a growth medium for vegetation. A seed mix of locally endemic native grasses would be sown and selected locally endemic trees established to provide shade for stock grazing on the final floor. The final sump within the extraction area would provide a suitable water source for stock.

2.10.3 Overburden Emplacement

The outer batters of the overburden emplacement would be profiled to create a slope of approximately 1:3(V:H) (~18°) with the surface ripped to allow for the keying of soil spread over the slopes. Soil would either be directly stripped from the footprint of the Stage 2 extraction area or recovered from stockpiles and spread over the profiled slopes, and seeded with a locally endemic native seed mix and allowed to revegetate. The entire overburden emplacement would be returned for a long-term nature conservation land use.

The success of rehabilitation and revegetation would be reviewed progressively, with additional soil, seed or tube stock added where revegetation is less successful.

2.10.4 Processing Area, Quarry Infrastructure and Services

All infrastructure associated with the processing plant would be removed at the end of quarry life. It is likely that by 2055, the vegetation of the bund wall within the riparian zone of the Coxs River would be well established as a viable riparian community providing habitat to a variety of fauna. As a consequence, it is proposed that rather than remove this bund to reinstate the pre-disturbance topography of the riparian zone and adjoining lands, only a small section at the eastern end be removed (following rehabilitation of the remaining Processing area) to allow for natural drainage of water to the Coxs River.

It is proposed that the hardstand surface be ripped and covered with a layer of weathered overburden followed by available soil and cleared vegetation. The final landform would then be seeded with endemic grass, shrub and tree species (predominantly those associated with the Coxs River riparian zone). Once a cover of grass has been established over the former hardstand, drainage to the Coxs River would be reinstated by removing a small section of the bund wall at the eastern end, the created spillway or channel to be provided with appropriate erosion protection.

The Quarry Access Road and Yorkeys Creek Crossing would be retained to allow for continued access to this part of the property.

2.10.5 Yorkeys Creek Stockpile Area

The Yorkeys Creek Stockpile Area would also be profiled to its pre-disturbance topography and vegetated for the resumption of grazing.

2.11 BIODIVERSITY OFFSET

The Applicant has commissioned Niche Environment and Heritage to assess the requirement for a biodiversity offset.

Details of the proposed biodiversity offset will be presented in the EIS.

2.12 ALTERNATIVES CONSIDERED

The Applicant has examined a range of alternatives before deciding upon the Proposal as presented within this document.

Method of Extraction

Given the nature and location of the rhyolite resource at or near the surface, open cut methods were determined to be the only feasible means of extracting the identified resource.

Limit of Extraction

The extraction area could be reduced in size and still provide for an increase in the life of the quarry. However, given the resource is now well understood, and the Applicant's experience in the current setting, there is little to be gained by progressively extending the quarry in smaller increments over the next 30 years. By presenting the larger extension, certainty can be provided to the local community, Council, DP&I and construction industry as to the ultimate extent and life of operation at the Austen Quarry.

Overburden Disposal

Backfilling of completed sections of the final extraction area remains a feasible option for placement of some of the overburden, however, is less favoured than the option to extend the existing overburden emplacement for the following reasons.

- The total volume of overburden requiring disposal is not large (6Mt – 13% of the total volume to be extracted) and would have little influence on the final landform within the extraction area or disturbance associated with the overburden emplacement (an increase of approximately 5.8ha).
- Backfilling would only be practical after many years of operation, when the overburden emplacement would already have been extended to (or close to) its maximum footprint.
- Any backfilling operations would need to take into account the presence of the primary crushing station and potential to damage or impact on the operation of this facility.

Transport Options

The use of rail to transport quarry products has been given some consideration, however, there is considered to be little benefit to pursuing this option for the following reasons.

- Quarry products would have to be delivered by road to a rail siding, possibly at Lithgow or Lidsdale or Mount Victoria, negating the benefit of using the rail.

- The Applicant does not have access to a rail facility capable of loading the aggregate products. The cost of constructing such a facility would be prohibitive.
- The locations of the Applicants concrete batching plants are not near rail sides and its customers are not static. Consequently, even if products could be placed on rail, there would be added cost and road transport necessary to deliver to the final destination.

Road transport is the only feasible alternative for transportation of quarry products from the Austen Quarry.

3. PLANNING ISSUES AND PERMISSIBILITY

3.1 COMMONWEALTH PLANNING ISSUES

Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. These are collectively referred to as Matters of National Environmental Significance (NES).

Under the EPBC Act, if a proposal has the potential to have a significant impact on a Matter of NES, it is required to be referred to the DSEWPaC for assessment as to whether it represents a 'controlled action' and therefore requires approval from the Minister for the Environment.

It is considered likely that the Proposal would impact on at least one threatened flora species listed under the EPBC Act, *Eucalyptus pulverulenta*, and will be referred to the Minister for the Environment.

3.2 STATE PLANNING ISSUES

In addition to State Environmental Planning Policy (State and Regional Development) 2011, the following SEPPs have been considered as potentially applying to the Proposal or over the Site.

State Environmental Planning Policy (State and Regional Development) 2011

As extractive industry, the Proposal is identified as State Significant Development under Schedule 1 (7(a)) by virtue of annual extraction exceeding 500 000tpa.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

This SEPP was gazetted in recognition of the importance to New South Wales of mining, petroleum production and extractive industries. The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. A summary of the matters that the consent authority needs to consider when assessing a new or modified proposal is as follows.

- Clause 12: Compatibility of proposed development with other land uses.
- Clause 13: Compatibility of proposed development with mining, petroleum production or extractive industry.
- Clause 14: Natural resource management and environmental management.
- Clause 15: Resource recovery.
- Clause 16: Transportation.
- Clause 17: Rehabilitation.

An assessment of how each of these clauses is addressed with respect to the Applicant's Proposal will be provided within the EIS.

State Environmental Planning Policy (Rural Lands) 2008

The aims of this SEPP are to facilitate development on rural land that is orderly and economic, promotes the social economic and environmental welfare of the state and avoids land use conflicts with existing agriculture. It also allows government authorities to identify State significance agriculture land and ensure the ongoing viability of agriculture in the State.

Specifically, and as described in Clause 12, the objectives of this SEPP are to provide for the protection of agricultural land:

- *that is of State or regional agricultural significance, and*
- *that may be subject to demand for uses that are not compatible with agriculture, and*
- *if the protection will result in a public benefit.*

The Proposal is considered with respect to these aims.

- The land that would be affected by the Proposal has not been identified as State or regional significant agricultural land by *Schedule 2* of the Rural Lands SEPP.
- The Proposal would not impact on any additional land currently managed for agriculture. As demonstrated at numerous other quarry sites where agricultural activities are undertaken concurrently within extractive industry, the Proposal would not be incompatible with continued agricultural land use surrounding the Site.
- The protection of the land that is the subject of the Proposal would not provide any public benefit. In fact, the employment and local economic stimulus that would be generated by the Proposal is considered to be of wider public benefit.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment. A risk screening of the Proposal will be performed in accordance with the document entitled *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DP&I, 2011). However, as the only hazardous substances and dangerous goods to be used or stored on the Site would be restricted to well managed diesel fuel and other hydrocarbon products, the Proposal is unlikely to classify as a hazardous or potentially hazardous industry.

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

SEPP 55 aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. In particular, this policy requires consideration of whether a development requires a consent for remediation works or not and, where warranted, requires that remediation works meet certain standards and notification requirements.

As the areas proposed for disturbance within the Site have previously been used only for dairying or grazing cattle, it is highly unlikely any contamination is present that requires remediation work prior to undertaking the proposed mining operation.

3.3 LOCAL PLANNING ISSUES

The Site is located on land zoned Rural 1(a) under Lithgow Local Environmental Plan 1994 (LEP). The objective of the zone is to promote the proper management and utilisation of natural resources by:

a) protecting, enhancing and conserving:

(i) rural land, in particular prime crop and pasture land, in a manner which sustains its efficient and effective agricultural production potential,

(ii) soil, by controlling and locating development in accordance with soil capability,

(iii)forests of existing and potential commercial value for timber production,

(iv) valuable deposits of minerals, coal and extractive materials, by controlling the location of development for other purposes in order to ensure the efficient extraction of those deposits,

(v) trees and other vegetation in environmentally sensitive areas, where the conservation of the vegetation is significant for scenic amenity or natural wildlife habitat or is likely to control land degradation,

(vi) water resources for use in the public interest, preventing the pollution of water supply catchment and major water storages,

(vii) localities of significance for nature conservation, including places with rare plants, wetlands and significant wildlife habitat, and

(viii) items of heritage significance,

b) preventing the unjustified development of prime crop and pasture land for purposes other than agriculture,

c) facilitating farm adjustments,

d) minimising the cost to the community of:

(i) fragmented and isolated development of rural land, and

(ii) providing, extending and maintaining public amenities and services,

e) providing land for other non-agricultural purposes, in accordance with the need for that development, and

f) providing for the separation of conflicting land uses.

Austen Quarry is able to satisfy the relevant LEP objectives though it is noted that items under section a) and f) will be further addressed in the EIS.

4. ENVIRONMENTAL FEATURES AND PRELIMINARY ASSESSMENT

4.1 IDENTIFICATION OF KEY ISSUES (PRELIMINARY RISK ASSESSMENT)

Risk is the chance of something happening that will have an impact upon the objectives or the task, which in this case is the extension of extraction area and overburden emplacement at the Austen Quarry without unacceptable environmental impact. Risk is measured in terms of consequence (severity) and likelihood (probability) of the event happening.

As part of a preliminary environmental risk assessment, and in accordance with Australian and International Standards HB 203:2006, AS/NZS 4360:2004 and IEC/ISO 310101 2009, environmental parameters that could be affected by the Proposal were identified. Risk sources, potentially affected receptors or environments, potential consequences and specific potential impacts were then identified. A review of the proposed operations, the local environment and other factors was undertaken to identify the likely consequence and likelihood of each potential environmental impact.

The determination of consequence was based on the definitions contained in **Table 4.1**. It is noted that the assigned consequence rating represents the highest level applicable, i.e. if a potential impact is assigned a level of 4 - Major based on cost of remediation and 2 - Minor based on area of impact, the consequence level assigned would be 4 - Major. The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table 4.2**.

The risk associated with each environmental impact was assessed **without** the inclusion of any specific operational controls or systems, mitigation measures or other safeguards in place (other than standard environmental management practices). Based on the assessment of consequence and likelihood, an overall risk ranking of; Low, Moderate, High or Very High was assigned to each potential impact based on the matrix of **Table 4.3**.

The four risk rankings are defined as follows.

Low (L): requiring a basic assessment of proposed controls and residual impacts. Any residual impacts are unlikely to have a major effect on the local environment or stakeholders.

Moderate (M): requiring a medium level assessment of proposed controls and residual impacts. It is unlikely to preclude the development of the project but may result in impacts deemed unacceptable to some local or government stakeholders.

High (H): requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures. Ultimately, this level of risk may preclude the development of the project.

Very High (VH): requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures and possible preparation of a specialised management plan. Unless considered to be adequately managed by the controls and/or management plan, this level of risk is likely to preclude the development of the project.

Table 4.1
Qualitative Consequence Rating

Level	Descriptor	Description
5	Severe	• Massive and permanent detrimental impacts on the environment. • Very large area of impact. • Massive remediation costs (>$5M). • Reportable to government agencies. • Large fines and prosecution resulting in potential closure of operation. • Severe injuries or death.
4	Major	• Extensive and/or permanent detrimental impacts on the environment. • Large area of impact. • Very large remediation costs ($1M - $5M). • Reportable to government agencies. • Possible prosecution and fine. • Serious injuries requiring medical treatment.
3	Moderate	• Substantial temporary or minor long term detrimental impact to the environment. • Moderately large area of impact. • Moderate to high remediation costs ($0.25M - $1M). • Reportable to government agencies. • Further action may be requested by government agency. • Injuries requiring medical treatment.
2	Minor	• Minor detrimental impact on the environment. • Affects a small area. • Minor to moderate remediation costs (<$0.25M). • Reportable to internal management only. • No operational constraints posed. • Minor injuries which would require basic first aid treatment.
1	Negligible	• Negligible and temporary detrimental impact on the environment. • Affects an isolated area. • No remediation costs. • Reportable to internal management only. • No operational constraints posed. • No injuries or health impacts.
Source: modified after HB 203:2006 - Table 4(B)		

Table 4.2
Qualitative Likelihood Rating

Level	Descriptor	Description	Indicative Frequency
A	Almost Certain	Is expected to occur in most circumstances	Ongoing (at least once a year or more frequently)
B	Likely	Will probably occur in most circumstances	Once every 3 years
C	Possible	Might occur at some time	Once every 10 years
D	Unlikely	Could occur at some time	Once every 30 years
E	Rare	May occur only in exceptional circumstances	Once every 100 years
Note: Rating modified after HB 203:2006 - Table 4(A)			

Table 4.3
Risk Ranking

Likelihood	Consequences				
	Negligible 1	Minor 2	Moderate 3	Major 4	Severe 5
A (Almost Certain)	M	H	H	VH	VH
B (Likely)	M	M	H	H	VH
C (Possible)	L	M	M	H	H
D (Unlikely)	L	L	M	M	H
E (Rare)	L	L	L	M	M
Note: Rating modified after IEC/ISO 310101 2009					

Following the identification of environmental risk sources for those parameters which could be affected by the Proposal (e.g. water resources, ecology, heritage, etc.), the likely receptor(s), potential environmental outcome and the likelihood and consequence of specific impacts of these outcomes (if not mitigated) have been reviewed and the **unmitigated** risk for each assessed based on the classifications and definitions provided in **Table 4.1** to **4.3**).

