

Preamble

The preparation of this Environmental Impact Statement (EIS) first commenced in 2009 when the then Operator, Glenella Quarry Pty Ltd was proposing to increase the production level from 200 000tpa to 380 000tpa. At that time, the Proposal was considered as a “Major Development” under the then *State Environmental Planning Policy – Major Development 2007*.

An *Environmental Assessment* (EA) was prepared and submitted to the then Department of Planning Infrastructure, however, the Applicant requested the development application be set aside due to an issue relating to signatories for the development application.

The matters relating to the signatories for the development application were resolved in late 2015 and, as a consequence, the former Operator (Glenella Quarry Pty Ltd) has now sought to re-lodge the application, i.e. in conjunction with a joint venture partner and under the name Bogo Operations Pty Limited.

Since the repeal of Part 3A of the *Environmental Planning and Assessment Act 1979*, and the introduction of the *SEPP State and Regional Development 2011*, the proposal for the increased production at Bogo Quarry and its ongoing operation is now considered as “local development”. As such, the development application is required to be accompanied by an *Environmental Impact Statement* (EIS).

This EIS has been compiled largely based upon the 2010 EA with a range of minor updates reflecting changes in government requirements since 2010 and the results of consultation. Given the Bogo Quarry has operated without complaint for almost 20 years and its optimal location with respect to surrounding residences and the Hume Highway, the level of investigation and assessment is commensurate with the low risks the Quarry poses to the surrounding environment.

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Executive Summary

INTRODUCTION

This *Environmental Impact Statement* (EIS) has been prepared to accompany a development application by Bogo Operations Pty Ltd (the Applicant) to:

- i) extend the operational life of the Bogo Quarry;
- ii) increase annual production to a maximum of 500 000 tonnes per year; and
- iii) operate a mobile asphalt plant and/or concrete batching plant on site on a campaign basis, as required.

These activities are collectively referred to throughout this document as “the Proposal”.

The Bogo Quarry is located approximately 5km east of the village of Bookham and 20km west of Yass (**Figure A**). The land on which the Quarry is located is owned by Bogo Quarry Pty Ltd. All components of the Quarry are located within an area of approximately 50ha referred to as the “Quarry Site”.

This EIS provides the following.

- A comprehensive description of the component activities of the Proposal.
- Identification and prioritisation of the environmental issues associated with the Proposal.
- A description of the environment within and surrounding the Bogo Quarry.
- The environmental safeguards the Applicant would incorporate into the design and operation of the Quarry.
- An assessment of the residual impacts (if any) that the safeguarded activities would have on the local environment.

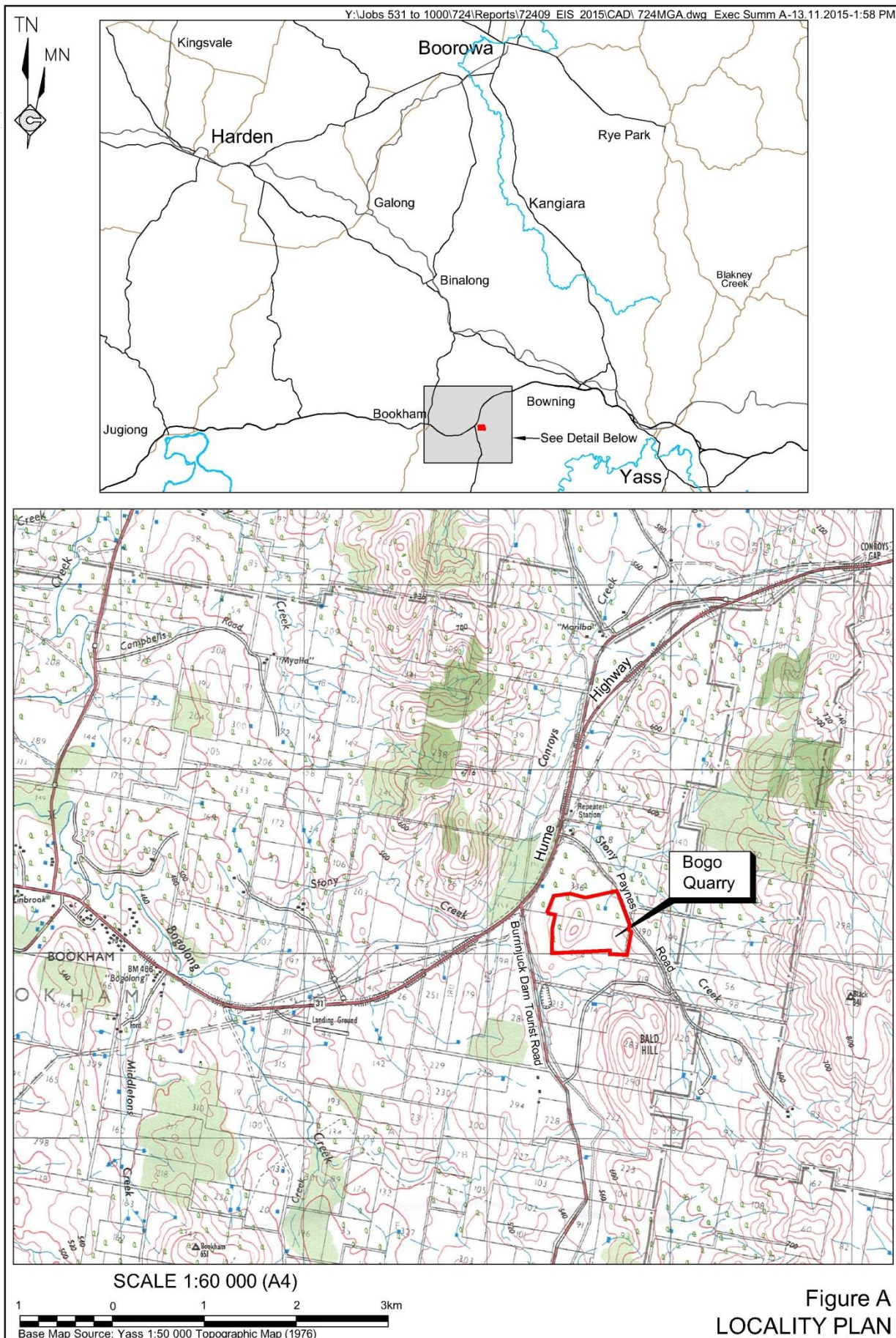
This EIS also briefly evaluates the proposal in terms of Ecologically Sustainable Development and planning controls, justifies the proposal in terms of biophysical, economic and social considerations and examines the consequences of not proceeding with the Proposal.

