Walker Quarries

ABN: 82 003 061 890

ENVIRONMENTAL ASSESSMENT

for

Modification to Operations at the Wallerawang Quarry (DA 344-11-2001)

May 2017

Prepared by:

R.W. CORKERY & CO. PTY. LIMITED

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Modification to Operations at the Wallerawang Quarry (DA 344-11-2001)

Prepared for:

Walker Quarries Pty Ltd
ABN: 82 003 061 890
Lot 6, Great Western Highway
WALLERAWANG NSW 2845

Telephone: (02) 6351 2931
Email: walkerquarries@bigpond.com

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) 6361 3622
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) 6361 3622
Email: brisbane@rwcorkery.com

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LIST OF ABBREVIATIONS

AHD	Australian Height Datum
DA	Development Consent
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EL	Exploration Licence
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ESEA	Eastern Stockpile Extension Area
ML	Mining Lease
RWC	R.W. Corkery & Co Pty Limited
WSEA	Western Stockpile Extension Area

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EXECUTIVE SUMMARY

The Wallerawang Quarry ("the Quarry") is located on land adjoining the Great Western Highway to the south of Wallerawang, approximately 8km northwest of Lithgow (see **Figure 1**). Development Approval DA 344-11-2001 for the Quarry was issued to Sitegoal Pty Ltd by the then Minister for Planning & Infrastructure on 19 October 2004. No activities were undertaken under DA 344-11-2001 until 2014 when an intersection with the Great Western Highway was constructed. Mining activities commenced in late 2015 with the Quarry now producing a range of quartzite aggregates, pebbles and sand. Notably, the range of products now produced at the Quarry is more extensive than envisaged by the original development application which nominated quartzite and rock aggregates only.

Since the commencement of activities at the Quarry Site, several inspections have been made by Department of Planning and Environment (DPE) personnel. As a consequence of these inspections, the DPE queried the compliance of activities at the Quarry related to the clearing of land for product stockpiling and the operation of a processing plant which produces products <5mm in diameter.

This *Environmental Assessment* has been prepared to support an application to modify DA 344-11-2001 in accordance with Section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act) under the transitionary provisions of Clause 8J(8)(c) of the *Environmental Planning & Assessment Regulation 2000* (EP&A Reg). The proposed modification seeks to regularise the following activities under DA 344-11-2001.

- Construction and operation of extended stockpiles areas to the west (Western Stockpile Extension Area [WSEA]) and east (Eastern Stockpile Extension Area [ESEA]) of the approved disturbance footprint of the Quarry.

  It is noted that clearing associated with the proposed modification has already been undertaken, however, this area has now been stabilised with vegetation ahead of assessment and determination. On approval of the Proposed Modification, earthworks would be undertaken to create flat surfaces for the placement of Quarry products. The WSEA would provide for the storage of quartzite aggregates and sand and the ESEA for quartzite pebbles and other lower turnover products.

  In order to maximise the available area for product stockpiling, the Proponent also proposes to in-fill the existing clean water drain to the west of the approved stockpile area and replace this with an underground pipeline to transfer clean water from the north of the Quarry Site to natural drainage to the south.

- Operation of a screening and washing circuit, and associated silt cells, to enable the production of washed aggregate (<7mm) and sand (<5mm) products.

  It is noted that this component of the processing circuit, and associated silt cells, are already in place on the Quarry Site and have been operated in accordance with an approved Water Management Plan. The Proposed Modification also provides for the removal of silt collected in the silt cells either to a drying cell or modularised dewatering unit.

The *Environmental Assessment* provides a description of these activities, identifies the issues likely to be of greatest significance to the local environment, surrounding and nearby landowners and the wider community, and assesses the residual impacts resultant should the Proposed Modification be approved.

The most significant impact associated with this increased disturbance footprint is the impact on local biodiversity which includes:

- 1.9ha of PCT 732 (Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion); and
- 0.5ha of PCT 1093 (Red Stringybark - Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion).

While neither of these communities represents a form of Endangered Ecological Community (EEC), the removal of this vegetation may have had an impact on a local population of the threatened Purple Copper Butterfly. Noting the impacts are largely irreversible, and on the basis that an offset is established, it is assessed that the impacts are acceptable and no further assessment or referral is required.

The additional disturbance would require an amendment to the final landform of the Quarry, however, this change would be minor and the landform would remain in sympathy with the surrounding topography. Currently planned rehabilitation methods could be used with the Proposed Modification not resulting in any change to the planned final land use. Minor and targeted amendments to the Quarry *Landscape Planting Plan* incorporating a vegetated bund wall along the northern perimeter of the Quarry Site would minimise any impacts of the additional disturbance on the visibility of the Quarry.

The Quarry *Water Management Plan* would require updating to include additional water diversion and collection infrastructure to ensure pollution of receiving waters by suspended sediment is avoided. The Quarry water balance, previously prepared and included in the *Water Management Plan* to include the aggregate and sand washing operations, has been reviewed and confirms sufficient water would be available for on-site requirements for all but very dry years. Under these conditions, water would be purchased or obtained under appropriate licence (either from a water supply work to be established or by trading on the commercial market).

Groundwater, air emissions and noise emissions are unlikely to be affected by the Proposed Modification.

It is concluded that the proposed modification would result in an increase to the approved disturbance footprint of the Quarry, impacts on local biodiversity and some minor changes the visibility of the Quarry. Noting these impacts have already taken place, and considering they are not resulting in unacceptable impacts on the local environment, it is assessed that the Proposed Modification could be undertaken in a manner which continues to meet relevant environmental criteria and meet reasonable community expectations.