Throughout Section 4, the results of the preliminary risk assessment as relevant to each environmental parameter are presented. The type of impact and rating of the risk has been used to prioritise the assessment of specific issues in the EIS and develop the scope of works for specialist environmental assessments.

4.2 ENVIRONMENTAL SETTING

4.2.1 Topography

The Site is located on the western fringe of the Blue Mountains with land to the south, east and west of the site consisting mainly of lightly wooded ridges and predominantly cleared valleys. Land to the north is mainly gently undulating grazing land. Elevations across the Site range from 660m AHD at the northern boundary adjoining the Coxs River to approximately 835m AHD to the immediate west of the overburden emplacement.

The rising hill slope along and within the northern limit of the Stage 1 extraction area has been retained to provide a visual barrier to the extraction activities to the southeast and south of this retained topographic feature. At its maximum elevation, this retained slope reaches 790m AHD, falling to the northeast to an elevation of approximately 780m AHD. Extraction activities have removed the remainder of this hill down to the current elevation of 750m AHD.

The Stage 2 extraction area consists of a single ridge within a maximum elevation of 810m AHD which is aligned in a southwesterly direction while the overburden emplacement would extend into a small gully between two ridges to the west of the proposed quarry extension.

4.2.2 Geological Setting

Regionally, the rhyolite and related igneous rock types within the Site are Lower to Middle Devonian in age (approximately 390 million years old). The volcanic group are interbedded with a range of metasediments of the Lambie Group that outcrop to both the east and west of the Site.

Drilling within the footprint of the Stage 2 extraction area has defined rhyolite comparable in quality to the rhyolite in the Stage 1 extraction area albeit with variable thicknesses of overburden.

4.2.3 Surrounding Land Ownership and Residences

The closest settlement to the Site is the village of Hartley, 3.5km to the north-northeast. The closest non quarry-related residences and their distances to the quarry administration area are as follows.

- "Glenroy" – 2.6km.
- "Ecclesbourne" – 4.0km west.
- "Glendoon" – 3.1km west-southwest.
- "Ant Hill" – 3.1km southwest.
- "The Braes" – 3.9km southwest.
- "Glenleigh" – 4.5km southwest.
- "Wuthering Heights" – 3.9km south-southwest.
- "Duddawarre" – 4.2km south.

The locations of these residences are displayed on **Figure 4.1**.

A camping ground used periodically by short-term campers (predominantly on weekends) is located adjacent to the Glenroy Bridge over the Coxs River. The camping ground is approximately 2.5km from the Site.

4.2.4 Climate

Table 4.4 provides a brief statistical summary of climate data sourced from the weather monitoring station at Mount Boyce, chosen as the closest station to the Site. Data from the station will be incorporated into the *Environmental Impact Statement* and used/referenced in the various environmental assessments, where appropriate.

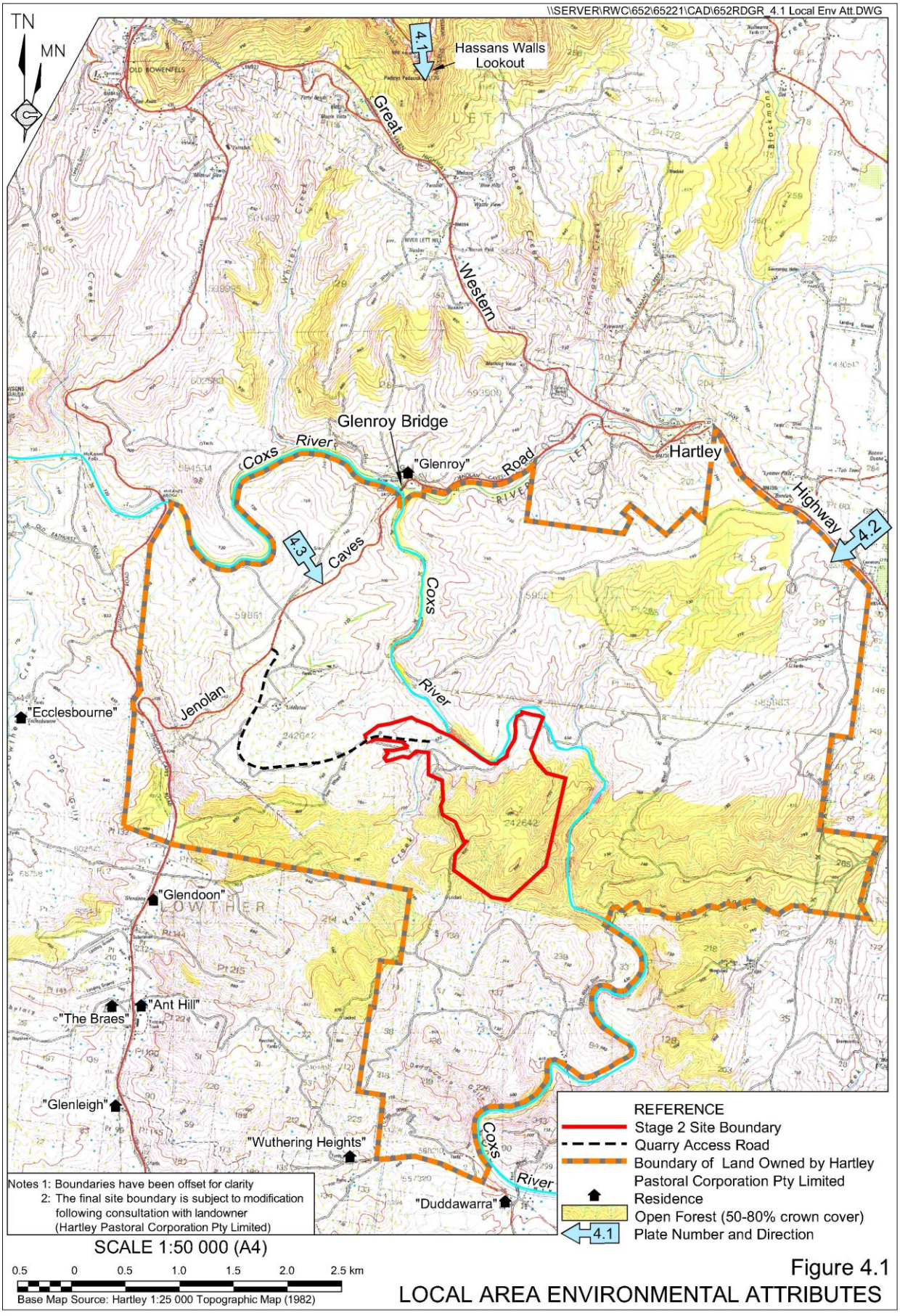


Figure 4.1
LOCAL AREA ENVIRONMENTAL ATTRIBUTES

Table 4.4
Monthly Meteorological Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature (°C) Mount Boyce AWS (Station # 063292) 1991 to 2012													
Mean maximum temperature	23.8	22.7	20.3	17.0	13.5	10.1	9.3	11.3	14.6	17.4	19.9	22.1	16.8
Mean minimum temperature	13.1	13.2	11.2	8.6	6.1	3.7	2.5	3.0	5.4	7.4	9.7	11.3	7.9
Rainfall (mm) Mount Boyce AWS (Station # 063292) 1994 to 2013													
Mean monthly rainfall	116.8	129.2	104.5	58.0	61.5	75.6	43.8	51.5	56.7	68.5	104.6	83.0	953.5
Highest monthly rainfall	208.0	284.8	268.0	157.2	232.4	305.0	130.4	294.8	144.8	186.2	290.8	200.0	1435.6
Lowest monthly rainfall	18.0	6.8	12.6	1.2	11.6	4.8	9.0	1.6	8.0	18.4	27.6	22.6	640.4
Highest daily rainfall	128.0	166.8	67.0	69.4	72.0	90.6	47.0	121.0	69.0	46.8	66.4	58.0	166.8
Source: Bureau of Meteorology 2013													

Temperature

The highest temperatures are evident from December through to February with January having the highest mean temperature of 23.8°C. The lowest temperatures were evident through June to August with the lowest mean temperature in July of 2.5°C.

Rainfall

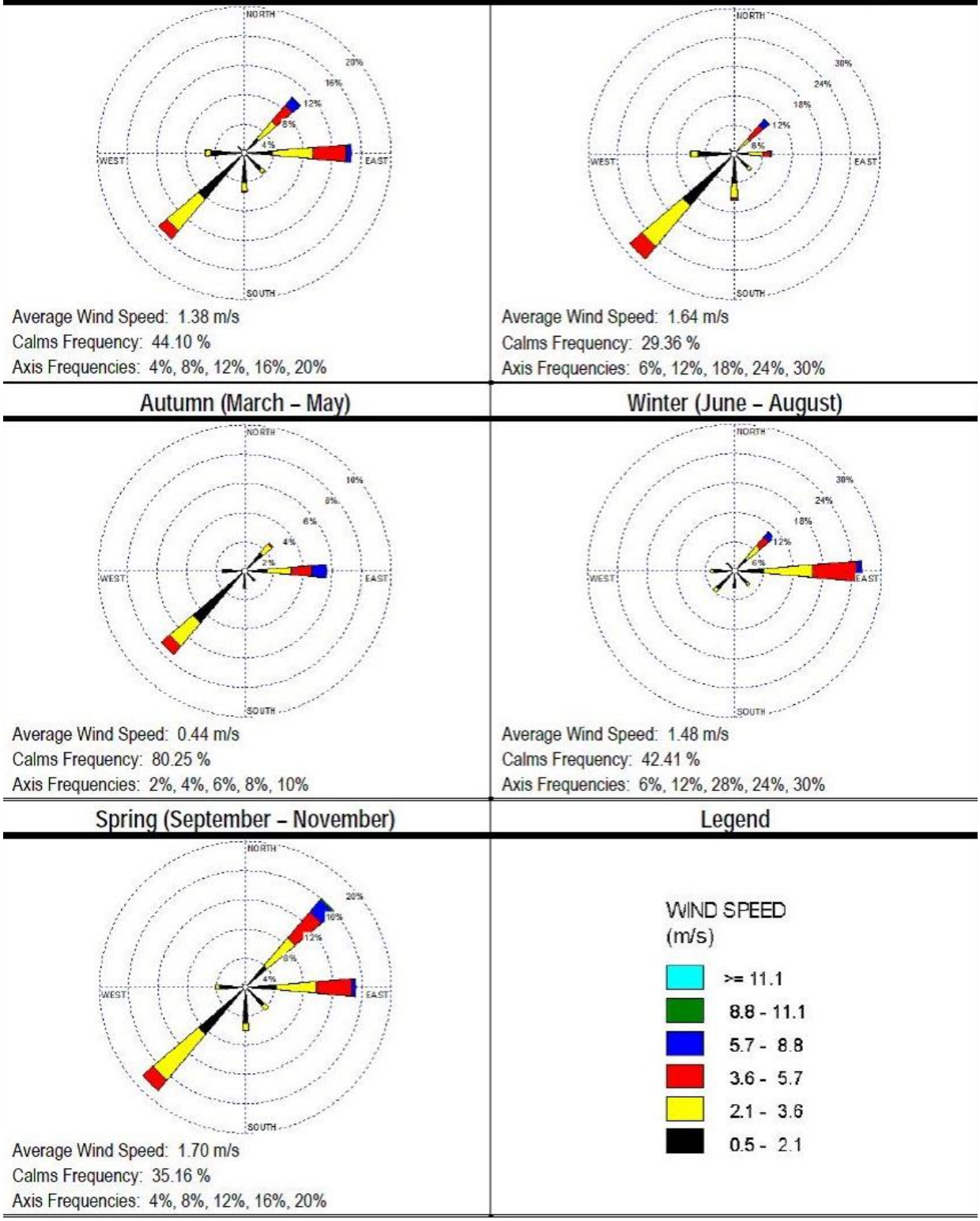
Mean annual rainfall is 953.5mm, with mean rainfall highest from November to March with highest recorded monthly average of 129.2mm in February. This period of above average rainfall poses the greatest risk for soil erosion. Rainfall can, however, be extremely variable, with infrequent, high intensity rainfall events occurring. When looking at the highest monthly rainfall, the measured rainfall is uneven throughout the year, with the highest monthly rainfall of 305mm recorded in June which coincides with a lower mean monthly rainfall. The lowest monthly rainfall of 1.2mm was recorded in April with remaining months uneven in the lowest recorded monthly rainfall measures.

Wind Speed and Direction

Figure 4.2 presents a summary of wind patterns observed from the on-site meteorological station. Wind roses indicate that on an annual basis, prevailing winds are from the southwest and east. Seasonally, the prevailing wind conditions are from:

- the southwest dominate during summer;
- the south-west and east dominate during autumn;
- the east dominate during winter; while
- during spring, winds occur from the east, southwest and northeast.

The average recorded wind speed is 1.38m/s and calm conditions occur for 44.1% of the year.



Source: Benbow Environmental

Figure 4.2
WIND ROSES (AUSTEN QUARRY METEOROLOGICAL STATION)
(APRIL 2012 TO APRIL 2013)

4.3 SURFACE WATER

4.3.1 Existing Environment

4.3.1.1 Drainage

The Site is located within the Hawkesbury-Nepean Catchment and more specifically the Mid-Coxs River sub-catchment. The Coxs River runs along the Site boundary to the north and eventually flows to Sydney's drinking water supplies at Lake Burragorang.

Runoff at the quarry has been modified by development of the Stage 1 extraction area and Processing area, however, broadly considered flows to the Coxs River are by way of three catchments (see **Figure 4.3**).

Coxs River North

The Coxs River North catchment incorporates an area of 107ha and includes the Stage 1 extraction area and Processing Area (12.7ha), with a series of ephemeral drainage lines and gullies flowing in a generally northerly direction towards the Coxs River. This catchment has been highly modified by the existing quarry with most runoff captured within the extraction area or various sediment and storage dams on or up-slope of the Processing Area. The Proposal would increase the total disturbed area within this catchment by 8.6ha.