THE PROJECT

Under the existing Development Consent (DA 96/067B), the maximum approved production at Bogo Quarry is limited to 200 000 tonnes per annum (tpa). Due to expanding market opportunities, the Applicant is seeking to increase the maximum approved production to 500 000tpa (average 250 000tpa to 350 000tpa), and introduce campaign asphalt manufacture and concrete batching activities.

Increased production levels would be achieved by incorporating the following modifications and improvements to quarry operations.

- Development and implementation of more efficient quarry plans which involve extraction from two to three active benches, reducing reliance on stockpiles of different quality raw feed and double handling.
- The more efficient use and progressive refurbishment of the existing crushing and screening plant and equipment.
- Increased transportation of quarry products through the engagement of additional sub-contracted product truck drivers.
- Adjustment to hours of operation to better service the Applicant’s customers.



It is noted that the modified Bogo Quarry operations would effectively retain a similar limit of extraction as is currently approved under DA 96/067B. There would be some minor alteration to the alignment of the outer limit of the extraction area to better approximate the natural topography of the hill.

The Applicant also proposes to import, place and operate a mobile asphalt plant and/or concrete batching plant on a campaign basis in conjunction with local/regional infrastructure/construction projects. When not required, the plant would be either stored on the Quarry Site or transported off site for use elsewhere.

Figure B displays the proposed layout of the Quarry Site.

The principal components within the Quarry Site for the ongoing operation of the Bogo Quarry comprise the following.

- Quarry entrance¹.
- Internal road network.
- Extraction area.
- Processing plant¹.
- Pre-coat plant¹.
- Stockpiling areas¹.
- Office / weighbridge¹.
- Workshop & fuel store¹.
- Southern bund.
- Various water supply and sediment dams.
- Mobile asphalt plant pad¹.
- Mobile concrete batching plant pad.

Quarry Resources and Products

The resources within the Bogo Quarry comprise rhyolitic and dacitic ignimbrites and lavas which are typically very hard and durable, due to their high silica content and interlocking crystals of various sizes.

¹ Existing feature of the Bogo Quarry that would remain largely unchanged as a result of the Proposal.

Within the extraction area of the Bogo Quarry identified on **Figure B** (which has been very minimally modified to better reflect the occurrence of the ignimbrite rock), an estimated 4.98 million tonnes of massive hard ignimbrite is available for extraction and the production of premium products.