1. INTRODUCTION

1.1 SCOPE

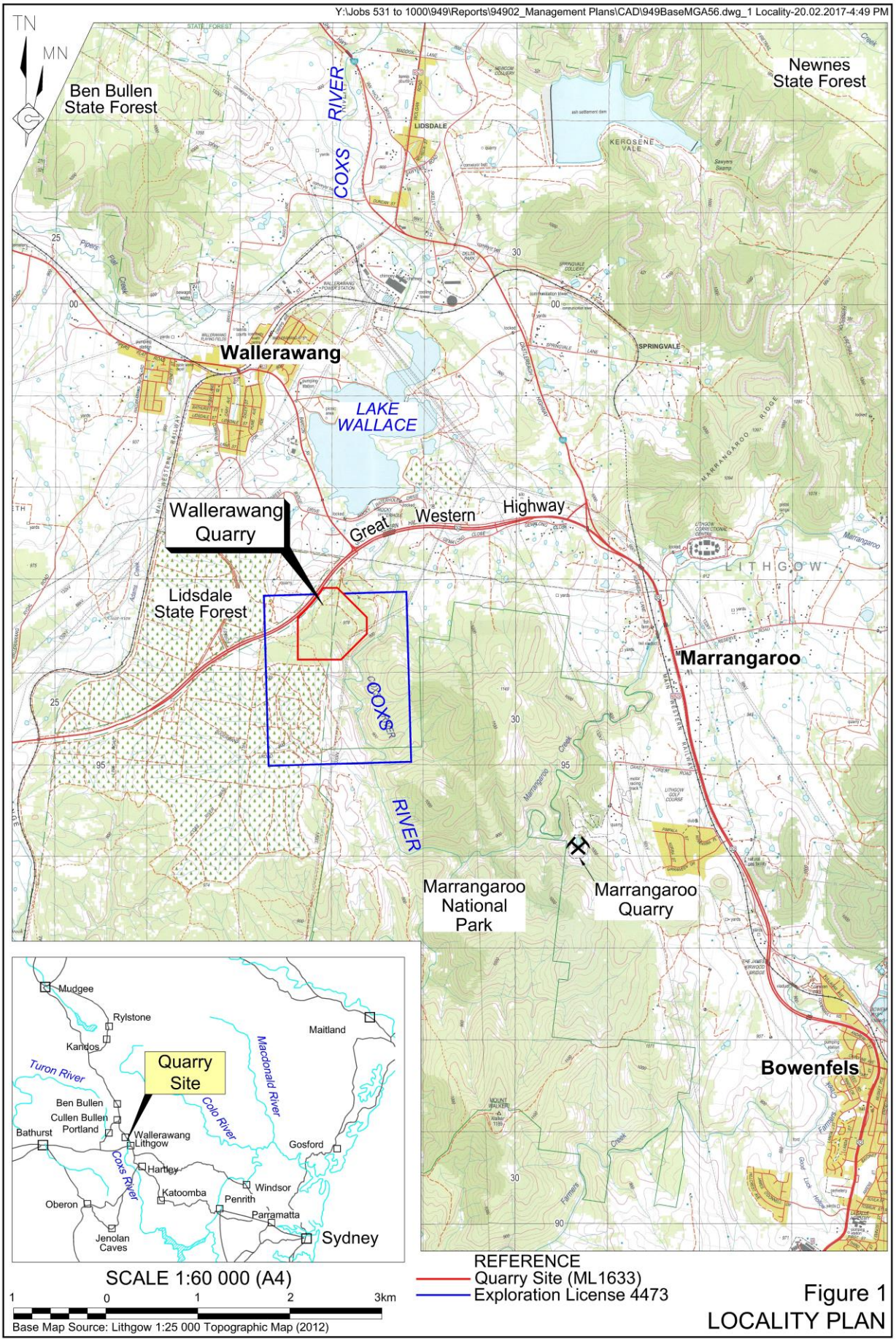
This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited (RWC) to support the application to modify development consent DA 344-11-2001 for the Wallerawang Quarry ("the Proposed Modification") issued to Sitegoal Pty Ltd by the then Minister for Planning & Infrastructure on 19 October 2004. This application has been prepared on behalf of Walker Quarries Pty Ltd ("the Proponent"), a fully owned subsidiary of Sitegoal Pty which operates the Wallerawang Quarry ("the Quarry").

The Quarry is located on land adjoining the Great Western Highway to the south of Wallerawang, approximately 8km northwest of Lithgow (see **Figure 1**). DA 344-11-2001 approves the mining and processing of quartzite to a depth of approximately 930m AHD[1] from a single open cut mining area. The Quarry also comprises the following components identified on **Figure 2**.

- Two processing plants in the form of the following.
  - A crushing and screening plant to produce a range of sand and aggregate sizes (<5mm and >40mm). This plant includes a washing circuit for the removal of clay and other small diameter particulates from the sand and fine aggregate product of <7mm and <5mm.
  - A Pug Mill for the blending of crushed and screened aggregates with other materials, e.g. clays, for the production of specialty road building and construction products.
- Three principal hardstand stockpile areas, identified on **Figure 2** as follows.
  - The Processing Pad for the placement of raw quartzite extracted from the open cut as feed for the crushing plant.
  - Stockpile Areas for the stockpiling of crushed, screened and washed quartzite products for either sale or further processing through the Pug Mill.
  - A Supplementary Stockpile Area located in the former Hoskins Quarry which predates the Quarry operation and which is used for the stockpiling of crushing and screening reject material prior to use of this material in rehabilitation works.
- An office, car park and amenities buildings.
- Various water storages and drainage structures.
- An intersection with the Great Western Highway, security gates and sealed entrance road.
- A range of ancillary infrastructure, including internal roadways, bunds, soil stockpiles and laydown areas.

The Quarry is currently being managed under Care and Maintenance arrangements whilst the Proponent awaits the determination of the Proposed Modification.

[1] Inferred from the 2001 Environmental Impact Statement of Pacrim (2001).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TN
MN
Ben Bullen State Forest
Newnes State Forest
COXS RIVER
LIDSDALE
KEROSENE VALE
Wallerawang
LAKE WALLACE
SPRINGVALE
MARRANGAROO RIDGE
Wallerawang Quarry
Great Western Highway
LITHGOW
Lidsdale State Forest
Marrangaroo
COXS RIVER
Marrangaroo Creek
Marrangaroo National Park
Marrangaroo Quarry
Bowenfels
Mudgee
Rylstone
Kandos
Maitland
Turon River
Quarry Site
Macdonald River
Ben Bullen
Cullen Bullen
Portland
Bathurst
Wallerawang
Lithgow
Cox's River
Cox River
Hartley
Gosford
Windsor
Katoomba
Penrith
Oberon
Parramatta
Jenolan Caves
Sydney
SCALE 1:60 000 (A4)
1 0 1 2 3km
Base Map Source: Lithgow 1:25 000 Topographic Map (2012)
REFERENCE
Quarry Site (ML1633)
Exploration License 4473
Figure 1
LOCALITY PLAN