There remain some undisturbed sections of the catchment to the north and northeast of the Stage 1 extraction area.

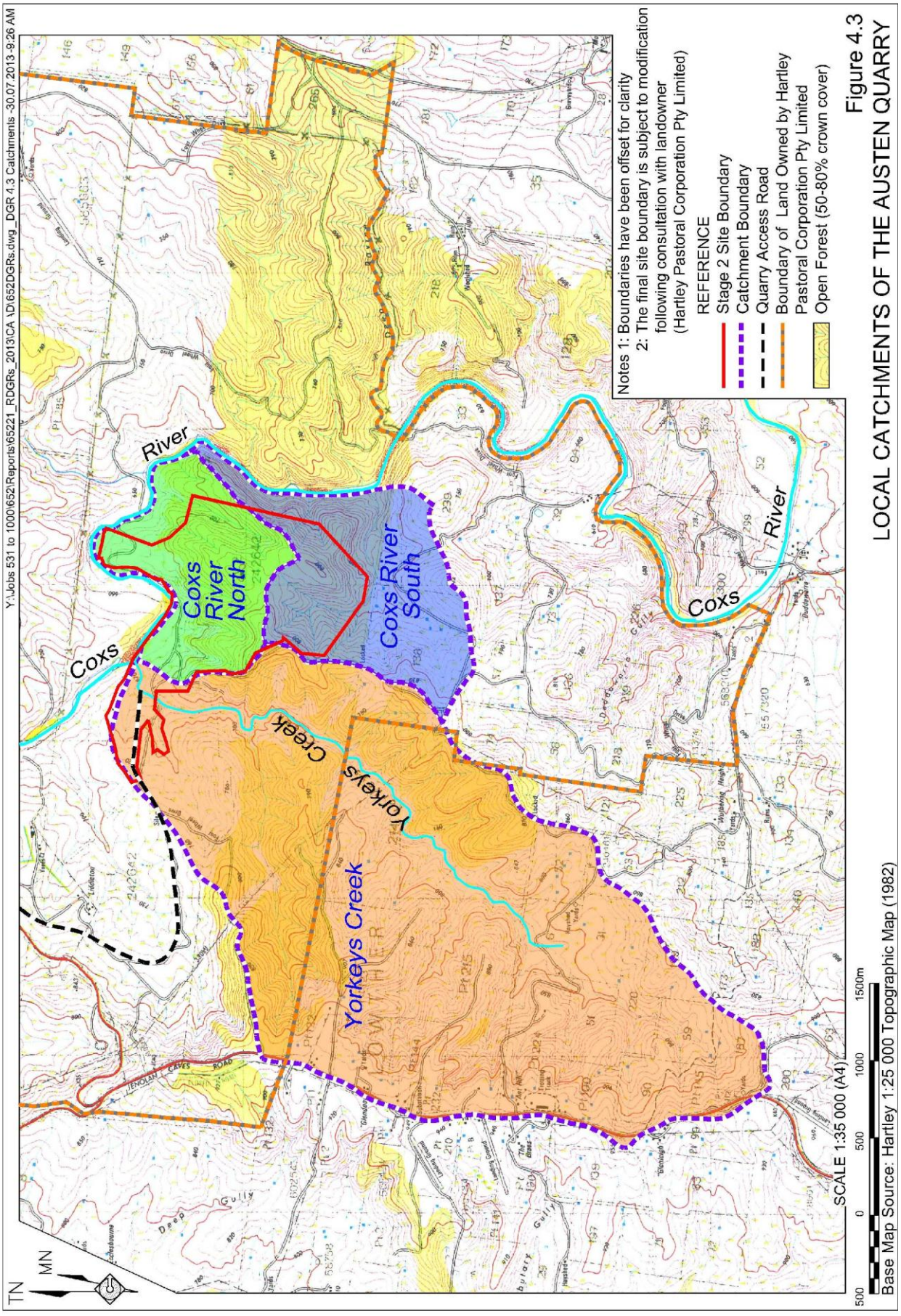
Coxs River South

This catchment, covering approximately 145ha, includes the overburden emplacement and a large proportion of the quarry extension. Runoff from various ephemeral drainage lines and gullies converge near the toe of the overburden emplacement with flow to the Coxs River then via a single easterly oriented drainage line.

Currently, 6.7ha of this catchment has been disturbed by the quarry, with additional disturbance of 16.3ha proposed. The catchment would therefore remain largely undisturbed, with only 16% disturbed on completion of the quarry extension.

Yorkeys Creek

Drainage from the Yorkeys Creek Stockpile Area and a small section of the Quarry Access Road as it passes over the creek, flows to the Coxs River via Yorkeys Creek of approximately 761ha. Appropriate sediment and erosion control is currently in place to ensure any discharge to the creek and Coxs River meets the criteria of EPL 12323. No change to areas of disturbance are proposed within this catchment.


Y:\Jobs 531 to 1000\652\Reports\65221_RDGRs_2013\CA \D\652DGRs.dwg_DGR 4.3 Catchments -30.07.2013 -9:26 AM
Notes 1: Boundaries have been offset for clarity
2: The final site boundary is subject to modification following consultation with landowner (Hartley Pastoral Corporation Pty Limited)
REFERENCE
Stage 2 Site Boundary
Catchment Boundary
Quarry Access Road
Boundary of Land Owned by Hartley Pastoral Corporation Pty Limited
Open Forest (50-80% crown cover)
Coxs River North
Coxs River South
Yorkeys Creek
Coxs River
Coxs River
Coxs
Yorkeys Creek
Deep Gully
TN
MN
SCALE 1:35 000 (A4)
500 0 500 1000 1500m
Base Map Source: Hartley 1:25 000 Topographic Map (1982)
Figure 4.3
LOCAL CATCHMENTS OF THE AUSTEN QUARRY

4.3.1.2 Water Quality

The Applicant has taken samples of water from three locations within the Coxs River on a monthly basis since 2007[4] at three locations (see **Figure 4.4**). Two of these locations are licensed under EPL 12323 and the following provides their EPL reference and location, where relevant.

- AQW-1 (EPA 2[5]) located upstream of the Site.
- AQW-2 located immediately downstream of the Processing area.
- AQW-3 (EPA 3) located downstream of the Coxs River South catchment.

Water from a further six locations (sediment basins and storage dams – EPA 1, EPA 7 to EP 11) are also sampled on a quarterly basis (see **Figure 4.4**).

Parameters monitored include: pH, electrical conductivity, turbidity, total dissolved solids, total suspended solids, biochemical oxygen demand (BOD) and oil and grease. With limited exception, generally as a result of environmental factors such as flushing rainfall[6], the results of this analysis indicate the water quality complies with the nominated criteria of EPL 12323. These results indicate that the quarry has operated without adversely impacting on the water quality of the Coxs River.

4.3.1.3 Flooding

The Processing area has been constructed on 'waterfront land', as defined by the *Water Management Act 2000*, incorporating an elevated hardstand and bund within 40m of the Coxs River channel. While not defined, this is likely to affect flows within this stretch of the river when the water level is elevated. It is noted that these works have been constructed in accordance with the development consent and following the issue of a Permit (No. PAR9012617) issued under the now repealed *Rivers and Foreshores Improvement Act 1948*. The Applicant is currently making application to the NSW Office of Water for a Controlled Activity Approval for these works to replace PAR9012617.

It is also noted that Yorkeys Creek is also subject to flooding. However, following a flood event in February 2005, considered a 1 in 150 year ARI event (Parsons Brinkerhoff, 2005), it is confirmed that the Processing area is not affected (and therefore not constrained) by local flooding. The Yorkeys Creek crossing has been designed and constructed to account for the flood recorded in February 2005, which is illustrated in **Figure 4.5**.

[4] Three samples were also taken from two of these sites (AQW-1 and AQW-2) in August, November and December 2006.
[5] EPL 12323 reference.
[6] Environmental factors are deemed responsible for elevated levels when the values of upstream sites (AQW-1 and AQW-4) are similarly elevated.