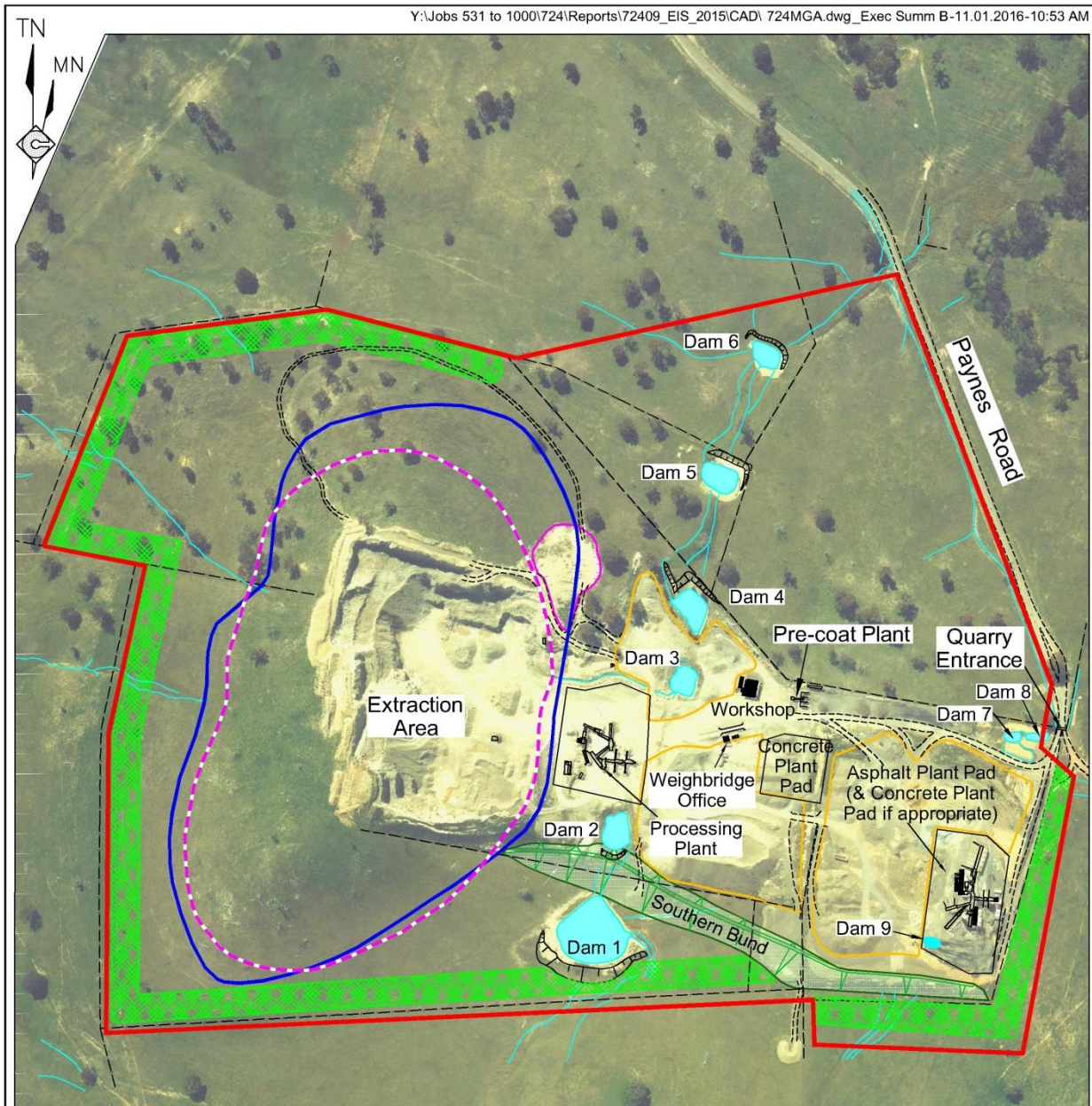
The Applicant proposes to maintain the existing range of products produced at Bogo Quarry, however, the proportion of products produced would vary in response to market demands. The products are recognised to be high quality construction aggregates for use in concrete, drainage, road construction and road sealing (pre-coat and asphalt) applications.

Extraction Operations

The extraction area is currently operated with two faces at three levels (i.e. the extraction floor and two benches at approximately 560m AHD and 575m AHD). Ultimately, a third bench / extraction floor would be created at 545m AHD.

Extraction operations would involve the continuation of the existing conventional extraction methods employed at the Quarry. This involves the progressive removal of a thin veneer of topsoil/subsoil and variable thicknesses of overburden prior to the extraction of the underlying hard rock resource.

Topsoil would be stockpiled within the current disturbance footprint of the Quarry Site and would eventually be respread over the final landform as part of rehabilitation activities. Subsoil and overburden would continue to be pushed down the western slope of the extraction area to form bunding between the edge of the advancing extraction face and the Hume Highway. This would create a visual screen of the advancing extraction area to motorists on the Hume Highway (particularly those travelling in an eastbound direction).

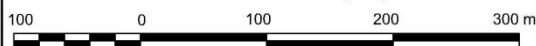


Note 1: Mobile Asphalt Plant is pictured here as the source photo was taken during the 2008 Asphalt Manufacture Campaign.