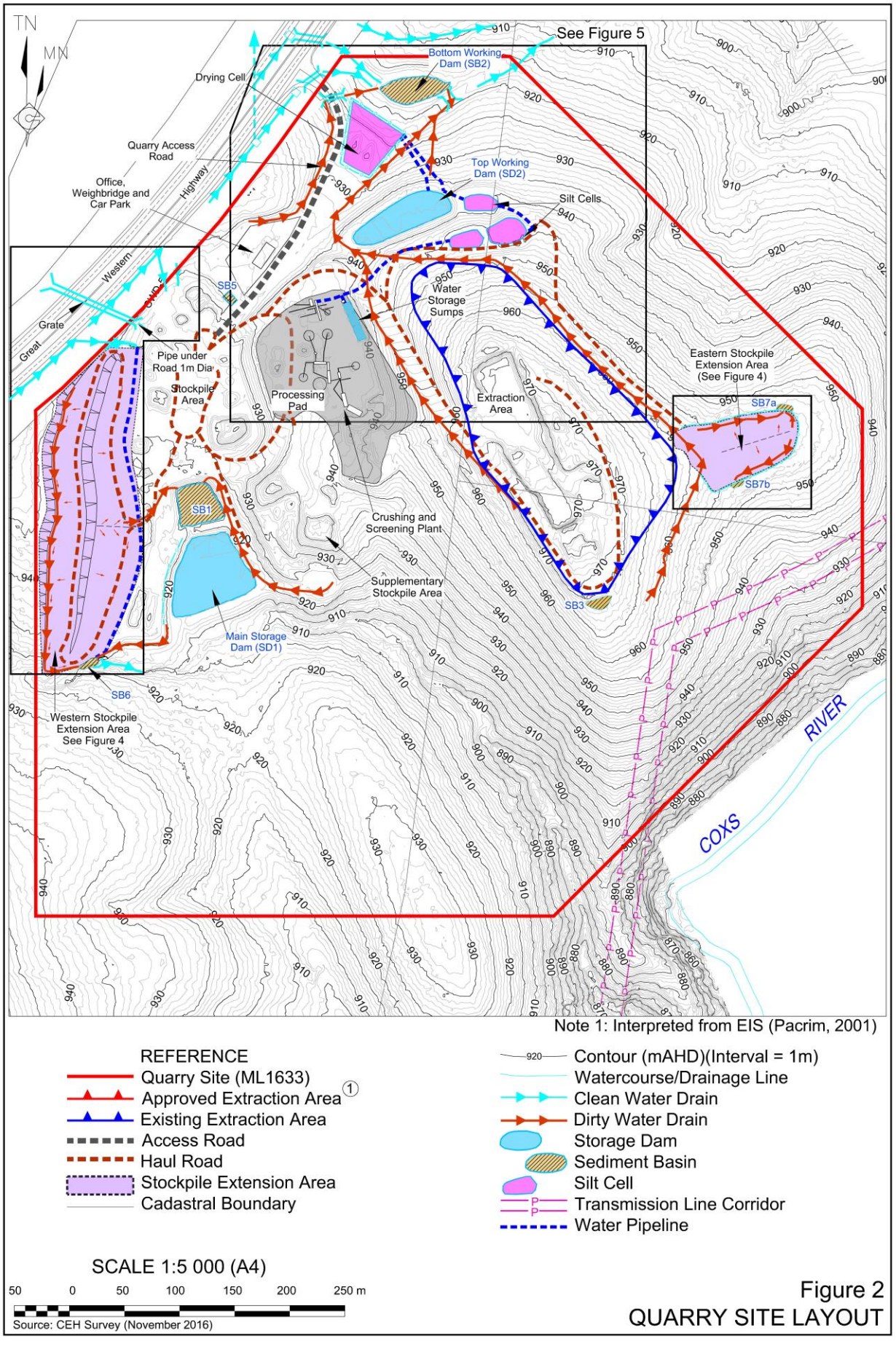


Figure 2
QUARRY SITE LAYOUT

This final section of the crushing and screening circuit, which involves the screening and washing of sand and aggregate of <5mm in diameter, along with those areas on **Figure 2** referred to as the Western and Eastern Stockpile Extension Areas (WSEA and ESEA), have been identified as potentially non-compliant with DA 344-11-2001 by the Department of Planning & Environment (DPE) (refer to Section 1.6). The Proposed Modification seeks to regularize[2] these activities and associated disturbance by including within the approved operations of DA 344-11-2001.

In accordance with Clause 8J(8)(c) of the *Environmental Planning & Assessment Regulation 2000* (EP&A Reg), DA 344-11-2001 is considered an approval under the now repealed Part 3A of the EP&A Act. As such, the application to modify DA 344-11-2001 is made under Section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act), in accordance with the transitional arrangements of the EP&A Act associated with the repeal of Part 3A.

The information contained in this document relates only to those components of the Quarry that would be the subject of the Proposed Modification. Aspects of the Quarry that would not be modified would continue to be undertaken in accordance with the following.

- The conditions of DA 344-11-2001.
- The commitments made in the following documents prepared to support the original application for development consent.
  - EIS titled Proposed Wallerawang Quarry (Report 01/206.1), dated November 2001 (Pacrim, 2001); and
  - Report titled Supplementary Report to the EIS for the Proposed Wallerawang, Quarry (Report 02/206.1), dated July 2002 (Pacrim, 2002).
- Wallerawang Quarry Mining Operations Plan (MOP), for the period 14 August 2016 to 14 August 2018 (RME, 2016).
- The Wallerawang Quarry *Environmental Management Strategy* and various management plans approved by the Secretary of the DPE on 27 September 2016, namely:
  - *Noise Management Plan* (incorporating a Noise Monitoring Program);
  - *Blast Management Plan* (incorporating a Blasting Management Protocol and Blast Monitoring Program);
  - *Air Quality Management Plan* (incorporating an Air Quality Monitoring Program);
  - *Flora and Fauna Management Plan; and*
  - *Water Management Plan*.

[2] To make regular by conformance to law, rules, or custom; to change a situation or system so that it obeys laws or is based on reason.

1.2 FORMAT

The format of the *Environmental Assessment* is as follows.

Section 1: introduces the Proposed Modification, the Proponent, the Quarry Site and provides relevant background information in relation to ongoing operations and the need for the modification. Information on the format of the document and management of investigations is also included.

Section 2: describes the Proponent's objectives in modifying DA 344-11-2001 and the proposed modified activities, including the modified Quarry Site layout and final landform.

Section 3: describes the approach taken to issue identification and prioritisation.

Section 4: identifies those components of the local environment which have been or are likely to be impacted, mitigation measures implemented or proposed, and an assessment of the residual impacts associated with the Proposed Modification.

Section 5: evaluates the Proposed Modification in light of the residual impacts on the environment and consequences of not proceeding.

References: lists the various source documents referred to for information and data used during the preparation of the *Environmental Assessment*.

Appendices: present the following additional information.

1. Approved final landform (as presented in the Quarry *Mining Operations Plan*).
2. Correspondence with the DPE (compliance).
3. Environmental assessment requirements of the DPE and consulted government agencies.
4. Noise Monitoring Reports prepared by Atkins Acoustics and Muller Acoustic Consulting.
5. Deposited Dust Monitoring Results (January 2016 – February 2017).
6. An Ecological Investigation prepared by Lesryk Environmental Pty Ltd.
7. Wallerawang Quarry *Landscape Planting Plan*.
8. Material Safety Data Sheet (MSDS) for flocculent HydroBond® HB-4118.
9. Wallerawang Quarry *Flora and Fauna Management Plan*.
10. Revised Universal Soil Loss Equation (RUSLE) Calculation Sheets (used to determine the minimum capacity requirements for Quarry sediment basins).