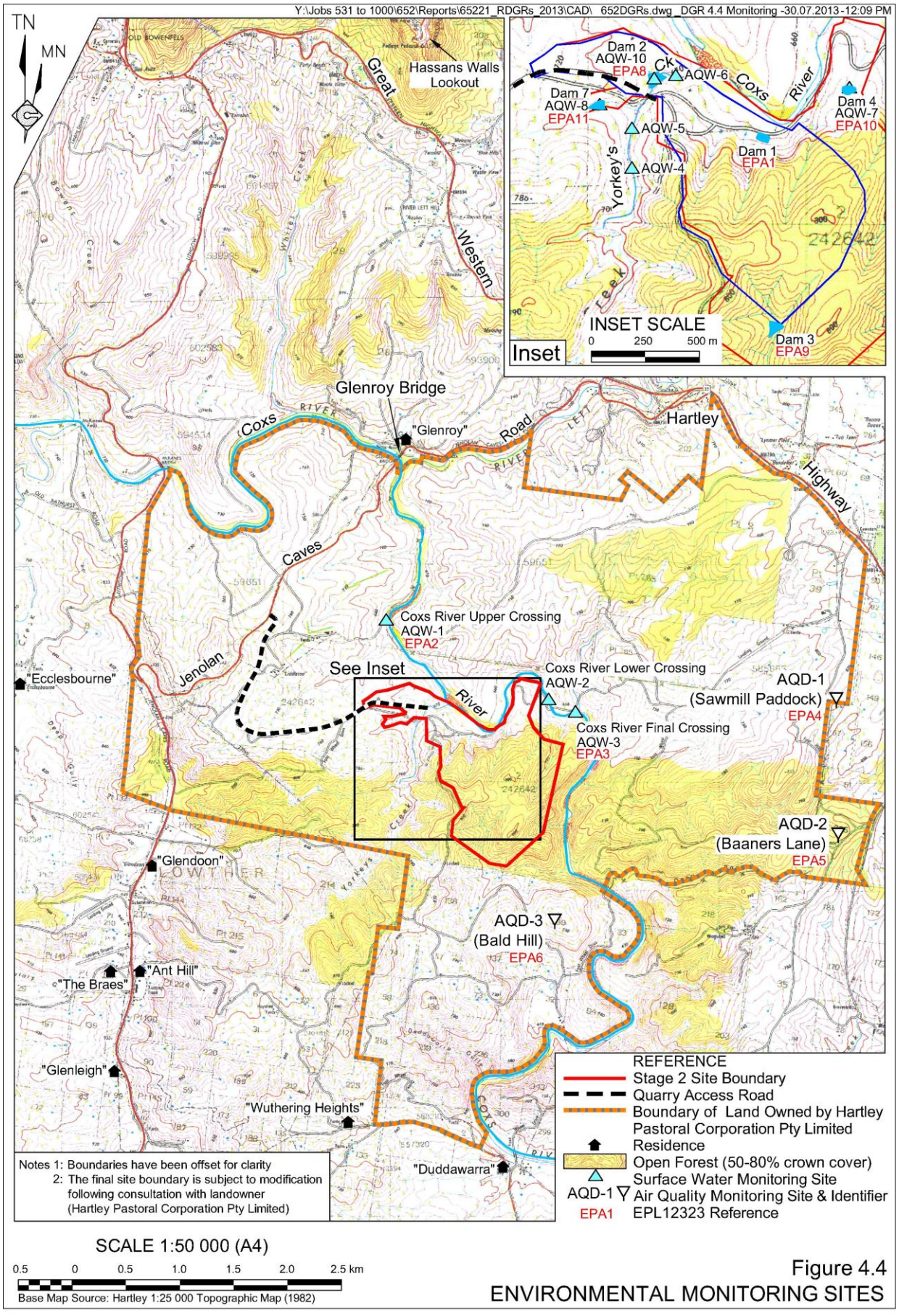


Figure 4.4
ENVIRONMENTAL MONITORING SITES

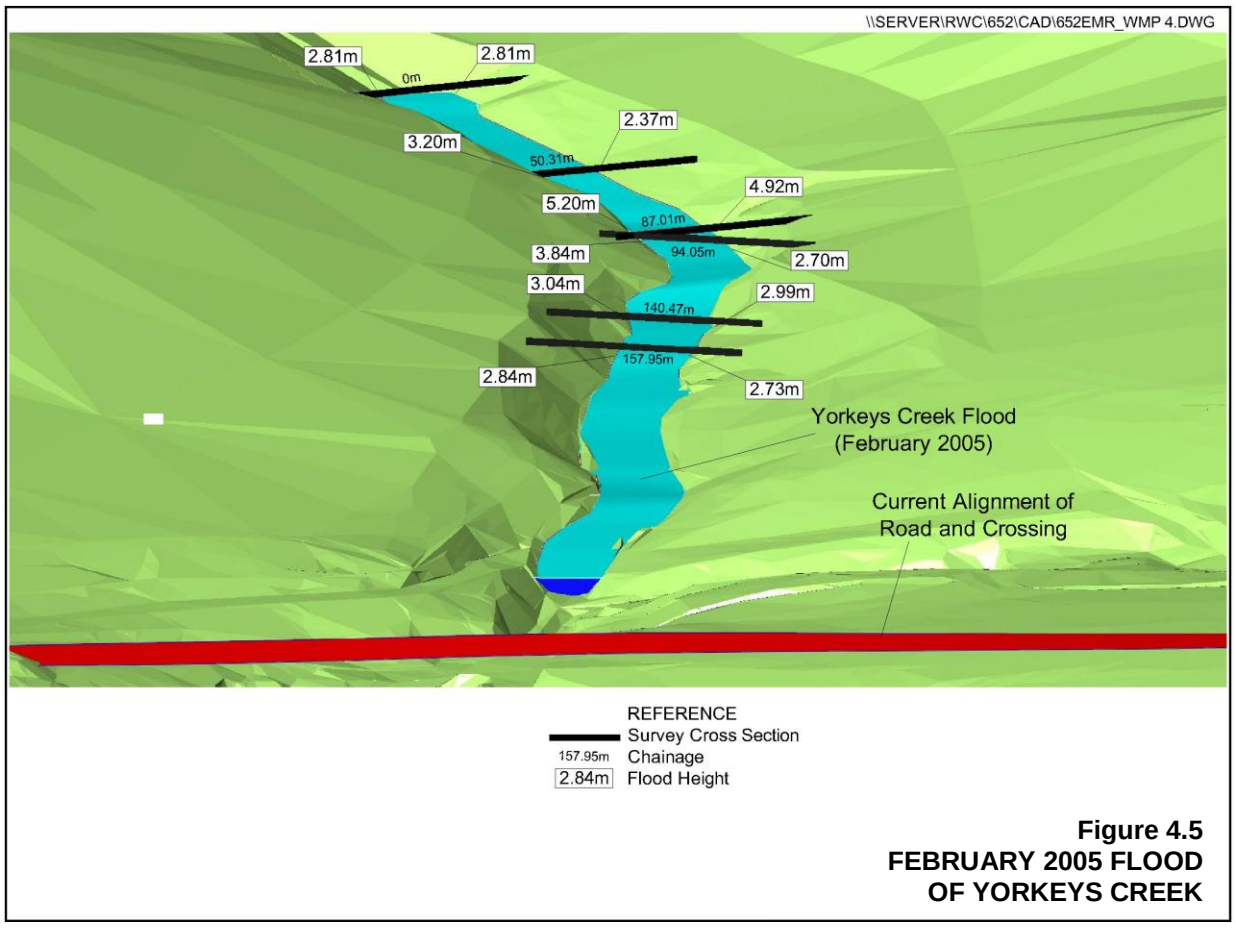


Figure 4.5
FEBRUARY 2005 FLOOD
OF YORKEYS CREEK

4.3.2 Potential Surface Water Impacts

Based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific surface water-related impacts (and assessed risk rating) that may result as a consequence of the Proposal (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment are as follows.

- Reduction in environmental flows through on-site capture of water resulting in:
  - reduced flows to Coxs River (High);
  - reduced availability of water to downstream users (Moderate);
  - stress to, and possible reduction in viability of native vegetation (Moderate); and/or
  - degradation of aquatic habitats (Moderate).
- Discharge of dirty or contaminated water resulting in:
  - pollution of downstream waters (High);
  - detrimental effects to flora and fauna (Moderate);
  - contamination of soil resources and indirect impacts on future land use (Low);

  - health related impacts (people) due to consumption of contaminated water (Moderate); and/or
  - health related impacts (stock) due to consumption of contaminated water (Moderate).

- Erosive actions of water resulting in:
  - soil erosion and loss of agriculturally productive capacity (High); and/or
  - decreased availability of soil for rehabilitation (High).

4.3.3 Indicative Surface Water Management

The Applicant has prepared and implemented a Soil and Water Management Plan (SWMP) for the Austen Quarry which, given the continued compliance with the water quality criteria of EPL 12323, is successful in preventing polluted or contaminated discharge from the Site.

It is noted that that as the quarry expands, further surface water and erosion control structures will be required on the Site to ensure as much water as possible can be diverted around areas of disturbance and sediment-laden water is collected, contained and settled prior to discharge. All structures would be designed in accordance with the Blue Book (Volumes 1, 2C and 2E) and the final landform designed to, as far as practicable, re-create the pre-disturbance drainage as closely as possible.

Appropriate controls and contingency measures will also be designed and adopted to minimise the potential for fuel spills which could contaminate local surface water. Furthermore, fuels and oils will continue to be stored in the enclosed and bunded facility.

The surface water to be captured and used on the Site would be undertaken with recognition of the Maximum Harvestable Rights Dam Capacity (MHRDC) for the landholding on which the Site is located. If necessary, water licences would be obtained for the surface water collected and used in excess of the MHRDC entitlement.

4.3.4 Preliminary Assessment

It is assessed that such controls can be designed and implemented such that the overall impact on the surface water resources would be acceptable. A further review will be undertaken to assess the adequacy of surface water management and residual impacts on the local environment.

4.4 GROUNDWATER

4.4.1 Existing Environment

The elevation of the current and proposed extraction area above the Coxs River suggests it is unlikely that significant groundwater, other than that short term flows through fractures to recharge deeper aquifers, would be encountered. Extraction has currently progressed to the 750m AHD without encountering the groundwater table supporting this assessment.

4.4.2 Potential Groundwater Impacts

The probably lack of groundwater notwithstanding, and based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific surface water-related impacts that may result as a consequence of the Proposal (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment are as follows.

- Dewatering of an aquifer resulting in:
  - reduced availability to local users (Moderate);
  - degradation of groundwater dependent ecosystems (Moderate); and/or
  - reduction in base flows leading to:
    - degradation of riparian or aquatic vegetation / ecosystems (Low); and/or
    - reduced availability of water to downstream users (Low).
- Groundwater contaminated with suspended solids from processing operations, erosion and/or chemicals and fuels used on site resulting in:
  - reduced groundwater quality and availability to local users (Moderate);
  - degradation of groundwater dependent ecosystems (Moderate);
  - contamination of local surface water bodies and as a result:
    - reduced availability of water to downstream users (High); and/or
    - degradation of riparian or aquatic vegetation / ecosystems become contaminated (High).

4.4.3 Groundwater Management

Should a review of local conditions identify groundwater resources that could be intersected by the proposed quarry extension, specific management measures would be designed and implemented. Furthermore, appropriate licences and licence entitlements would be obtained under the WM Act.

4.4.4 Preliminary Assessment

An initial groundwater assessment aiming to confirm or negate the occurrence of groundwater below the Site is planned and groundwater management measures would be developed based on the results of this assessment.

As noted in Section 4.3.1, groundwater is not expected to be encountered as a result of the proposed quarry extension and therefore, no impacts are anticipated.

4.5 VISIBILITY

4.5.1 Existing Environment

While isolated from major residential or commercial development, the elevated location of the quarry is such that it is visible from look-outs or elevated vantage points throughout the local area. As previously noted, the extraction sequence of Stage 1 has been designed to retain a

visual barrier to the north of the extraction area. In addition, exposed areas on the southern side of the extraction area are painted black to further reduce contrast with the surrounding woodland which has been identified in the past as increasing the visibility of the extraction area from public vantage points.

Plates 4.1 to **4.3** provide the views of the Site currently available from Hassans Walls (approximately 6km to the north of the Site), the Great Western Highway near the intersection of Mid Hartley Road (approximately 4km northeast of the Site) and Jenolan Caves Road (approximately 2km to the west of the Site).

4.5.2 Potential Impacts on Visual Amenity

As the extraction area and overburden emplacement are extended, the potential for the disturbance to become more exposed to vantage points which currently have views of the operations (see **Plates 4.1** to **4.3**), or exposed to additional vantage points, in particular those to the east of the Site, would increase. Considering this potential change to the local setting, and based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific visual amenity-related impacts that may result as a consequence (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment include the following.

- Changes in visual characteristics of the locality resulting in:
  - reduced visual amenity of local residents and visitors (High); and/or
  - reduced aesthetic value of lookouts (such as Hassans Walls) (High).

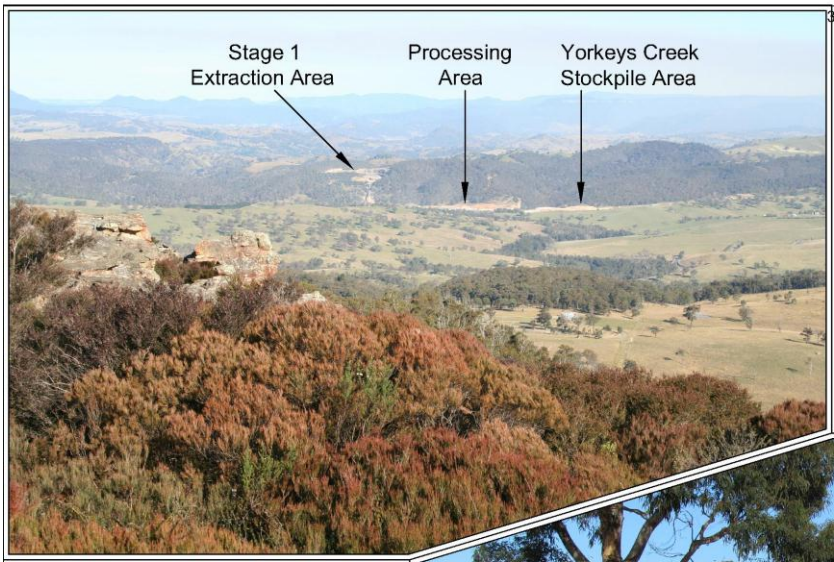
4.5.3 Management of Visual Amenity

As it forms part of the current management of extraction operations, the section of the hill that currently provides a visual barrier to vantage points to the north and northeast is proposed to be retained and continued to the north to screen the northern extension of the extraction area. Painting of exposed rock would also be continued when safe to do so.

The extraction sequence (see **Figure 2.2**) would implement a similar approach for vantage points to the east of the Site whereby, the outer perimeter of the extraction area would be retained for as long as possible while extraction occurs behind this natural barrier.

Progressive rehabilitation of the overburden emplacement would continue to be implemented to reduce the overall visual impact of this structure from neighbouring land holdings, residential receivers and local roads. The Applicant would also ensure that areas of disturbance are minimised ahead of development and the Site be maintained in a clean and tidy state at all times with dust suppression activities to be implemented to reduce the occurrence of visible dust emissions.

Overall, emphasis would also be placed upon minimising the views of operational areas during the life of the Proposal and the creation of a final landform that is compatible with and aesthetically acceptable in the long term visual landscape.



3\CAD\ 652DGRs.dwg_DGR Plates-16.07.2013-5:30 PM

Plate 4.1: View southwards from Hassans Wall Lookout towards the Austen Quarry (a distance of 6km) (Ref: E652Q_001)

Plate 4.2: View in a southwesterly direction from the Great Western Highway towards the Stage 1 Extraction Area (Ref: E652Q_004)

Plate 4.3: View in a southeasterly direction from Jenolan Caves Road towards the Processing Area (Ref: E652S_090)

4.5.4 Preliminary Assessment

It is noted at the outset that the value placed upon visual amenity and the impacts upon surrounding visual amenity would vary from person to person and from location to location. As a result, a visual amenity assessment is, by its nature, somewhat subjective. As a result, during the visual amenity assessment emphasis will be placed on providing a description of the existing visual amenity surrounding the Site and the measures that would be undertaken by the Applicant to minimise potential visual amenity-related impacts on surrounding residents and others. The subjective nature of visual impact assessment notwithstanding, it is concluded that the Proposal is likely to achieve a satisfactory level of compatibility with the existing visual landscape and be undertaken in a manner which minimises visual impact.

4.6 TRANSPORTATION

4.6.1 Existing Road Network

Quarry products will continue to be despatched on the existing road network and follow a pattern consistent with existing transport operations. Access to the Site is via the Great Western Highway, turning into Jenolan Caves Road and then entering the Quarry Access Road. A series of internal roads throughout the Site provide access to the existing processing and extraction operations and overburden emplacement.

A summary of the existing status of these roads is as follows.

- Quarry Access Road – is a sealed, private access road and contains a single travel lane in each direction with centre line and road edge markings. The road is approximately 3.1km long and the only vehicular access for personnel and product transport to and from the quarry.

  A traffic survey on the Quarry Access Road over a two week period in March 2013 recorded average daily flow of 202 vehicles (GTA, 2013).

- Jenolan Caves Road – in the vicinity of the Austen Quarry, this State road has a single travel lane in each direction, with marked centre lines and edge lines. It is an approved B-Double truck route 24 hours per day, 7 days per week. The road is widened at the intersection with the Quarry Access Road to provide an auxiliary right turn and auxiliary left turn that allows through traffic to pass vehicles slowing to turn into the quarry. The intersection with the Great Western Highway and Blackmans Creek Road is a four-way priority-controlled intersection. A left turn deceleration lane (from the east) and a right turn bay (from the west) are provided on the Great Western Highway for vehicles turning into Jenolan Caves Road.

  Traffic surveys undertaken in March 2013 recorded average daily traffic of 1 307 vehicles on Jenolan Caves Road (GTA, 2013).

- Great Western Highway – is the major arterial road providing the key road freight, tourist and commercial link between the Sydney metropolitan area and central western New South Wales. It is also used for local commuting trips, local freight, industry and tourist trips.

The Great Western Highway between Emu Plains and Katoomba has been substantially upgraded over the past 15 years, providing a divided road with two lanes in both directions. These road works are nearing completion.

In July 2012, the Australian and NSW governments announced a $250 million revised investment program for the upgrade of the Great Western Highway between Katoomba and Lithgow, which would target specific deficiencies along the highway. The upgrade would improve road safety, road freight efficiency and cater for the mix of through local and tourist traffic, and be sensitive to the area's natural environment, heritage and local communities. The Hartley Valley safety upgrading would include widening of Great Western Highway near the Jenolan Caves Road intersection.

These upgrades are planned to accommodate an increase of daily vehicle movements from 3 950 in 2011 to 5 900 in 2035 (RMS (2012) as cited in GTA, (2013).

- Internal Access Roads – A series of single-lane unsealed roads provide access to the Processing area, primary crushing station, extraction area and overburden emplacement.