REFERENCE

- Quarry Site Boundary
- - - - - Limit of Approved Extraction
- Proposed Limit of Extraction
- . - . - Temporary Overburden Stockpile
- Product Stockpile Area Boundary
- Dam / Water Storage (& No.)
- Watercourse / Drainage Line
- - - - - Unsealed Road / Track
- Fence
- X X X X X Perimeter Tree Screen (30m Wide)

SCALE 1:6 000 (A4)



Base Map Source: Geo-Spectrum (Australia) Pty Ltd - Date of Mapping: 11 September 2008

Figure B
QUARRY SITE LAYOUT

The extraction of the hard rock resource would continue to be undertaken using drill and blast methods. Blasts would occur in the order of 12 times per year with each blast yielding between approximately 20 000t and 60 000t, depending upon the location within the extraction area. Blasted rock on the extraction floor would be pushed up into stockpiles before being transported to the processing plant(s). Blasted rock on the upper working benches would generally be pushed over the extraction face onto the floor for stockpiling and transfer to the processing plant(s) as already described.

Processing Operations

The hard rock raw feed would continue to be loaded into the hopper of the Bogo Quarry processing plant by front-end loader, with the rock passing through the primary and secondary crushers. The crushed material would continue to be sorted over a series of screens which separates the crushed rock into the following product sizes.

- >26mm.
- 20mm and 14mm.
- 10mm and 7mm.
- 5mm and quarry fines (<5mm).

A stand-alone aggregate pre-coating plant is located adjacent to the quarry workshop (**Figure B**) to facilitate the manufacture of pre-coated sealing aggregates for road sealing programs.

The sized, blended and pre-coated products would continue to be stockpiled within the Central, Northern and Eastern Stockpile Areas prior to despatch to customers. The proposed stockpiling areas would have sufficient capacity to accommodate the proposed increase in production, especially considering that a proportion of the increase in hard rock production would be utilised in the production of asphalt or by pre-mixed concrete which would not be stockpiled within the Quarry Site.

Southern Bund Construction and VENM Management

In order to minimise the visibility of extraction and processing operations from vantage points to the south of the Quarry, it is proposed that an earthen bund wall be progressively constructed along the southern boundary of the Quarry Site, subject to the availability of materials for its construction. The bund wall would be constructed using overburden material from the advancing extraction area, supplemented by virgin excavated natural material (VENM) generated by earthworks projects within the local area or region. VENM would be trucked to site, generally as a backload within product delivering trucks, tipped and profiled using the site bulldozer. Acceptance of the VENM to the site would be subject to a range of management procedures.

Proposed Mobile Asphalt and Concrete Plants

The Applicant proposes to import, place and operate a mobile asphalt plant and/or concrete batching plant on a campaign basis in conjunction with local / regional infrastructure / construction projects.

The placement and operation of the asphalt plant and the concrete batching plant within Bogo Quarry aims to:

- supply asphalt and pre-mixed concrete to the Southern NSW/ACT region; and
- value add to existing quarry products which are currently being sold.

Mobile Asphalt Plant

The asphalt plant would be a mobile plant designed in a manner consistent with industry practice to achieve efficient installation and operation. The asphalt plant would be operated solely to meet the contractual requirements for RMS, local councils or other private operators as part of re-sealing projects on the Hume Highway, local roads and potentially roads within the

ACT. Depending on the asphalt plant brought onto site, it would have the capacity to produce up to approximately 1 000t of asphalt per day, although the actual rate would vary depending upon the requirements of the client during a campaign and the capability of each plant.

Concrete Batching Plant

The manufacture of concrete would involve the retrieval and weighing of the various raw materials (coarse aggregates, sand, cement and/or fly ash and chemical additives) and placement in the agitator bowl of a transit mixer for mixing. Once mixing is completed, the concrete would be observed and checked from a slump stand prior to despatch from the Quarry. The concrete batching plant would typically manufacture approximately 40m³ per hour or up to 500m³ of concrete per day. There would be numerous days when the Applicant would not be producing and/or despatching any pre-mixed concrete.

As the concrete and asphalt plants would be mobile and operated on a campaign basis, the plants would either be stored on site when not in use or dismantled and taken off site, as and when required.

Product Transportation

All Quarry products would be transported from the Quarry by road-registered trucks following Paynes Road for approximately 1.4km to where it intersects with the Hume Highway. Product trucks would then travel either east or west on the highway depending on product destination. The Applicant would continue to maintain Paynes Road to the satisfaction of Yass Valley Council.

Based on an average truck load of 32t:

- average daily traffic would increase to approximately 112 movements each day (104 truck movements, 8 light vehicle movements);

- on a busy day, approximately 208 traffic movements would be generated each day when only quarry products are being transported (200 truck movements, 8 vehicle movements); and
- approximately 156 movements would occur each day during asphalt plant or concrete plant operation (140 truck movements, 16 light vehicle movements).