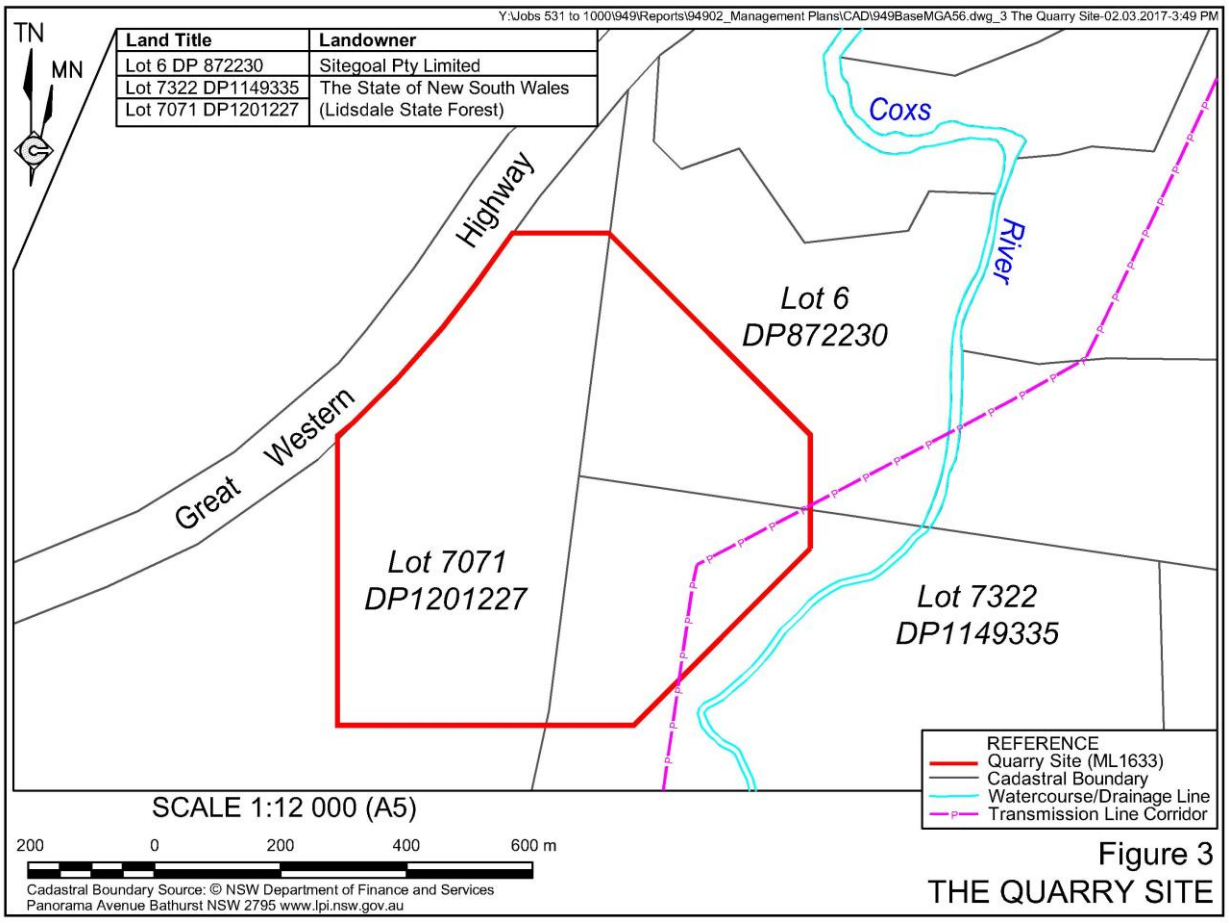
1.3 THE PROPONENT

Sitegoal Pty Ltd was formed in 1994 to identify and develop mineral resources in New South Wales. The Company Directors maintain a hands-on management style and are either Lithgow or Sydney based.

Walker Quarries Pty Ltd was created to carry out mining, processing, transport and other ancillary activities at the Wallerawang Quarry and remains a wholly owned subsidiary of Sitegoal Pty Ltd. Walker Quarries Pty Ltd is committed to operating the Quarry in a manner that complies with relevant environmental legislation and is environmentally responsible.

1.4 THE QUARRY SITE

All activities associated with the Proposed Modification would be undertaken within the approved Quarry Site which coincides with the boundary of Mining Lease (ML) 1633 (traversing Lot 6 DP872230, Lot 7322 DP1149335 and Lot 7071 DP1201227). The Quarry Site adjoins the Great Western Highway and includes freehold land owned by Sitegoal Pty Ltd and crown land within Lidsdale State Forest (see **Figure 3**).



It is noted that the land titles identified on **Figure 3** have been modified since DA 344-11-2001 was issued and should be reflected in any modification to DA 344-11-2001.

A transmission line traverses the Quarry site with all activities have been designed to remain at least 40m from this.

The Coxs River is located approximately 50m from the southeastern boundary of the Quarry Site at its closest point.

Some drainage from and to the north of the Great Western Highway currently discharges onto the Quarry Site. This water is currently collected to the north of the approved stockpile area and diverted to a discharge point to the south of the stockpile area via a rock-lined clean water drain. Further information on this drainage and proposed management as part of the Proposed Modification is provided in Section 2.3.1.2.

1.5 APPROVED AND ONGOING ACTIVITIES

Figure 2 displays the approved layout of the Quarry. Detailed information regarding approved activities is available in the following documents.

- EIS titled *Proposed Wallerawang Quarry (Report 01/206.1),* dated November 2001 (Pacrim, 2001);
- Report titled *Supplementary Report to the EIS for the Proposed Wallerawang, Quarry (Report 02/206.1),* dated July 2002 (Pacrim, 2002);
- *Mining Operations Plan for the Wallerawang Quarry* dated October 2006 (Sitegoal, 2006); and
- *Wallerawang Quarry Mining Operations Plan*, for the period 14 August 2016 to 14 August 2018 (RME, 2016).

While noting the Quarry has been placed under Care and Maintenance whilst the Proposed Modification is determined, the following provides a summary of the activities undertaken, subject to market demand.

- Where it is present in sufficient thickness, topsoil is stripped and stockpiled for use in rehabilitation activities. When possible, cleared vegetation is selectively placed within areas being revegetated to take advantage of the existing seed bank.
- Raw material is extracted using conventional drill and blast, load and haul methods. Material is loaded into haul trucks at the extraction face and transported to the raw feed stockpile.
- Overburden material is temporarily stockpiled within the footprint of the open cut from where it is either used within the site for approved construction activities or sold for use as road base materials.
- Processing of raw quartzite material involving crushing, screening and washing using mobile plant to meet customer requirements.
- Product transportation involves loading of road registered trucks at the mobile pug mill. Trucks then enter the Great Western Highway directly from the Quarry Site entrance.
- Progressive rehabilitation of eastern slopes of the mining area and rehabilitation of the remaining landform at Quarry closure in accordance with *Plan 4* of the approved Mining Operations Plan (MOP) (RME, 2016) which follows from final landform concepts presented in Pacrim (2001) (refer to **Appendix 1**).

The Quarry is approved to produce 500 000t per year of quartzite and rock aggregate material for use principally in the Wallerawang, Lithgow, Blue Mountains and Sydney regions.

No activities were undertaken under DA 344-11-2001 until 2014 when an intersection with the Great Western Highway was constructed. Mining activities commenced in late 2015 with the Quarry now producing a range of quartzite aggregates, pebbles and sand. Notably, the range of products now produced at the Quarry is more extensive than envisaged by the original development application which nominated quartzite and rock aggregates only.

1.6 BACKGROUND TO THE PROPOSED MODIFICATION

Since the commencement of activities on the Quarry Site in 2015, several inspections have been made by DPE personnel. As a consequence of these inspections, the DPE queried the compliance of two separate activities on the Quarry Site.

In correspondence dated 19 October 2016[3], the DPE requested the Proponent show cause as to why further action should not be taken in relation to the clearing of those areas identified as the WSEA and ESEA on **Figure 2**. The Proponent responded on 26 October 2016 confirming that the clearing was outside that approved by DA 344-11-2001[3]. The DPE subsequently issued the proponent with a Penalty Infringement Notice in relation to this clearing and an Order under Section 121B of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to rectify the non-compliance with Condition 1.2 of DA 344-11-2001[3]. In accordance with the Order, the Proponent seeks approval to modify DA 344-11-2001 to include these areas within the Quarry impact footprint, i.e. to regularise the development consent to the current layout of the Quarry Site (including the WSEA and ESEA). In modifying DA 344-11-2001 to include the additional stockpiling area, the Proponent also seeks to modify the drainage of clean water to maximise the available area for product stockpiling.

Separate correspondence was sent to the Proponent on 23 November 2016 which queried the processing operations being undertaken[3]. Specifically, the DPE questioned whether these activities are compliant with DA 344-11-2001. The Proponent provided correspondence to the DPE on 6 December 2016[3] nominating these activities as generally in accordance with the documents referenced in Section 1.2 (of Schedule 2) of DA 344-11-2001. This assessment, supported by legal advice provided by Hickson's Lawyers[3], argued that the original EIS provides for the potential for flexibility in processing arrangements "dependent on contractor and product requirements" (Pacrim, 2001 – p. ix & p. 12), and that the production of a quartzite products of <5mm in diameter remains within the scope of crushing / processing operations assessed by Pacrim (2001).