All existing products are transported using predominantly articulated truck and dog trailer combinations or B-Double trucks that leave the Site via the Quarry Access Road travelling to Jenolan Caves Road. All trucks then continue from this intersection towards the Great Western Highway where approximately 95% of product trucks turn eastwards onto the Great Western Highway in the direction of the Blue Mountains and Sydney. The remaining west-bound traffic corresponds with smaller contracts in the Lithgow or Bathurst regions. Depending on the nature of local product supply contracts, the proportion of traffic turning west on the Great Western Highway could reach a maximum of 10% of total traffic from Jenolan Caves Road (with the remaining 90% continuing to head east). On average, approximately 83 loaded trucks currently depart the quarry each day up to a maximum of 150 loaded truck departures per day.

Traffic surveys completed in March 2013 (GTA, 2013), established that the total contribution to traffic on Jenolan Caves Road by the Austen Quarry was 17% to the north of the Site and only 1% to the south of the Site. Traffic on Jenolan Caves Road peaked during weekend periods when quarry traffic was at its lowest. This indicates that recreational traffic may significantly contribute to total traffic on Jenolan Caves Road with the majority of this occurring during periods when it is not likely to be impacted by quarry traffic. Peak periods for quarry traffic departing from the quarry were recorded to be in the morning from 5:00am to 6:00am and from 5:00pm to 6:00pm in the evening. The peak traffic on Jenolan Caves Road was recorded to be 11:00am to 12:00pm for traffic north of the Site and 10:00am to 11:00am for traffic south of the Site with both directions having an evening peak between 4:00pm and 5:00pm. This indicates that existing quarry traffic peaks occur outside the peaks in general traffic on Jenolan Caves Road.

GTA (2013) also reviewed road crash history on Jenolan Caves Road, identifying that the majority of crashes involved a single vehicle leaving the carriageway, with speed being a contributing factor. A review of records available regarding crashes involving articulated vehicles indicated that where an articulated trailerwas involved, the driver of the car involved in the crash was travelling on the wrong side of the road. GTA concluded that the presence of trucks on Jenolan Caves Road did not appear to contribute to crashes on the road.

According to the Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis 2009 and the Highway Capacity Manual 2000, both the Quarry Access Road and Jenolan Caves Road are classified as Class 2 two lane, two-way roads, being roads on which motorists do not expect to travel at high speeds and are used to access Class 1 roads, serve as scenic or recreational routes or pass through rugged terrain. Class 2 roads are assessed for roadway capacity and efficiency based on the Level of Service (LOS) that gives an indication of operation conditions determined by the Percentage Time Spent Following (PTSF). Both the Quarry Access Road and Jenolan Caves Road were determined to have a LOS rating of A, indicating that road users can expect good levels of service with regard to roadway efficiency and delays during the busiest hours.

A SIDRA intersection analysis established that the intersection of the Quarry Access Road with Jenolan Caves Road has a rating of 'good with acceptable delays and spare capacity' while the intersection of Jenolan Caves Road with the Great Western Highway has a 'satisfactory rating , with accident study required'. This indicates that both intersections are currently operating at satisfactory levels of service with spare capacity and few delays.

Existing daily volumes of heavy and light vehicles on the Great Western Highway are presented in **Table 4.5** and compared with the existing truck traffic generated by the Austen Quarry. The data indicates that at the approved production level of 1.1 Mtpa the traffic associated with product despatch would contribute 5.41% of total traffic in the Hartley area and a lower contribution to other areas along the Great Western Highway. It has previously been noted that at the maximum traffic levels the majority of trucks would be smaller capacity rigid trucks of (average) 15t capacity.

Table 4.5
Contribution of Austen Quarry traffic to Great Western Highway traffic in the vicinity of Jenolan Caves Road

Location	Existing Daily Volume (vehicles/day)	Austen Quarry Daily Truck Trips					
		Average Day Existing		Average Day at Peak Production		Maximum Day at Peak Production*	
		Truck Movements	% of Total Existing	Truck Movements	% of Total Existing	Truck Movements	% of Total Existing
Victoria Pass	14 000	128	0.9%	238	1.7%	476	3.4%
Little Hartley	10 400	128	1.2%	238	2.3%	476	4.6%
Hartley	8 800	128	1.5%	238	2.70%	476	5.4%
Forty Bends	7 900	8	0.1%	12	0.2%	24	0.3%

Source: Adapted from GTA (2013) * Peak production occurs less than 5 days per year.

Peak hour traffic volumes surveyed during March 2013 (GTA, 2013) indicate that east of Jenolan Caves Road, the Great Western Highway carries a peak of approximately 530 vehicles per hour during the morning peak hour, and approximately 620 vehicles per hour during the evening peak hour. During the same period Austen Quarry generated up to 30 (5.7% of total) and 14 (2.3% of total) heavy vehicle movements during the typical weekday morning and evening peak hours respectively.

4.6.2 Potential Transportation Impacts

An increase in the current annual production volume to the approved maximum of 1.1 million tpa would result in a corresponding increase in the number of truck loads despatched from the Site each day. Currently, an average of 83 truck loads and a maximum of 150 truck loads are despatched per day to deliver 750 000tpa. At the currently approved production volume of 1.1 million tpa, it is anticipated that product transport would increase to an average of 125 loads per day and maximum number to 250 loads per day. As discussed in Section 2.7.3, the maximum number of truck movements in any one hour would be 25 for smaller (15t capacity) rigid trucks and 20 for the larger truck and dog trailer combinations and B-Doubles.

Based on a preliminary risk assessment undertaken for the Proposal (see Section 4.1), the following specific traffic and transportation related impacts have been attributed higher risk rankings (without the implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require specific assessment include the following.

- Increased traffic levels on the existing road network resulting in:
  - inconvenience to commuters (moderate risk);
  - increased risk of accidents occurring (high risk);
  - accelerated road and pavement deterioration (high risk); and
  - possible loss of species due to a higher incidence of animals killed on the road (moderate risk).

4.6.3 Road Management Issues and Preliminary Assessment

Key management issues relating to traffic include potential impacts to road pavements and intersections, bridge structures, traffic congestion and road safety.

Previous concerns from local residents regarding the impact of quarry traffic on Glenroy Bridge prompted the Applicant to upgrade the approaches to the bridge on the northern and southern sides to reduce the noise impact from passing trucks. This significantly reduced the impact of quarry traffic and was done as an 'in faith' gesture to local residents.

During Stage 2, production would increase to the currently approved 1.1 million tpa with an estimated increase in average truck loads to a daily average of 125 and daily maximum of 250. Physical limitations for loading trucks restrict product transport to 20 loads per hour for larger capacity truck and dog trailer combinations and B-Doubles and 25 loads per hour for smaller rigid trucks.

Table 4.5 compares the average and maximum daily contribution of product trucks travelling to and from the Austen Quarry to existing traffic on the Great Western Highway. Based on these figures, the existing daily average traffic contribution to the Great Western Highway from product transport is 83 truck loads or 0.94% of existing daily traffic. At the anticipated average of 125 truck loads per day this contribution would increase to 1.42% and at the anticipated maximum of 250 truck loads per day increase to 2.84% of daily traffic volume. The maximum hourly contribution to existing traffic at the maximum despatch level would be 40 movements (ie 6.5% of total existing traffic and a 1.7% increase on the current maximum hourly contribution to traffic) and 50 movements (ie 8% of total existing traffic and a 3.2% increase on the current maximum hourly contribution to traffic) for the larger 30t and smaller 15t capacity trucks respectively. Based on the surveyed traffic levels on the Great Western Highway (GTA,

2013) the maximum possible contribution of quarry-related traffic to total traffic during the peak period for the Great Western Highway would be 8% using 15t capacity trucks. It should be noted that this maximum contribution relates to a situation in which the maximum quarry output coincides with the maximum peak in traffic on the Great Western Highway.

This preliminary assessment reflects the impact the Proposal would have on currently surveyed traffic levels of the Great Western Highway. The potential impact between Lithgow and Emu Plains, taking into account predicted growth in traffic during the life of the Proposal, will be assessed in detail in the Environmental Impact Statement.

GTA (2013) has applied a projected traffic increase of 2% per annum to their surveys and determined that the weekday total traffic movements on Jenolan Caves Road will increase from 1 420 movements in 2013 to 1 846 movements in 2033. Average levels of service are projected to remain at a good level based on this change to traffic levels over a 20 year period.

Projected increases to traffic levels will occur due to general growth in the road transport task demand with upgrades designed to account for these changes. The proposed increase to quarry-related average and maximum truck loads to approximately 125 and 250 respectively will have only a minor impact on the total number of vehicles using these roadways.

The impact of the increased volumes of traffic on the existing road network and users will be considered in greater detail as part of the Environmental Impact Statement for the Proposal. This assessment will be undertaken in accordance with the Guide to Traffic Generating Development, Road Design Guide (Roads & Traffic Authority), relevant Austroads standards and other relevant guidelines.

The Proposal would result in a minor increased levels of traffic on Jenolan Caves Road and the Great Western Highway, however, considering past upgrades to the roads, the minimal impact of existing operations and that the proposed increase will not significantly impact total capacity or level of service, the likely impacts upon the road pavements, traffic congestion and road safety would be acceptable.

4.7 ECOLOGY

4.7.1 Introduction

Niche Environment & Heritage Pty Ltd (Niche-EH) has been commissioned to complete an Ecological Assessment of the Proposal. The assessment of Niche-EH will build upon data of earlier surveys completed in the 1990s by Gingra Ecological Consultants and between 2004 and 2008 by Biosis Research Pty Ltd.

Assessment of aquatic ecological health have been undertaken annually by Cardno Ecology Lab since 2005.

The following provides a summary of the ecological setting, based on survey data completed to date, consideration of the potential impacts on the local setting attributable to the Proposal and an outline of the proposed method of assessment to be applied.

4.7.2 Existing Environment

Vegetation

Figure 4.6 provides the vegetation of the Site, as mapped following the establishment of BioBanking Plots and Rapid Data Points, in accordance with the revised biometric vegetation types (RBVTs) for the Hunter Nepean Catchment by Niche-EH

The vegetation communities mapped include seven communities representing three RBVTs:

- Brittle Gum - Broad-leaved Peppermint open forest (HN570);
- Silver-leaved Mountain Gum mallee woodland (HN570);
- Yellow Box - Forest Red Gum grassy open forest (HN527);
- Yellow Box - Forest Red Gum native grassland (HN527);
- Yellow Box - Forest Red Gum exotic grassland (HN527);
- River Oak riparian open forest (HN527); and
- Rough-barked Apple gully forest (HN574).

None of the vegetation types aligned to Threatened Ecological Communities (TECs) as listed on the TSC and/or EPBC Acts.

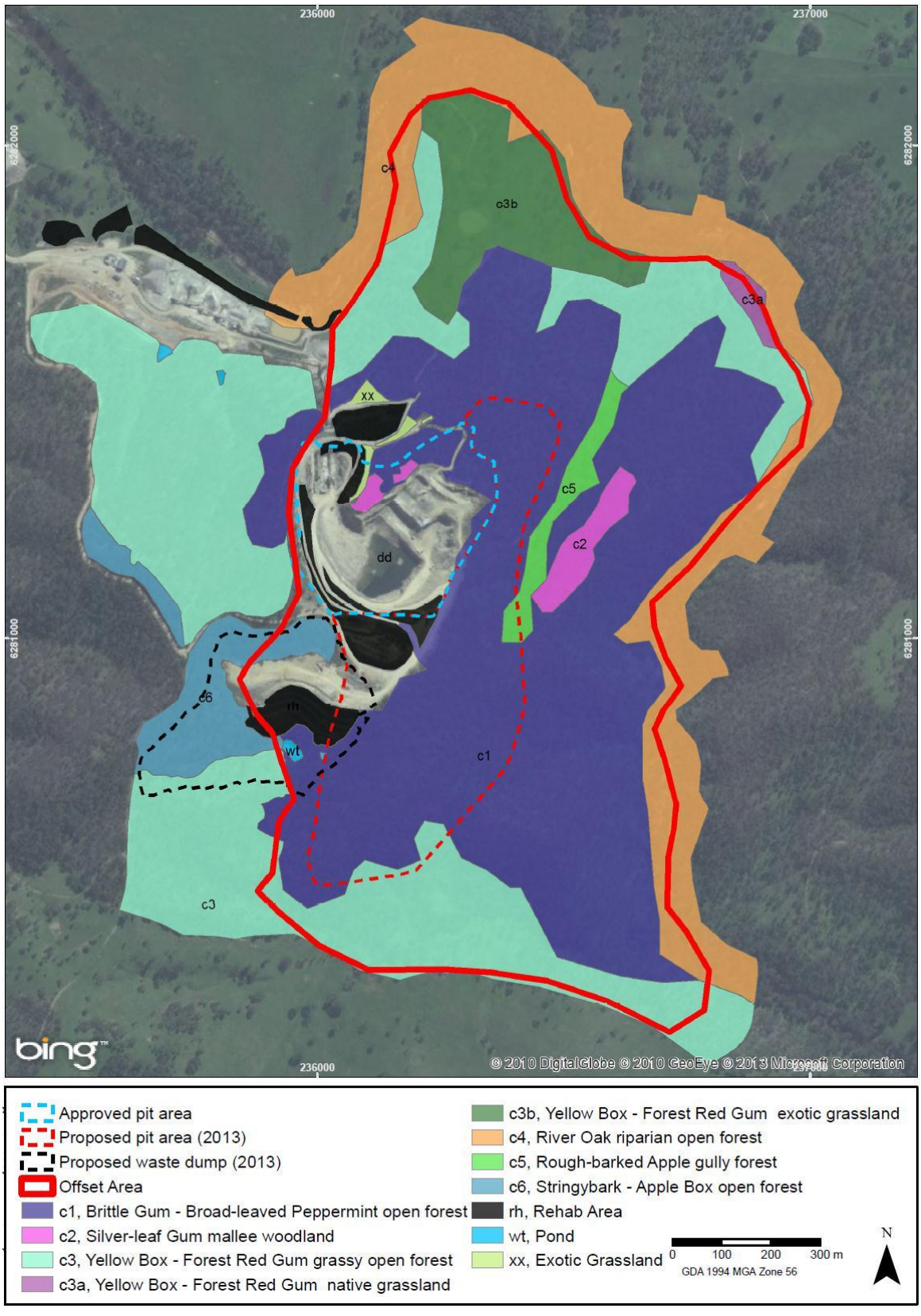
Threatened Flora

Threatened flora random meanders were conducted in conjunction with the survey of native vegetation. A single threatened plant species, *Eucalyptus pulverulenta* (silver-leaved mountain gum), would be affected by the potential expansion as a number of individuals of this species fall within the proposed quarry extension area. Notably, this species is relatively common in the local area (including an area adjacent to the Site offices where in excess of 3 000 successful plantings of this species have been grown from seed since the quarry commenced operations in 2005), with abundant numbers available for offsetting purposes.