It is noted that one load generates two truck movements, one towards the Quarry and one away from the Quarry.

Hours of Operation and Quarry Life

It is noted that the proposed core hours of operation are comparable to the existing approved hours of operations, namely:

- 5:00am to 10:00pm Monday to Saturday; and
- 8:00am to 10:00pm Sunday (public holidays excluded).

It is, however, proposed that product transportation could occur 24 hours per day, 7 days per week.

Rehabilitation

Figure C displays the proposed final landform and revegetation of the Quarry Site which would be very similar to that currently approved. In summary, the final site rehabilitation would involve three main elements, namely rehabilitation of:

1. the extraction faces and benches by restoration blasting and backfilling with overburden and VENM;
2. the floor of the extraction area by the placement of overburden and VENM and profiling to recreate natural drainage; and
3. stockpile areas and plant footprints outside the extraction area by ripping and profiling of the hardstand areas.

ENVIRONMENTAL SETTING

Topography

The Quarry Site is situated on the eastern side of a small hill located 900m directly south of the junction of Paynes Road and the Hume Highway, approximately 5km east of Bookham and 20km west of the town of Yass in the Southern Tablelands region of New South Wales. The hill, which rises to approximately 600m AHD, forms part of a series of near parallel ridgelines oriented generally in a north-south direction.

Approximately 1.4km to the south, the locally significant Bald Hill rises to approximately 700m. Other significant local features include Black Ridge, which is a north-south aligned ridge between the Yass River and the Hume Highway at Conroys Gap rising to 800m AHD approximately 2.5km east of the Quarry Site, and Sugarbag Hill, a sprawling hill located 4km south-southeast of the Quarry Site rising to approximately 720m AHD.

Drainage

The Quarry Site is located within the Stony Creek Catchment, which flows into Bogolong Creek then Jugiong Creek to the northwest and eventually to the Murrumbidgee River.

Meteorology

Local weather conditions are characterised by warm to hot summers and mild to cool winters with rainfall generally evenly spread throughout the year. Winds speeds average 10km/hr to 20km/hr throughout the year and are generally stronger in the afternoon. Calm conditions occur approximately 46% of the time at 9:00am, reducing to 20% by 3:00pm.

Land Use

The land adjacent to the Quarry Site is currently used for agriculture, predominantly cattle and sheep grazing. However, the most dominant land use near the Bogo Quarry is the Hume Highway, the major interstate route between Sydney and Melbourne. Additionally, it is noted that the proposed Conroy's Gap Wind Farm lies approximately 2.2km to the east of Bogo Quarry. **Figure D** presents a land ownership plan of the Quarry Site and surrounding area.

ISSUE IDENTIFICATION AND PRIORITISATION

Following the identification of all environmental issues, an analysis of unmitigated risk for each potential environmental impact was completed. Through a review of the allocated risk ratings, the relative priority of each issue was determined, with this priority used to provide an order of assessment and depth of coverage within the EIS.

ENVIRONMENTAL SAFEGUARDS AND IMPACTS

Soil and Water Resources

The use of appropriate soil stripping, handling and stockpiling procedures, together with appropriate surface water controls would result in a minimal impact to soils and land capability within the Quarry Site.

The proposed extraction operations would not intercept local groundwater and as such would not have any impact on the local groundwater table.