The above assessment and legal advice notwithstanding, on 21 December 2016 the DPE issued the Proponent with a letter[3] advising that the processing activities in question were non-compliant, principally on the basis that the EIS references crushing operations in the EIS and that this nominates that "*the finest dimensions of rock specified is 5mm*", and requested confirmation from the Proponent as to how the non-compliance would be rectified. Whilst maintaining that that in the opinion of the Proponent, the processing activities in question are

[3] The referenced correspondence is provided in full in **Appendix 2**.

compliant with DA 344-11-2001, the Proponent informed the DPE on 13 February 2017[3] of a decision to submit an application to modify DA 344-11-2001 to regularise this to the activities currently undertaken to produce the smaller diameter aggregate and sand.

The application will be lodged under Section 75W of the *Environmental Planning & Assessment Act 1979* (EP&A Act) under the transitionary provisions of Clause 8J(8)(c) of the *Environmental Planning & Assessment Regulation 2000* (EP&A Reg).

1.7 NEED FOR THE PROPOSAL

The incorporation of additional aggregate and sand processing activities, along with the clearing and proposed development of additional stockpile areas, has been identified as critical to the feasibility of the Quarry in the current market.

Since approval of the Quarry in 2004, the market for concrete aggregates has seen a considerable consolidation amongst the larger concrete manufacturers. These companies, who service a large proportion of the market for concrete, are typically sourcing the bulk of their aggregate material from their own quarries. As a consequence, the ability to supply large volumes of aggregate products to single customers has been reduced. The market for sand products as a component of concrete is not as restricted and the Proponent therefore sees an opportunity to provide supply of <5mm aggregates and sand for concrete manufacture.

In addition to an opportunity to supply smaller diameter aggregates and sand for concrete manufacture, the Proponent has determined that carrying a larger range of aggregate types and sizes for a variety of construction, road-building and landscaping markets is similarly important in ensuring that production, and therefore profitability, increases. In order to carry sufficient stocks of an increased variety of products, the overall stockpiling area of the Quarry requires increasing.

Reflecting the importance of the proposed increase in stockpile area to accommodate the variety of products, the Company recently placed operations under care and maintenance until such time as this additional stockpile area can be established.

1.8 MANAGEMENT OF INVESTIGATIONS

This document has been prepared by Mr Alex Irwin (B.Sc (Hons)), Senior Environmental Consultant with R.W. Corkery & Co Pty. Limited (RWC). Information on current and future operations at the Quarry was provided by Mr Ray Sharwood (Quarry Manager) and Mr David Murray (Director) of Walker Quarries Pty Ltd.

The Ecological Investigation which accompanies this *Environmental Assessment* (**Appendix 6**) was prepared by Lesryk Environmental Pty Ltd.

2. DESCRIPTION AND OPERATIONS

2.1 OBJECTIVES OF THE MODIFICATION

The Proponent's objectives in modifying DA 344-11-2001 are as follows.

- To rectify non-compliances identified by the DPE with respect to:
  - clearing beyond the approved impact footprint; and
  - operation of processing operations to produce screened and washed products of <5mm in diameter.
- To maximise the available area for product stockpiling associated with the Quarry Site regularization.
- To ensure the modified Quarry operations remain compliant with all other conditions or commitments, unless modified by this Proposed Modification.
- To maximise the recovery of the identified resource and promote the diversification of products produced at the Quarry.
- To reduce, to the maximum extent practicable, the overall environment impact of the Quarry.
- To minimise, to the maximum extent practicable, the impact on the local community and other stakeholders.
- To ensure that the ongoing operation of the Quarry can continue in a safe and reliable manner.

2.2 OVERVIEW OF THE MODIFICATION

As noted in Section 1.1, the Proposed Modification provides regularization of current operations and disturbance to those approved by DA 344-11-2001. Specifically the Proposed Modification includes the following.

- Construction and operation of extended stockpiles areas to the west (WSEA) and east (ESEA) of the approved disturbance footprint of the Quarry.

  It is noted that clearing associated with the proposed modification has already been undertaken, however, this area has now been stabilised with vegetation ahead of assessment and determination. On approval of the Proposed Modification, earthworks would be undertaken to create flat surfaces for the placement of Quarry products. The WSEA would provide for the storage of quartzite aggregates and sand and the ESEA for quartzite pebbles and other lower turnover products.

  In order to maximise the available area for product stockpiling, the Proponent also proposes to in-fill the existing clean water drain to the west of the approved stockpile area and replace this with an underground pipeline to transfer clean water from the north of the Quarry Site to natural drainage to the south.

- Operation of a screening and washing circuit, and associated silt cells, to enable the production of washed aggregate (<7mm) and sand (<5mm) products.

  It is noted that this component of the processing circuit, and associated silt cells, are already in place on the Quarry Site (refer to **Figure 2**) and have been operated in accordance with an approved Water Management Plan. The Proposed Modification also provides for the consolidation of silt collected in the silt cells either within a drying cell or modularised dewatering unit.

2.3 STOCKPILE EXTENSION AREAS

2.3.1 Design and Construction

2.3.1.1 Eastern Stockpile Extension Area

Located on an easterly spur of the main hill from which the quartzite is being extracted, the ESEA would be constructed as a slightly convex surface at an elevation of approximately 955m AHD (see **Figure 4**). A low bund wall would be maintained around the perimeter of the area (of approximately 0.5ha) which would be profiled to drain water to the northeastern and southwestern (approximately) corners where sediment detention basins would be located and maintained.

2.3.1.2 Western Stockpile Extension Area

With a maximum differential in elevation of 20m (925m AHD to 945m AHD), the WSEA would be constructed as a two tiered stockpile area over an area of approximately 1.9ha. The final dimensions of each tier would be subject to some minor modification during construction with **Figure 4** providing a conceptual illustration of design.

The upper tier would be sloped back towards the batter with accumulated runoff draining along a shallow channel and discharging to a sediment basin to be constructed at an elevation of approximately 925m AHD at the southeastern corner of the WSEA. The lower tier would be sloped to the east with accumulated runoff collected in a shallow drain which also discharges into the sediment basin at the 925m AHD. Further detail on the dimensions of these dirty water drains and sediment basin is provided in Section 4.3.4.2.

To the west, the WSEA extends to the top of a low ridge aligned north-south and as a result no clean surface runoff from the west would flow towards the WSEA. Runoff from three catchment areas to the north currently flows through the Quarry Site (see **Figure 4**).

- A small catchment area to the north of the Great Western Highway which is transferred below the road surface via a concrete pipeline (1 000mm diameter) and discharged to a rock-lined drain on the Quarry Site (see **Plate 1**). This catchment also includes runoff collected within a drain constructed within the median between the west and east bound lanes which enters the pipeline via a grate. The total catchment area is approximately 5.5ha.
- Runoff from a small section of the west bound lanes of the Great Western Highway (catchment area of approximately 0.7ha) which discharge via a concrete lined drain onto the Quarry Site (see **Plate 2**).
- A small catchment area (1.3ha) immediately north of the Quarry Site office and carpark which is collected within a shallow open drain (see **Plate 3**).