Threatened Fauna

Threatened fauna surveys were undertaken on three occasions covering 8 days and 8 nights in February and March 2012. A total of 89 vertebrate species were recorded during field survey with the species assemblage observed including common and widespread species, as well as moderately rare species on a regional or state basis. Six threatened or migratory species were recorded and an additional 12 threatened fauna were considered as likely to be affected due to suitable habitat requirements. These species are listed below (* represents species recorded within or adjacent to the Site).

- Eastern Bentwing-bat*
- Gang-gang Cockatoo*
- Large-eared Pied-bat*
- Powerful Owl*
- Satin Flycatcher*
- Koala
- Greater Broad-nosed Bat
- Powerful Owl
- Varied Sittella
- Yellow-bellied Sheathtail-bat



Source: Niche Environment and Heritage Pty Ltd

Figure 4.6
VEGETATION COMMUNITIES OF THE SITE

- Scarlet Robin*
- Eastern False Pipistrelle
- Flame Robin
- White-throated Needletail
- Little Lorikeet
- Swift Parrot
- Southern Myotis
- Squirrel Glider

Aquatic Ecology

Annual survey of river conditions and macro-invertebrate assemblages of the Coxs River has been undertaken since 2005 using the AUSRIVAS methodology. The monitoring program is based on comparisons of macro-invertebrate assemblages in riffle and edge habitats at pairs of sites situated just downstream of the licensed discharge (Quarry Treatment) and approximately 1.5km and 4.5km upstream of the discharge point (Quarry Control and Upstream Control, respectively). In situ measurements of water quality and notes on habitat characteristics are also taken at each site, so that differences in macro-invertebrate assemblages can be related to differences in the aquatic environment.

While there has been some variation in river conditions and macro-invertebrate assemblages between treatment and control sites and between years, the results have consistently indicated that conditions at the treatment sites have not been consistently poorer or more variable than that at the control locations, which is what would have been expected if activities at the quarry had an impact on the aquatic ecosystem.

4.7.3 Potential Ecological Impacts

The Proposal would require additional disturbance to native vegetation, including known records of at least one threatened flora species, known habitat of at least six threatened fauna species and potential habitat for a further 12 threatened fauna species. Furthermore, given the proximity of the Site to the Coxs River, the potential for adverse impact on aquatic ecological communities or species is also possible.

Considering these proposed changes and potential impacts on the local setting, and based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific biodiversity impacts that may result as a consequence (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment would include the following.

- Removal of threatened flora and fauna species identified at the site through clearing activities resulting in:
  - local or regional reduction in distribution of threatened species, populations and endangered ecological communities (High); and/or
  - loss of biodiversity and alteration to existing habitat (High).
- Detrimental effects of indirect Proposal impacts, e.g. noise, dust, lighting resulting in:
  - reduced biodiversity value of the Site (Moderate); and/or
  - reduced local distribution of threatened species, populations and endangered ecological communities (Moderate).

4.7.4 Management of Ecological Issues

The Applicant would be committed to implementing a strategy with the objective to:

- avoid impacts where possible;
- minimise or mitigate unavoidable impacts; and
- offset residual impacts.

The final impact footprint of the Stage 2 Extension remains to be confirmed and impacts on threatened species would be avoided if practical to do so.

In order to minimise or mitigate impacts on native fauna, vegetation clearing protocols would follow those already implemented and in place to ensure that clearing is preferentially undertaken during periods when the likelihood of encountering nesting or roosting species is minimised and in such a way that should native species be present the potential for injury or mortality is minimised. The management of surface water and prevention of polluted or contaminated run-off should ensure that impacts on aquatic ecology are minimised.

Acknowledging that eliminating or mitigating all impacts is not always possible, the Applicant intends on further developing and implementing a biodiversity offset strategy. Assessment of impacts and potential offsets is to be undertaken in accordance with the *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) projects* (OEH, 2011) and will utilise tools, should as the BioBanking Assessment Methodology (BBAM) with the objective of achieving either a Tier 1 ("maintain or improve") or Tier 2 ("no net loss") outcome.

4.7.5 Preliminary Assessment

While one threatened flora species and six threatened fauna species have been recorded on or adjacent to the Site, the potential constraint posed by this is considered low given the occurrence of these species or suitable habitat surrounding the Site which could be incorporated into a biodiversity offset strategy.

Therefore, while an assessment of the residual impact of the Proposal on local biodiversity is to be completed by Niche-EH, including Assessments of Significance under both the TSC Act and the EPBC Act, it is anticipated that the Proposal could be managed with minimal and mitigated impacts on local biodiversity principally because:

- of the relatively limited area of impact (25.5ha);
- proposed impact mitigation measures; and
- development and implementation of a biodiversity offset in accordance with OEH (2011).

4.8 SOIL RESOURCES AND LAND CAPABILITY

4.8.1 Existing Environment

The Site is located within the Katoomba 1:100 000 scale soil landscapes map sheet area (King 1994). Limited areas to the south of the Quarry Access Road are located on the Round Mount Soil Landscape with the quarry site activities located predominantly on the Marrangaroo Soil Landscape. Soils of the Marrangaroo Soil Landscape generally display the following characteristics.

- Location: Generally occurring on rolling hills and narrow flat to rounded converse crests of Carboniferous granites, local relief to 90m and slopes <30º.
- Texture: Shallow (<80cm) loamy sand to sandy loam above clayey sand changing to coarse, gravely sand or sandy clay at depth.
- pH: Moderately to slightly acid in topsoil layers. Subsoil is slightly acid to slightly alkaline (6.5 to 8.0).
- Permeability: Highly permeable with low water holding capacity.
- Fertility: Low fertility.
- Erodibility: High erodibility. King (1994) attributes an Erodibility (K) factor of between 0.024 and 0.031.

Soils of the Marrangaroo Soil Landscape are considered to show slight dispersibility (EAT Classes 3(1), 3(2) and 5) and generally moderate dispersion (0% - 60%) (King, 1994).

Based on this description of the soil, careful management is required to reduce the erosion hazard.

No formal assessment of land capability has been undertaken, however, based on the steep terrain, shallow soils and remnant native vegetation a Soil and Land Capability Class of 6 or greater is anticipated.

4.8.2 Potential Soil Resources and Land Capability Impacts

Due to the relatively steep terrain and occurrence of outcropping rock, soil resources over the proposed extraction area and overburden emplacement extensions are likely to be shallow with some deeper horizons occurring within the lower slopes of some gullies. Considering the limited occurrence of soils, poor soil and land capability and the proposed changes to the local setting, and based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific soil and associated land use related impacts that may result as a consequence (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment include the following.

- Removal and loss or degradation of soil resource on site due to overburden stripping and surface water runoff resulting in:
  - reduced soil resource to undertake appropriate rehabilitation program and therefore rehabilitation outcomes not meeting objectives (High);
  - compromised soil quality leads to poor vegetation regrowth on site and therefore reduced productivity on final landform (High); and/or
  - sedimentation of on-site and local surface water bodies resulting in poor water quality (Moderate).

4.8.3 Soil Management

4.8.4 Preliminary Assessment

The proposed extraction area and overburden emplacement would involve the removal and transfer/storage of all topsoil and selected subsoil in operational areas. Progressive and final rehabilitation would also be undertaken using the previously stripped topsoil and subsoil.

Although the proposed disturbance area is not located over land currently used for agriculture, further studies are to be undertaken in accordance with the NSW Strategic Regional Land Use Policy to confirm the Proposal would have minimal, if not no, impact on local agriculture. An assessment of soils is also to be undertaken by an external consultant in conjunction with a Surface Water Assessment which will assess the residual impacts on soil resources and provide recommendations on soil stripping, stockpiling, erosion control and rehabilitation methods.

4.9 AIR QUALITY

4.9.1 Introduction

Benbow Environmental has been commissioned to undertake a comprehensive air quality impact assessment of the Proposal. The following provides a compilation of air quality monitoring data collected on the Site by the Applicant, consideration of the potential impacts on air quality that could be associated with the Proposal and an outline of the proposed method of assessment to be applied.

4.9.2 Existing Environment

Table 4.6 provides a summary of the annual average dust deposition data collected at the Site from locations licensed on the Applicant's Environment Protection Licence (EPL) (see **Figure 4.5**). Monitoring data obtained to date indicates compliance with the EPA's assessment criterion of 4g/m^2/month, which is expressed as an annual average.

Table 4.6
Monthly Dust Deposition Data

Month	Monitoring Location[1]		
	EPL Point 4 – Sawmill Paddock	EPL Point 5 – Baaners Lane	EPL Point 6 – Bald Hill
April 2012	0.5	1.4	1.9
May 2012	0.2	0.4	0.2
June 2012	0.8	ND	0.2
July 2012	1.5	1.8	0.1
August 2012	1.8	1.1	BD
September 2012	0.9	1.3	0.3
October 2012	0.5	1.2	0.7
November 2012	0.7	0.6	0.9
December 2012	ND	0.5	0.6
January 2013	0.4	0.7	0.9
February 2013	2.6	0.3	1.2
March 2013	0.6	0.3	0.3
April 2013	3.9	0.5	0.9
Average	1.2	0.8	0.7
Note 1: see **Figure 4.4** ND = not detected BD = bad data			
Source: Hy-Tec Industries Pty Limited (ALS data reports)			

4.9.3 Potential Air Quality Impacts

The proposed extension to the extraction area and continued production of up to the currently approved limit of 1.1 million tpa has the potential to increase levels of airborne dust principally as a result of:

- vegetation clearing and surface disturbance associated with the extension of the extraction area and waste rock emplacement;
- an increase in the total area of disturbance; and
- increased mobile and fixed plant operation as production reaches the approved upper limit.

There would also likely be a small increase in other particulate and gaseous emissions from the increased mobile and fixed plant activity, and associated product transport.

Based on the above, and a preliminary risk assessment undertaken for the Proposal (see Section 4.1), the following specific air quality-related impacts have been attributed higher risk rankings (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require specific assessment include the following.

- Dust generation resulting from vehicle movements on unsealed roads, hardstand surfaces, fixed plant, including crushing operations, blasting operations and wind action on disturbed areas, overburden emplacements and stockpiles resulting in:
  - nuisance/amenity impacts from dust deposited on window sills, cars, surfaces (Moderate);
  - adverse health impacts (if PM_{10} levels are excessive) (Moderate); and/or
  - reduction in local water quality (Moderate).
- Increased contribution to greenhouse effect (Moderate).

4.9.4 Air Quality Management

The Applicant currently implements several dust minimising measures a part of operations for the existing quarry, these include:

- limiting the disturbance areas exposed at any one time, both in terms of new areas disturbed and areas being rehabilitated;
- suppression of dust on internal roads, activity areas and stockpiles through the application of water or dust suppressants; and
- control of dust at its source through collection and/or suppression.

The Applicant is committed to maintaining the currents standards of operations which limit the emission of particulate matter from the Site.

4.9.5 Preliminary Assessment

Assessment of the existing dust deposition data for the Austen Quarry suggests that, through the implementation of these management measures, impacts associated with dust generation are managed effectively. Given this, and considering the relatively low wind speeds, high frequency of calm conditions detailed in Section 4.1.4 (see **Figure 4.2**) and generally large distance to surrounding residences (see **Figure 4.1**) indicate that dust produced during operations has a low likelihood of adversely impacting on surrounding landowners and residents.

The air quality assessment to be completed as part of the EIS will incorporate further details of the design and operational safeguards that the Applicant would implement so that compliance with the site specific criteria would be achieved.

Dust

The assessment will involve consideration of several representative operational scenarios. The scenarios selected would involve the proposed extraction, processing, waste management, rehabilitation and related activities with the nominated static equipment positioned at their nominated locations and elevations and the mobile equipment considered along their movement paths.

The dust levels attributable to each of the proposed activities on site, i.e. after the adoption of the design and operational safeguards, would be entered into a dispersion model and predictions made to each of the non-project-related residences surrounding the proposed activities. The meteorological inputs to the model would be drawn from the on-site meteorological station and any available relevant longer term data. The air quality modelling would predict future air quality surrounding the Site relating to both the amenity and health effects of dust and will be assessed against the relevant criteria.

The assessment of potential air quality impacts for inclusion in the EIS will also incorporate details of the proposed air quality monitoring program.

Greenhouse Gas Emissions

Emissions of carbon dioxide (CO_2) would be the most significant greenhouse gas (GHG) emitted as a result of the Proposal. Detailed inventories of greenhouse gas emissions will be presented in the EIS for the three 'scopes' of emissions (Scope 1, Scope 2 and Scope 3). Sources that will be considered for the Site include:

- fuel consumption (diesel and gas) during operations – Scope 1;
- blasting emissions – Scope 1;
- indirect emissions resulting from the consumption of purchased electricity – Scope 2;
- indirect emissions associated with the production and transport of fuels – Scope 3; and
- indirect emissions associated with transmission and distribution losses from electricity supply – Scope 3.