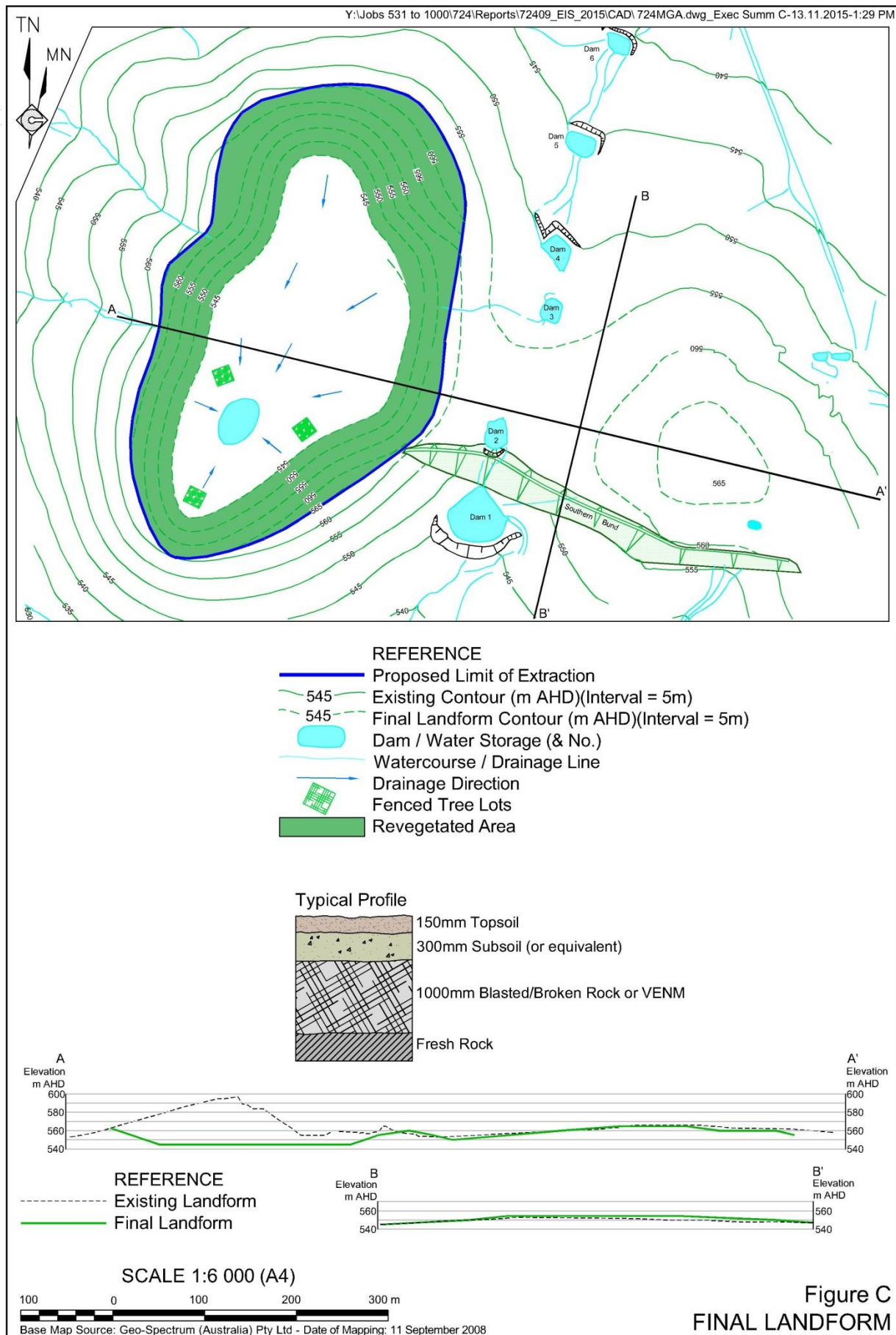
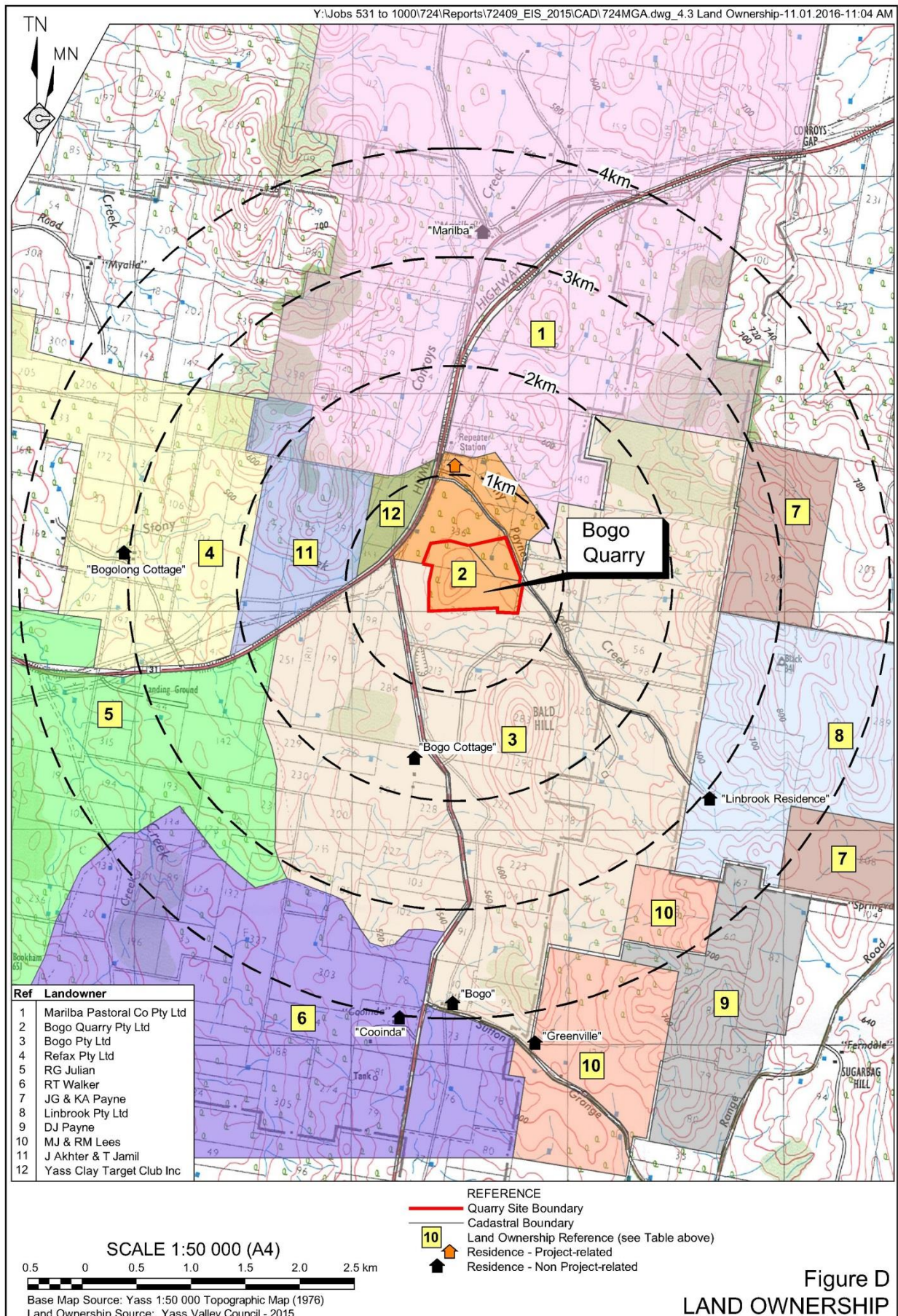