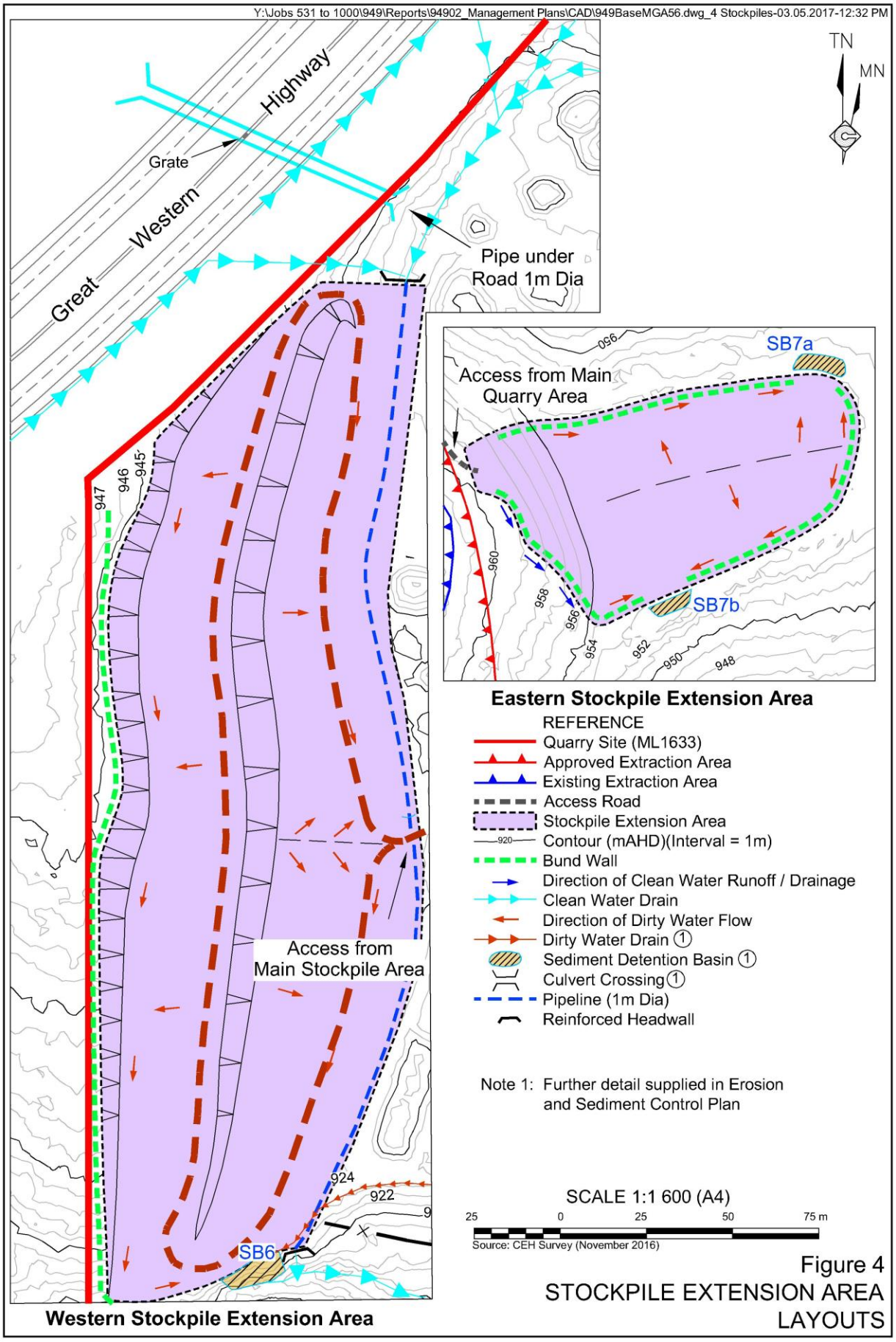


Figure 4
STOCKPILE EXTENSION AREA LAYOUTS

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Plate 1: Culvert discharge from Northern Great Western Highway Catchment
(Ref: D141116_IMG_1903)

Plate 2: Concrete Drain from Great Western Highway Surface Runoff
(Ref: D141116_IMG_1901)

Plate 3: Open Channel from Northern Quarry Site Catchment
(Ref: D141116_IMG_1904)

Plate 4: Existing Clean Water Drain
(Ref: D141116_IMG_1902)

The discharges from each of these small catchments currently converge on the Quarry Site and are transferred to natural drainage to the south via a rock-lined drain (see **Plate 4**). It is proposed to replace this open drain with a pipeline along the same alignment. Once in place, the existing clean water drain would be backfilled to an elevation of approximately 925m AHD (elevation of the lower tier of the WSEA) with a reinforced headwall established at the entry point to the pipeline. Discharge from the pipeline would be to a rock-lined discharge point before flowing via natural drainage to the Coxs River.

2.3.2 Stockpile Area Management

The Proponent proposes to produce a wide range of aggregates (40mm, 20mm, 14mm, 10mm 7mm and 5mm), sand (<7mm and <5mm), decorative landscaping products (pebble), blended road pavement products, select fill, gabion and drainage materials with many of these products to be customised to meet the individual specifications of customers.

From the small stockpiles created around the processing plant, the products not immediately loaded to trucks for sale and despatch would be loaded to haul trucks with the higher turnover aggregate and sand products delivered to the main stockpile area. As capacity of the main stockpile area is reached, excess product would be delivered to the WSEA for placement in individual stockpiles. The WSEA would also be utilised for the storage of the many specialized products with lower demand and turnover.

The ESEA would be utilized primarily for the stockpiling of lower turnover products such as pebble and other landscaping, gabion and drainage products, or for the drying of silt excavated from silt cells (refer to Section 2.4.2). These materials would either be collected from stockpile around the processing plant or delivered directly from extraction point within the open cut or other on-site earthworks. The ESEA would also be available for the stockpiling of products in excess of the capacity of the WSEA if required.

The stockpiles would be watered as required to reduce the potential for dust lift-off during hot, dry and windy conditions.

Road registered trucks would be loaded from stockpiles by front-end loader and despatched (refer also to Section 2.5.1).

2.4 PROCESSING OPERATIONS

2.4.1 Design and Processing Flow Sheet

The processing operations involve the use of a series of crushers and screens to crush and separate the quartzite into various size aggregates and to blend some products to produce customised road pavement products. **Figure 5** presents the indicative layout and flow sheet of the crushing, screening and separating operations at the Quarry. It is noted that the actual equipment used may vary over the life of the Quarry. It is also noted that the size fractions quoted below and on **Figure 5** represent those of the current processing arrangement and these may be subject to change over the life of the Quarry.