GHG emissions will be presented in the EIS in the context of Australian baseline and NSW total emissions and global climate change. A qualitative assessment of the potential impacts of these emissions on the environment will be presented in the EIS, including consideration of all reasonable and feasible measures to minimise emissions.

4.10 NOISE AND VIBRATION

4.10.1 Introduction

Benbow Environmental has been commissioned to undertake a comprehensive noise and vibration impact assessment of the Proposal. The following provides a compilation of recorded noise monitoring data, consideration of the potential impacts on the local setting attributable to noise and vibration generated by the Proposal and an outline of the proposed method of assessment to be applied.

4.10.2 Existing Noise Climate

Existing noise levels in the vicinity of the Site are influenced by a range of sources including:

- industrial noise from existing quarry operations;
- traffic on Jenolan Caves Road;
- rural noises such as tractors and stock;
- wind in the trees;
- water flowing along Coxs River; and
- insect and bird noise.

In order to assist in identifying the character and duration of the ambient noise sources, operator-attended day, evening and night time noise surveys were conducted on and surrounding the Site on the 13 and 14 June 2013. **Figure 4.4** identifies the noise monitoring locations which were subject to attended surveys. **Table 4.7** presents the results of the attended noise monitoring program.

Table 4.7
Attended Noise Monitoring Results

Page 1 of 2

Location	Date - Time	Primary Noise Descriptor (dB(A) re 20µPa)				Description of Noise Emissions (and Typical Maximum Levels – dB(A) (L_{Amax}))
		L_{A1}	L_{A10}	L_{Aeq}	L_{A90}	
Daytime						
R1 - Good Forest	14/6/13 – 7:05am	53.5	41.3	40.2	34.2	Industrial Noise: Inaudible ≤ 35 Birds: ≤ 52 Dog barking: ≤ 82 Vehicles: ≤ 41
R2 – Hartley	14/6/13 – 10:50am	71.9	57.7	58.0	37.4	Industrial Noise: Inaudible ≤ 35 Birds: ≤ 70 Residence: ≤ 56 Vehicles: ≤ 76
R3 – Little Hartley	14/6/13 – 10:50am	49.1	45.2	42.0	37.5	Industrial Noise: Inaudible ≤ 35 Birds: ≤ 41 Wind : ≤ 50 Vehicles: ≤ 41
R4 – Little Hartley	14/6/13 – 7:17am	52.1	41.2	40.9	33.2	Industrial Noise: Inaudible ≤ 35 Birds: ≤ 43 Wind : ≤ 40 Vehicles: ≤ 62

Table 4.7 (Cont'd)
Attended Noise Monitoring Results

Location	Date - Time	Primary Noise Descriptor (dB(A) re 20µPa)				Description of Noise Emissions (and Typical Maximum Levels – dB(A) (L_{Amax}))
		L_{A1}	L_{A10}	L_{Aeq}	L_{A90}	
Evening						
R1 - Good Forest	13/6/13 – 6:49am	40.9	36.9	35.0	31.8	Industrial Noise: Inaudible ≤ 35 Wind : ≤ 43 Vehicles: ≤ 42 Impact noise from residence: ≤ 48
R2 – Hartley	13/6/13 – 7:00pm	67.5	52.2	54.9	38.1	Industrial Noise: Inaudible ≤ 35 Birds: ≤ 70 Dog barking: ≤ 40 Vehicles: ≤ 79
R3 – Little Hartley	13/6/13 – 8:42pm	50.5	37.1	36.9	29.4	Industrial Noise: Inaudible ≤ 35 Insects: ≤ 51 Wind : ≤ 42 Vehicles: ≤ 40
R4 – Little Hartley	13/6/13 – 8:02pm	44.8	37.1	37.8	30.4	Industrial Noise: Inaudible ≤ 35 Frogs: ≤ 33 Wind : ≤ 42 Vehicles: ≤ 35
Night Time						
R1 - Good Forest	14/6/13 – 6:35am	53.7	47.5	44.4	37.0	Industrial Noise: Inaudible ≤ 35 Wind : ≤ 38 Horn: ≤ 54 Vehicles: ≤ 54
R2 – Hartley	14/6/13 – 5:53am	72.5	57.2	58.1	38.2	Industrial Noise: Inaudible ≤ 35 Coxs River: ≤ 40 Vehicles: ≤ 78
R3 – Little Hartley	14/6/13 – 5:52pm	45.2	39.2	36.6	32.7	Industrial Noise: Inaudible ≤ 35 Wind: ≤ 33 Residential: ≤ 45 Vehicles: ≤ 39
R4 – Little Hartley	14/6/13 – 6:43pm	52.9	43.6	43.0	34.7	Industrial Noise: Inaudible ≤ 35 Wildlife: ≤ 54 Vehicles: ≤ 41
Source: Benbow Environmental 2013 - unpublished						

The industrial noise, attributed to the quarry-related activities within the Site, was inaudible at all monitoring locations although the monitoring showed an exceedance of the 35dB(A) $L_{Aeq\ (15\ minute)}$, which was attributable to a range of other noise sources typical of a rural area, such as road traffic, wind and wildlife.

4.10.3 Potential Noise and Vibration Impacts

The Stage 2 Extension and continued production of up to the currently approved limit of 1 100 000tpa has the potential to increase noise levels surrounding the site as a result of:

- vegetation clearing and surface disturbance associated with the extension of the extraction area and waste rock emplacement;
- an increase in the total area of disturbance;
- increased mobile and fixed plant operation as production reaches the approved upper limit; and
- increased frequency of associated product transport.

Based on the above, and a preliminary risk assessment undertaken for the Proposal (see Section 4.1), the following specific noise and vibration-related impacts have been attributed higher risk rankings (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require specific assessment include the following.

- Noise from fixed and mobile plant equipment on site, trucks on site and trucks transporting quarry products off site resulting in:
  - local annoyance and/or distractions (Moderate);
  - adverse effects on physical and mental health (Moderate); and/or
  - loss, relocation or reduction in native fauna species (Low).
- Vibration from blasting and other extraction activities resulting in:
  - reduced local amenity (Moderate); and/or
  - structural damage to buildings or structures (Low).

4.10.4 Preliminary Assessment

The quiet nature of the area within and around the Site dictates that noise management will be an important issue for coverage in the EIS. The Applicant recognises that the development of the operation of mobile fleet closer to surface as a result of the proposed extraction area extension may cause noise levels within the local area to increase. While it is expected that the Proposal, similar to current operations, would be able to operate in compliance with appropriate noise criteria, a noise assessment is to be undertaken to assess the predicted noise levels that would be received at surrounding residences and recommend mitigation measures.

The noise assessment would involve the consideration of one or more representative operational scenarios. The scenarios selected would involve those extraction, processing and transportation activities based on the nominated mobile and static equipment positioned at typical locations and elevations. The noise levels of the various items of equipment and their locations/elevations will be entered into the approved noise model to enable the noise level received at residences surrounding the Site to be predicted for neutral (calm), prevailing and noise-enhancing conditions.

In addition to modelling the noise generated by construction and operational activities on the Site, the noise and vibration assessment will consider the following.

- The noise generated by road transport to and from the Site. Traffic noise has a significant contribution to ambient noise levels for the surrounding area and as such it will be important to assess any potential increase in traffic levels associated with the Proposal.
- Proposed blasting activities throughout the life of the Proposal. The assessment would focus on identifying the blast parameters necessary to achieve compliance with both ground vibration and airblast overpressure levels, although it is recognised that the blast limits set by the EPA would remain as these are amenity targets.

The noise modelling and assessment will assist the Applicant in identifying practical and effective noise mitigation measures to attenuate the noise generated by the mobile and static equipment, blasting operations and transportation so as to achieve compliance with the relevant criteria under both calm and adverse weather conditions.

4.11 INDIGENOUS HERITAGE

4.11.1 Introduction

Niche-EH has been commissioned to prepare an initial desktop review of potential impacts on Aboriginal heritage. This has included literature and database reviews, coordination of initial Aboriginal stakeholder consultation and preliminary survey of the Site. Consultation with the Aboriginal community is ongoing and further field surveys are planned to confirm the occurrence or potential for sites or artefacts within the proposed disturbance footprint. This section identifies listed Aboriginal heritage sites in the vicinity of the Site, reviews the potential impacts on Aboriginal heritage sites and artefacts and provides a preliminary assessment of likely impacts.

4.11.2 Stakeholder Consultation

Stakeholder consultation has and will continue to be conducted in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Applicants 2010* (ACHCRs) (DECCW 2010).

4.11.3 Existing Environment

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was conducted on 11 June 2013 covering an area of approximately 10km^2, including the Site. The search identified 49 previously recorded Aboriginal archaeological sites within the search area with the dominant site type being isolated finds (25 in total) and open camp sites (18 in total). No recorded sites occur within the proposed extension area, however, two open camp sites (artefact scatters) are located within 500m of the Site (see **Figure 4.7**).

On completion of stakeholder identification in accordance with the ACHCR's, Niche-EH has been commissioned to undertake additional field survey over the Site. The results of this survey and an assessment of the likely impacts of the Proposal on Aboriginal cultural heritage will be provided in the EIS.

4.11.4 Potential Indigenous Heritage Impacts

Based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific Aboriginal heritage-related impacts that may result as a consequence of the Proposal (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment include the following.

- Removal or destruction of known Aboriginal sites and/or artefacts within the Site (Moderate).
- Removal or destruction of currently unidentified Aboriginal sites and/or artefacts due to disturbance associated with the Proposal (High).

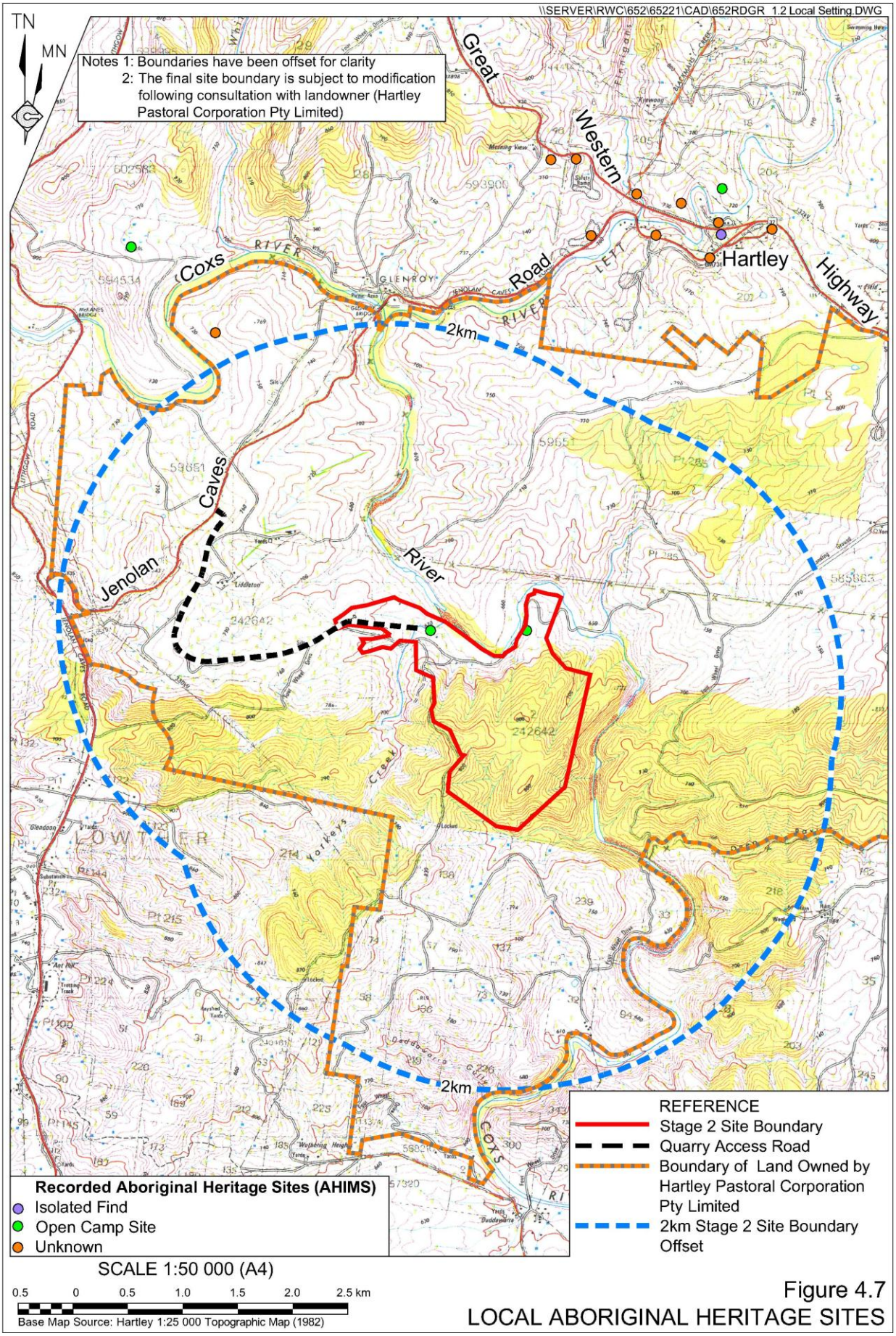


Figure 4.7
LOCAL ABORIGINAL HERITAGE SITES

Prior to any disturbance of an identified Aboriginal site or artefact, the Applicant would ensure that this is to occur in accordance with the recommendations provided by the Aboriginal community. The Applicant acknowledges that it is a prosecutable offence under the *National Parks & Wildlife Act 1974* (NPW Act) to disturb or destroy Aboriginal sites and would ensure that identified sites are appropriately protected and/or managed and all personnel are aware of their obligations under the NPW Act.