Figure C
FINAL LANDFORM



Surface water flows on and surrounding the Quarry Site would be managed to meet two primary objectives.

1. Clean water flows would be diverted away from disturbed areas, through the targeted placement of catch banks, sediment basins and level spreaders.
2. Surface water flows within disturbed areas of the Quarry would be collected and retained on the Quarry Site for use in dust suppression activities.

It has been assessed that with the implementation of the proposed control measures, there would be no significant impacts upon surface water quality or the quantity of water within or downstream of the Quarry Site.

Flora and Fauna

The vegetation and fauna habitat at the Quarry Site has been highly modified by past and ongoing disturbances, including vegetation clearing, grazing and pasture improvement. The majority of the Quarry Site now consists of cleared, exotic pasture with scattered trees.

A review of threatened species, populations and communities (listed under NSW and Commonwealth legislation) that may occur on or surrounding the Quarry site was undertaken by qualified ecologists. A field survey of the Quarry Site was completed, targeting these threatened species, populations or communities. No threatened species or populations were identified during the field survey, and it is predicted that there will be no adverse impacts from the Proposal to threatened species that have the potential to occur within the Quarry Site.

A Box Gum Woodland Endangered Ecological Community (EEC) was identified within the Quarry Site, in small remnant patches, in poor condition, with a high presence of exotic species. One 0.05ha patch of Box Gum Woodland (consisting of

four mature trees) would be removed as a result of the Proposal. In addition, a small number of scattered remnant paddock trees would be removed. The Applicant would ensure the presence of an ecologist or experienced wildlife carer to be present during tree felling to rescue any displaced fauna. Additionally, the Applicant would continue to undertake a native tree planting program to offset the loss of the small number of trees that would occur as a result of the Proposal.

The Proposal is considered unlikely to result in a significant impact to any threatened species, populations or communities.

Heritage

A field archaeological survey of the Quarry Site identified three Aboriginal sites, one of which had previously been identified and registered. Each of these sites was outside the proposed footprint of disturbance and therefore assuming the implementation of the proposed safeguards and controls, the Proposal would have no adverse impact on Aboriginal heritage values. This assessment has been discussed with local Aboriginal stakeholders.

No European items or relics of heritage significance occur within the proposed area of disturbance.

Noise and Blasting

In order to determine the acoustical impact of the increased production and additional activities at the Bogo Quarry, two dimensional computer models were developed to incorporate the significant noise sources and the intervening terrain to the surrounding residences within 4km of the Quarry.

Various scenarios incorporating the operation of all or some of the component activities within the Quarry Site were considered under neutral and noise enhancing conditions and during the day, evening and night-time periods.

The results of the modelling indicate that there is potential for a minor 1dB(A) exceedance of the criteria of 35dB(A) at the closest residence ("Bogo Cottage"), under a combination of operational and meteorological conditions which have a low likelihood of occurring. Noise is predicted to comply with criteria at all other residences.