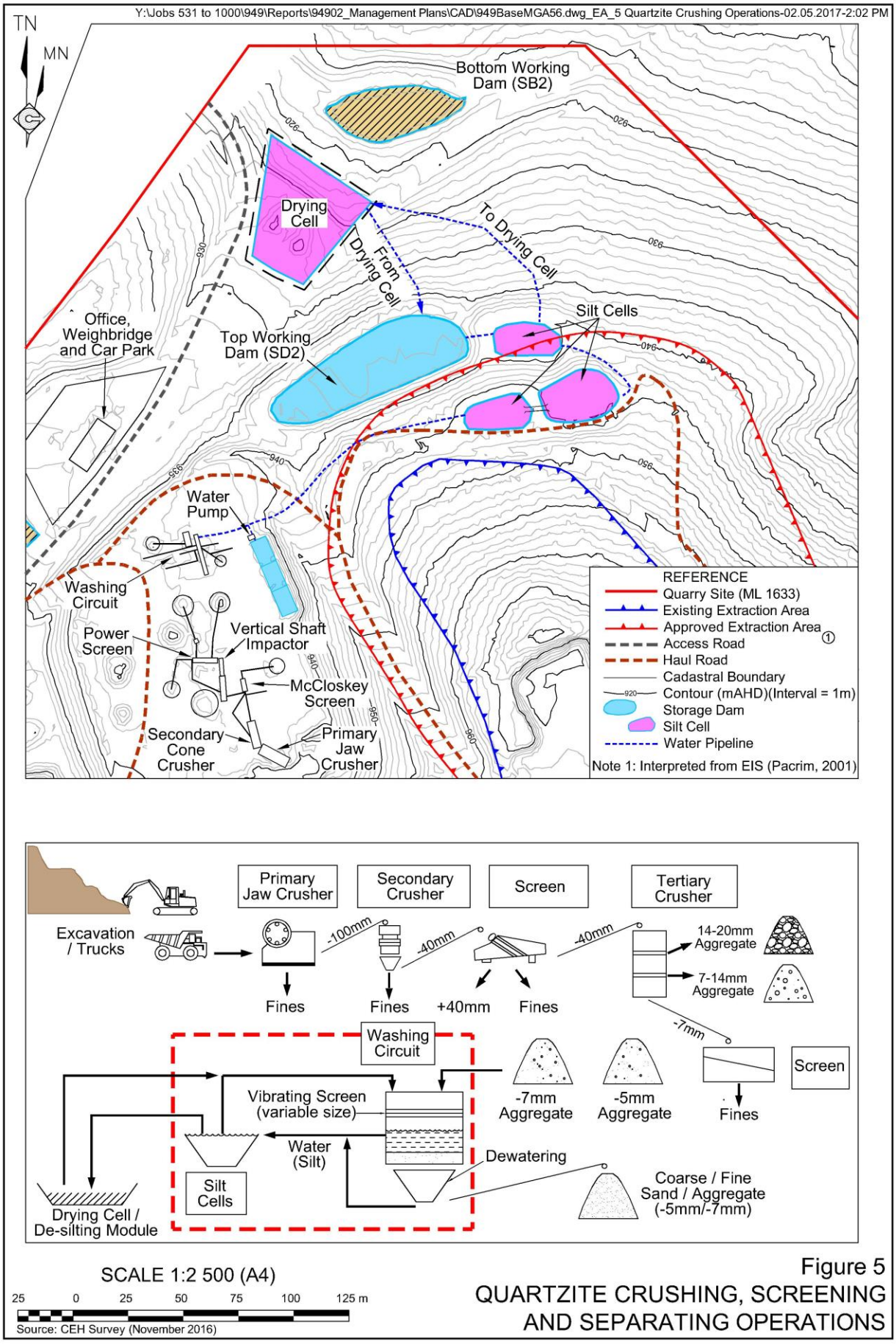

Figure 5
QUARTZITE CRUSHING, SCREENING AND SEPARATING OPERATIONS

The blasted or fragmented rock is transported by haul truck to the primary jaw crusher located at the southern end of the ROM Pad. The quartzite is crushed to reduce the size (<100mm) with oversize and dust screened before the rock is conveyed to a secondary crusher. This secondary crushing reduces the size of the quartzite again (<40mm) for delivery by conveyor to a screen. The screen allows for various size fractions (>40mm, fines) to be removed and either returned to the primary crusher or stockpiled for future blending or use in rehabilitation. The targeted size fraction (<40mm) is delivered by conveyor to a tertiary crusher for further size reduction. Oversize (>20mm) and selected diameter aggregates (14-20mm and 7-14mm) are then screened and graded for delivery to stockpile or sale. The >20mm may be delivered to stockpile for sale or returned along with other oversize material to the primary jaw crusher for re-crushing. The <7mm fraction from the tertiary crusher may be delivered to another where it can be further separated into smaller sized (currently <7mm and <5mm) aggregates.

The smaller aggregates from the screen may either be delivered to stockpile for sale or sent to the washing circuit to create washed aggregate and sand products. This component of the processing circuit (identified in the red box on **Figure 5**) was not identified in Pacrim (2001) or supporting documentation and it is to approve these activities that modification is sought. Water is added to the <7mm material over a variable sized vibrating screen (7mm or 5mm). This initial mixing of water and rock, along with the vibrating nature of the screen, allows for the removal of fine clay and silt particles from the quartzite aggregates. Additional water sprays are used to remove additional clays and silts with the heavier and washed aggregates moving to the bottom of the tanks and the silt containing water drawn off the top and pumped initially to a water storage sump to the immediate east of the processing plant for initial settlement. The <7mm or <5mm quartzite aggregate collected at the base of the tank is then dewatered with the aggregates stacked before being loaded to trucks and delivered to stockpile and the water returned to the circuit.

2.4.2 Process Water and Silt Management

The silty water collected drawn from the wash tank and delivered to the water storage sump is then pumped and discharged via a 300mm HDPE pipeline to the first of three silt cells operated in sequence to the east of the processing operations. To avoid potential damage, the pipeline is buried below the surface of the main haul ramp to the open cut.

The silt cells have been designed as rectangular structures (length:width ratio of between 2:1 and 3:1) to extend the flow through time and therefore promote the settlement and collection of silts within each cell. Gabion basket walls are placed across the middle of each cell to further assist in the collection and settlement of silts and clays. A concrete weir is designed at the discharge point of the first two cells, again to assist in the retention of silt in the cell, with flow between each cell via a concrete culvert, to prevent the collection of additional silt during transfer between cells.

The water within the silt cells is to be dosed with an anionic acrylamide based copolymer flocculent to accelerate the settlement of silts. As the silt accumulates in the cells, it will be removed by one of three methods.

1. The silt would be sucked into the tank of a waste management trucks and transported to a licensed facility for processing and disposal.

2. The silt would be pumped to a Drying Cell constructed on the 930m AHD contour to the immediate north of the Top Working Dam (SD2) and upslope (west) of the Bottom Working Dam (SB2).

   The Drying Cell would be constructed on land already disturbed and currently used for stockpiling of miscellaneous materials. The dimensions of the Drying Cell would be as follows.

   – Area: 2 200m^2.
   – Total Capacity: 3 300m^3 (average depth of 1.5m).
   – Freeboard: 300mm (based on rainfall following 1 in 100, 72hr storm ARI event for Wallerawang of 248mm[4]).

   A spill way would be maintained at the eastern end with any overflow joining an existing drain which flows into SB2.

   As the silt dries sufficiently to be shovelled, it would be excavated, loaded to trucks and used either as a blending material for specialty aggregate or fill materials, in ongoing rehabilitation activities or stockpiled for future used in rehabilitation.

3. A modularised dewatering unit would be imported to the Quarry Site and placed in the location identified for the Drying Cell. The silt would be suctioned from the silt cells and passed through the module where the solids would be collected and water returned to one of the storage dams.

   The solids collected by the modularised dewatering unit would be periodically collected and either blended with other Quarry products, for sale, or soil and non-saleable material for use as a growth medium in the rehabilitation of the Quarry Site.