4.11.5 Preliminary Assessment

Several features of the landscape setting increase the likelihood of past human habitation and therefore the likelihood of evidence of Aboriginal sites or items to be present. The dominance of igneous (granite, micro-granite, diorite and rhyolite) and metamorphic (quartz hornfels) rock types and the identified rhyolite to a depth of 120m (800m AHD to 680m AHD) decrease the likelihood of rock shelters and/or rock platforms. In addition the proximity to Coxs River to the north and east of the site increase the likelihood of sites occurring as this watercourse may have accessed as a source of food and water.

Niche-EH concludes that based on previous archaeological assessments, the topography and geology of the landscape and a search of the AHIMS register, it is likely that Aboriginal heritage sites may occur within the overall Site, although with lower likelihood within the proposed area of disturbance. On this basis, if any artifacts are discovered, the Applicant would enter into negotiations for the salvage and management of the identified artefacts. There is no reason to suggest at this stage that appropriate site management cannot be negotiated with the traditional owners and local Aboriginal stakeholders to achieve this.

4.12 NON-INDIGENOUS HERITAGE

4.12.1 Introduction

Niche-EH have been commissioned to prepare an initial desktop review of potential impacts on Non-Indigenous heritage. This section identifies the relevant European history of the local setting and listed Non-Indigenous heritage sites, reviews the potential impacts on Non-Indigenous heritage sites and provides an outline of the proposed method of assessment to be applied.

4.12.2 European History

The Site is located within an historical estate known as ‘Liddleton’, granted to John Maxwell in May 1832. Despite extensive development of the estate and a history of agricultural industry on the estate, no known buildings were erected within the area to be disturbed. Liddleton became part of a wildlife refuge in July 1978 before being purchased by the Hartley Pastoral Company and later being developed as a quarry. Austen Quarry has been in operation since 2005, following the issue of development consent in 1995.

4.12.3 Listed Sites

A search of statutory heritage database and listings was completed on 3 June 2013. The following databases were included.

- NSW State Heritage Register
- NSW State Heritage Inventory

- Australian Heritage Database
- Local Environment Plan for the Lithgow City Council – Heritage Schedule

There are currently no listed Non-Indigenous heritage items within the Site.

4.12.4 Potential Non-Indigenous Heritage Impacts

Based on the risk assessment undertaken for the Proposal (see Section 4.1), the specific Non-Indigenous heritage-related impacts that may result as a consequence of the Proposal (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) and therefore require assessment include the following.

- Removal or destruction of sites of historic (European) heritage significance due to disturbance associated with the Proposal (Low).

4.12.5 Preliminary Assessment

Throughout the recorded history of the 'Liddleton' estate, the land had been continually developed for agricultural use and buildings of different sizes and purposes were established. The land was also sold in parts and in 1884, the homestead was destroyed by fire. This varied history and evidence of incidents indicate there may be potential for non-indigenous heritage items to be located within the Site such as ancillary farming outbuildings, early roads and fencing.

A heritage survey is proposed to establish the presence or absence of non-indigenous heritage sites and items within the Site. This survey will be completed in accordance with *The Burra Charter 1999* and the *NSW Heritage Manual 1996*, with results presented in the EIS.

4.13 SOCIO-ECONOMIC SETTING

4.13.1 Existing Environment

The Site is located with the Lithgow Local Government Area (LGA). Centred on the major regional town of Lithgow, the Lithgow City LGA also includes other small villages in the vicinity of the Site including (amongst others):

- Wallerawang;
- Marrangaroo;
- Hartley;
- Hampton;
- Portland; and
- Sodwalls.

Existing operations allow the direct employment of 16 people and indirect employment of a further 40 people on a daily basis. With the Applicant's local purchases, particularly in Lithgow, it is estimated that they spend in excess of $5 million per year in the local community through wages, purchases, local contractors and suppliers and local transporter operators.

A summary of key demographic statistics of the Lithgow LGA, obtained from 2011 Census data collected by the Australian Bureau of Statistics is presented as follows.

Population

As of the 2011 Census, the Lithgow LGA had a population of 20 160 with a relatively even proportion of males to females (51% male and 49% female). This represents a population growth of 2.0% from the 2006 Census data. The Census data (2006 and 2011) also identifies a trend towards an aging of the population with the percentage of the population over the age of 65 trending upwards.

Employment, Labour Force and Industry Employment Profile

Unemployment figures decreased between 2006 and 2011 from 8.5% to 7.2%. Overall, 92.8% of the labour force was employed (53.0% of the population aged over 15), and 7.2% unemployed (0.4% of the population aged over 15), compared with 94.1.0% and 5.9% respectively for NSW.

An analysis of the jobs held by the resident population in the LGA (in 2011) shows the three dominant industry sectors as:

- mining (12.4%);
- health care and social assistance (11.0%); and
- retail trade (10.0%).

Income

Analysis of household income levels in the Lithgow City LGA in 2011 compared to the NSW average shows a smaller proportion of persons earning high income (those earning $1,000 per week or more) and a corresponding higher proportion of persons earning a low income (those earning less than $400 per week). Overall, 20.4% of the population earned a high income, and 41.9% earned a low income, compared with 25.8% and 36.7% respectively for NSW.

Housing

The total number of households at the time of the 2011 census was 7 787. Of these households, 40.2% owned their dwelling; 31.2% were purchasing, and 24.3% were renting, compared with 33.2%, 33.4% and 30.1% respectively for NSW. This indicates a higher percentage of the local population that have or are purchasing their household compared to the whole f NSW average.

The total number of households in the Lithgow LGA increased from 7 728 in 2006 to 7 787 in 2011. While the number of households owned and rented did not change substantially, the number of households being purchased increased from 2 148 in 2006 to 2 429 in 2011. This may indicate a greater number of first home buyers entering the housing market in this region between 2006 and 2011.

Regional Amenity

The Austen Quarry is located on the western side of the Blue Mountains National Park (which covers an area of 268 987ha). In addition the quarry is also located on the route to the Jenolan Caves, an area of national heritage significance. Both areas are within the Greater Blue Mountains World Heritage Area. These areas are popular tourist destinations for both scenic and adventure activities, with the Jenolan Caves receiving over 230 000 visitors annually.

The Coxs River that adjoins the Site on the northern and eastern boundaries is a regionally significant fishing watercourse. While there are no areas in the vicinity of the Site dedicated to fishing, the river remains a significant fish habitat.

4.13.2 Potential Socio-economic Impacts

Based on the preliminary risk assessment undertaken for the Site (see Section 4.1), specific social and economic related impacts that may result as a consequence of the Proposal not being granted (without the continued implementation of the safeguards, controls and mitigation measures presented in this section) include the following.

- Increase in local employment for quarry operations (Moderate).
- Perceived minor loss of local amenity at local and neighbouring properties and tourist or accommodation locations causing:
  - changes to local social activities (Moderate);
  - potential impacts to ongoing existing business viability (High); and/or
  - impacts to community feelings of well-being derived from perceived inability to influence changes to their residence or local surroundings (Moderate).

4.13.3 Approach to Socio-economic Assessment

The approach to the socio-economic assessment will involve an analysis of the available socio-economic data and the results and issues raised through community consultation to capture potential issues and opportunities within the community. The assessment will include the following.

- A review of all available socio-economic related studies/data for the local and regional communities surrounding the Site.
- Use of Australian Bureau of Statistics and Council data to profile the local and regional communities including information relating to education, housing, industry and employment, community services and facilities.
- Identification of all land uses and community infrastructure/services surrounding the Site and identification of the potential social contribution/impact on those land uses and community infrastructure/services.
- Consultation with various stakeholders to scope socio-economic issues.
- An assessment of the potential impact on the local and regional communities including the following.
  - Social impact with respect to potential noise, air quality, visibility and transport impacts.
  - Impacts upon services and social infrastructure.
  - Social impact associated with the proposed preferred final land use(s).
  - Economic impacts on the local community (e.g. employment market, tourism and land values) and broader area of influence (i.e. contribution to the regional and NSW economies).

- Community perceptions.
- Cumulative impacts and mitigation strategies.
- Ongoing consultation mechanisms for the life of the quarry.

- Consideration of community contributions appropriate for the types and scale of development proposed.

4.13.4 Preliminary Assessment of Socio-economic Impacts

Contribution to the wider Regional and State Economy

The Applicant's contribution to the regional economy through employment, local purchases, local contractors and suppliers and local transporter operators is estimated at a minimum of $5 million. In addition the company provides a strategically important resource, in the extracted rhyolite, to the construction industry in the greater Sydney metropolitan area. Uses include the manufacture of concrete, construction of roads and preparation and management of construction sites. Demand for these products is unlikely to decrease in the foreseeable future.

Employment Impacts and Population Growth

As stated earlier the quarry currently employs 16 staff and, should approval be received for the Proposal, would expect to hire at least two additional staff members. The proposed requirement for additional personnel is not likely to greatly impact skills availability in the Lithgow LGA, given this is an established mining region and in fact may provide opportunities to those currently or recently employed in the mining sector which has contracted in recent times. As a consequence, it is expected that additional staff would come from existing residents and therefore not result in population growth beyond the existing capacity of regional housing, education, health or other public infrastructure.

Environmental Impacts

There is a social dimension to environmental impacts and community and stakeholder consultation will explore the priorities of the community and provide information on environmental issues of likely concerns such as:

- vegetation clearing (loss of local habitat and rehabilitation plans);
- processing and dust emissions (and perceived health impacts);
- water management and impacts;
- visual (amenity) impact during operational phase;
- traffic impacts;
- noise and blasting impacts; and
- final landform.

4.14 CUMULATIVE IMPACTS

There are no other extractive industry developments of significant size in close proximity to the Austen Quarry. Kables Quarry, located at Clarence on the Bells Line of Road is considered the closest quarry of equivalent size, however, located over 14km to the north it is sufficiently distant that an accumulation of impacts such as air and noise emissions would not occur.

While the Lithgow City LGA does contain a number of coal mining operations, these are located to the north and northeast of Lithgow. Clarence Colliery is approximately 15km to the north-northeast and there a number of operations to the north-northwest in and around Lidsdale, Wallerawang and Blackmans Flat at least 20km from the Site. Given the distance separating these operations from the Site there are unlikely to be accumulated impacts.

The main potential for cumulative impacts is attributable to the increase in heavy vehicle traffic on the Great Western Highway. The Great Western Highway is the main route between Sydney and the central west of NSW and already carries significant volume of light and heavy vehicle traffic. It is noted, however, that the Applicant currently has approval to transport 1 100 000t of products from the Austen Quarry to customers via this state highway and therefore is not proposing to increase the volume of traffic for which it already has approval. This notwithstanding, and noting that an extension of the life of the quarry for a further 30 years beyond the current consent expiry in 2020 is proposed, the potential cumulative impacts of traffic generated by the Proposal and any other industrial sources will be considered further in the EIS to be prepared.

5. CONCLUSION

Based upon the known impacts of the operating Austen Quarry, monitoring undertaken since the commencement of operations in 2005 and the additional investigation associated with the planning phase of the Proposal, it is assessed that the Stage 2 Extension of the Austen Quarry is practical and feasible and can be designed and operated in a manner which continues to reflect the environmental and other constraints. At the same time, the Proposal would optimise the recovery and production of a regionally significant resource with benefits to be felt by the State, region and local area. As such, it is concluded that the information currently available and presented in this document is sufficient for the Department of Planning and Infrastructure and both State and local government agencies to issue their requirements for an EIS for the Proposal. Likewise, it is also concluded that it would be possible for an appropriately designed Proposal to be assembled for determination.

6. REFERENCES

Australian Bureau of Statistics (2006). 2006 Census QuickStats: Lithgow (NSW) (Local Government Area).

Australian Bureau of Statistics (2011). 2011 Census QuickStats: Lithgow (NSW) (Local Government Area).

Australian Standard HB 203 (2006) *Environmental risk management — Principles and process*.

Australian Standard AS/NZS 4360 (2004). *Risk management.*

Austroads (2009). *Guide to Traffic Management Part 3: Traffic Studies and Analysis.*

Benbow Environmental. (2013 unpublished). *Noise Compliance Assessment Report: Prepared for Hy-Tec Industries Pty Limited, Hartley Quarry (Draft).*

Bureau of Meteorology (BOM) (2013). *Climate statistics for Australian locations: Mount Boyce MWS.*

Department of Environment, Climate Change and Water (DECCW). (2010). *Aboriginal Cultural Heritage Consultation Requirements for Applicants 2010*.

GTA Consultants (GTA) (2013, unpublished). *Austen Quarry – Baseline Traffic Conditions (Draft).*

International Standard IEC/ISO 310101 (2009). *Risk management — Risk assessment techniques.*

King D.P., (1994). *Soil Landscapes of the Katoomba 1:100,000 Sheet map and report*. NSW Department of Land and Water Conservation, Sydney.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction (The Blue Book). 4th Edition*. New South Wales Government, Sydney.

Niche Environment and Heritage. (2013a unpublished). *Austen Quarry Extension: Revised Summary of Biodiversity Constraints Assessment.*

Niche Environment and Heritage. (2013b unpublished). *Hartley Quarry Preliminary Assessment – Aboriginal Heritage Desktop Assessment.*

Office of Environment and Heritage (OEH) (2011). *NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A, State significant development (SSD) and State significant infrastructure (SSI) project.*

Parsons Brinkerhoff (2005). *Modelled Flood Heights for 1 in 150 Year Storm event within Yorkeys Creek Catchment.* Unpublished Report.

Sinclair Knight Merz (SKM) (1994). *Hartley Rhyolite Quarry: Environmental Impact Statement.*

Transportation Research Board (2000). *Highway Capacity Manual.* As cited in Austroads (2009). *Guide to Traffic Management Part 3: Traffic Studies and Analysis.*