The level of blast emissions has been predicted using the formula given in the Australian Standard (AS) 2187.2-1993 for blasting to a free face in hard or highly structured rock. Assuming a Maximum Instantaneous Charge (MIC) of 136kg, the formulae predicts the Proposal will comply with the ANZECC general human comfort criteria for ground vibration (5mm/s) and air overpressure (115dB Linear).

Air Quality

A screening dispersion modelling assessment was conducted to predict potential air quality impacts associated with emissions of dust and particulate matter from the Proposal at five sensitive residential locations surrounding the Quarry.

The predicted dust deposition, 24-hour PM₁₀ and annual average PM₁₀ levels from the Proposal would all comply with the Environment Protection Authority (EPA) nominated criteria (even when considered cumulatively with established background levels).

Increased greenhouse gas emissions attributable to combustion of diesel both on site and for product deliveries, and on-site electricity consumption, would be negligible (<0.001%) when compared to 1990 Australian greenhouse gas emissions.

Transportation

The Quarry products would continue to be transported via the Hume Highway and used in both asphalt and concrete produced on site. The proposed increase in traffic

from the Quarry Site would be negligible when compared to the overall volume of traffic on the Hume Highway.

An assessment of the existing intersection treatment was conducted by a qualified transport planner, concluding that the additional movements would not appreciably alter the existing operating conditions at the intersection in terms of increased delay for the left and right turning movements out of Paynes Road that could result in risky behaviour and a decrease in road safety.

Visual

Activities within the Quarry Site would be visible to varying degrees to the south of the Quarry Site, as well as from the Hume Highway and Burrinjuck Tourist Road. Given the proposed operational controls to be implemented and effective implementation of dust management measures, it is considered that the Proposal would not significantly increase the visual impact of the currently approved operations.

Land Use

Future use of the land on and surrounding the Quarry Site is planned to remain comparable to current uses. Following completion of extractive activities, the Quarry Site itself would be returned to agricultural use of equivalent style and scale to that currently undertaken on adjoining properties.

Land use along the Sydney-Canberra corridor generally, of which the Quarry Site forms part, is likely to develop to meet the logistic, material, energy and human resources of this main transport corridor between Sydney – Canberra – Melbourne.

The Proposal is an ongoing use of an accepted land use within the local setting and unlikely to have a significant effect on the overall land use of the surrounding land.

Importantly, the Quarry would not be incompatible with any future industry or land use. To the contrary, the further development of Bogo Quarry would be highly compatible with the aims and objectives of the NSW government's strategic planning document "*Sydney-Canberra Corridor Strategy*". For example, the Quarry Site would, over the life of the Quarry, provide necessary resources for the continued development of the roads, towns and urban centres within the corridor. The final landform could also provide a suitable site for a future industrial or transport-related industry within the corridor.

Socio-economic

The Proposal would result in the ongoing positive benefits to the existing socio-economic environment. While it would result in minor changes to local noise, air quality, traffic and visual amenity, it would also continue to provide employment locally, provide for a continued supply of high quality aggregates and road base material for construction and road building purposes, as well as provide a local source of concrete, reducing the reliance on sources further away and therefore cost.

CONCLUSION

The Proposal, as presented within this EIS has been designed to manage relevant environmental issues during the extraction, processing and transportation of the aggregate, asphalt and concrete and asphalt products. It has been assessed that the Quarry could continue to operate within the limits of accepted criteria or goals and with minimal adverse impact on the surrounding environment.

It has also been assessed that the Proposal is consistent with the features which distinguish an ecologically sustainable approach to development, in that the proposed production increase at the Bogo Quarry would provide construction and road-building products, economically benefit the local and wider community and result in minor, yet acceptable environmental impacts.

KEY FACTS AND FIGURES

Applicant	Bogo Operations Pty Limited
Project Area (approximate)	Quarry Site – 50 ha Total Area of Disturbance - 28 ha
Annual Production	Maximum 500 000t per year Average 250 000-350 000tpa
Products	Road pavement materials, aggregates (including pre-coated), fines, hard rock
Proposed Quarry Life	Until approximately 2046
Employment	Approximately 10-30 full time equivalent positions
Extraction Equipment	Bulldozer, excavator, haul truck, front-end loaders, hydraulic drill
Processing Equipment	Crushing & screening plant, mobile processing plant, pre-coating plant, mobile asphalt plant, concrete plant
Extraction Floor	545m AHD
Hours of Operation	
Blasting	Mon – Fri 9:00am – 5:00pm
Extraction	Mon – Sat 5:00am – 10:00pm
Processing	Mon – Sun 5:00am – 10:00pm
Product Transportation and Maintenance	24 hours 7 days per week
Traffic Volumes (approximate)	Average day - 52 truckloads (104 truck movements) Maximum per day - 120 truckloads (240 truck movements) Maximum per hour – 8 truckloads (16 truck movements)

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