2.5 TRANSPORT OPERATIONS

2.5.1 Quarry Site Access

Product transportation would be undertaken in a manner consistent with current practices. All trucks would continue to enter and exit the Quarry via the existing entrance and intersection with the Great Western Highway (see **Figure 6**). This entrance and intersection was constructed in 2014 to accommodate the approved level of truck transportation onto the Great Western Highway which is a dual lane, 110km/hr road at this point. The internal access road is sealed from the Quarry Site entrance to just beyond the Quarry office and weighbridge.

[4] Source: Bureau of Meteorology 2016 Rainfall IFD Data System (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016)

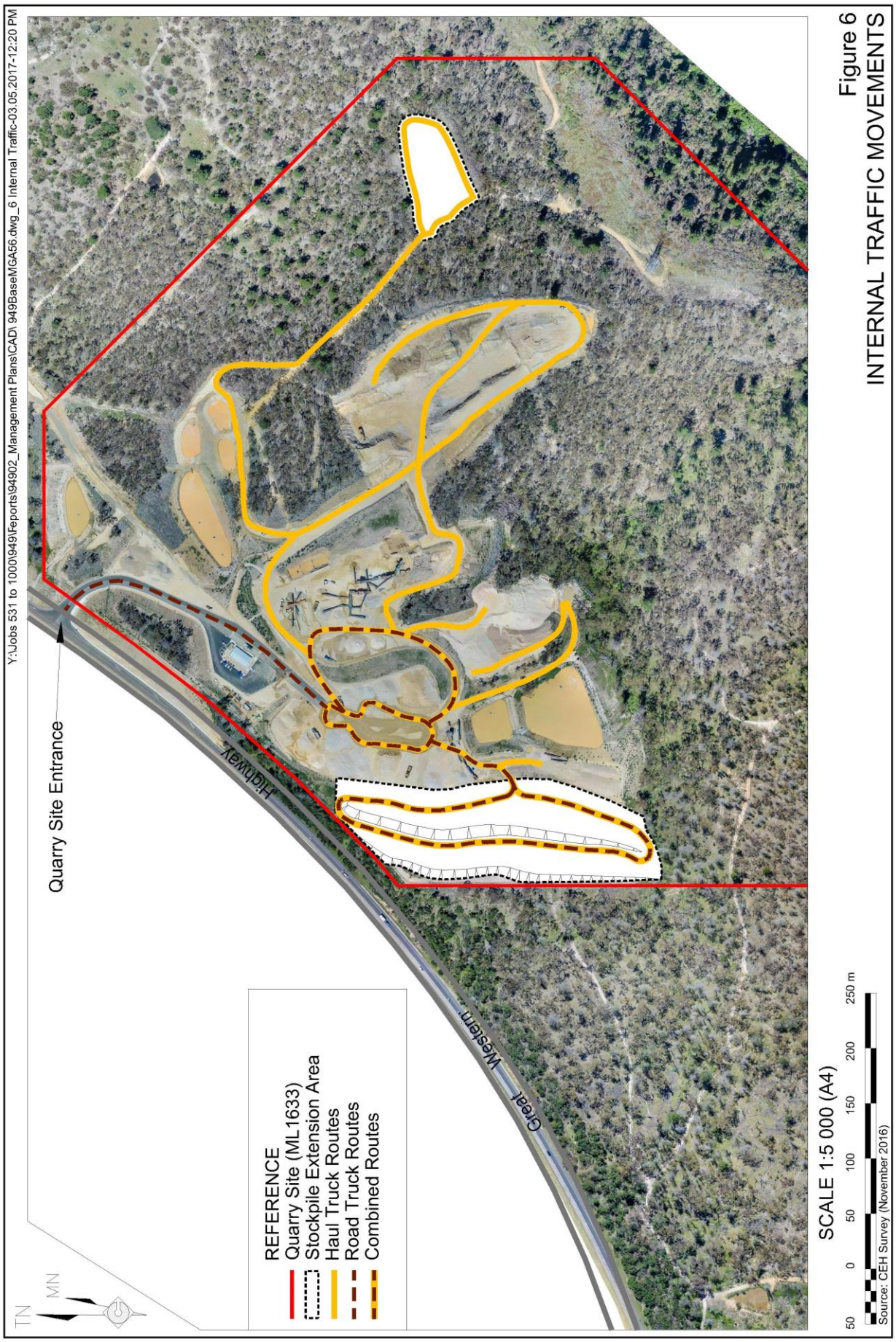
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Figure 6
INTERNAL TRAFFIC MOVEMENTS
Quarry Site Entrance
Highway
Great Western
REFERENCE
Quarry Site (ML1633)
Stockpile Extension Area
Haul Truck Routes
Road Truck Routes
Combined Routes
TN
MN
SCALE 1:5 000 (A4)
50 0 50 100 150 200 250 m
Source: CEH Survey (November 2016)

2.5.2 Internal Traffic Movement

Within the Quarry Site, haul trucks, road registered trucks and light vehicles share roads. **Figure 6** provides an illustration of the key haul truck and road truck routes on the Quarry Site. As far as practical, one way routes would be maintained to avoid conflict between vehicles as well as maximise the available space for stockpiling. A brief overview of internal haul truck and road truck movements is as follows.

Haul Truck Traffic

From the open cut, haul truck deliver blasted quartzite to the primary jaw crusher hopper via a roadway which diverts from the main haul ramp approximately half way along. After unloading material to the ROM pad or hopper, the haul trucks would continue down past the processing plant and stockpiles and return to the open cut via the main haul ramp.

Haul trucks carrying pebble or other specialised products not requiring further processing may continue down the main haul ramp before travelling east past the silt cells to deliver these materials to the ESEA. Haul trucks would also be used to carry products between the processing plant, the main stockpile area, WSEA and ESEA via the routes identified on **Figure 6**.

Road Truck Traffic

Trucks entering the Quarry Site would continue past the weighbridge and onto the main stockpile area or WSEA for loading. A front-end loader would be used to load the road trucks which would then pass over a weighbridge prior to exit, to ensure load limits are adhered to.

2.5.3 Product Distribution

Product trucks entering and leaving the Quarry are typically truck and dog or 19m B-Double configurations. Other trucks such as smaller rigid vehicles also make up a small proportion of quarry traffic. The average pay load capacity for all trucks would be approximately 33t taking into account the capacity of smaller rigid vehicles carrying material from the quarry.

At the approved production rate of 500 000tpa, the Quarry would generate between 90 and 110 truck movements per day. The daily number would fluctuate depending on customer demand, however, the total number of movement in any one day is unlikely to exceed 150.

The distribution of trucks from the Quarry, eastbound to Lithgow, the Blue Mountains and Sydney, or westbound is likely to vary dependent on market demand. It is anticipated, however, that except during periods when the Quarry supplies significant regional roadwork or infrastructure projects, the majority of truck movements will be to the east.

2.6 MINE LIFE AND HOURS OF OPERATION

No change to the approved hours of operation presented in **Table 1** is proposed.

Table 1
Approved Hours of Operation

Activity	Permissible Hours
• Drilling and Blasting. • Mining operations. • Processing operations. • Overburden Management. • Stockpile Management.	• 7:00am to 6:00pm Monday to Friday; • 8:00am to 1:00pm Saturday; and • At no time on Sundays or public holidays.
• Loading and Despatch.	• Any time provided it meets the noise criteria set out in *Table 2.1* of DA 344-11-2001.
• Maintenance.	• Any time provided it is inaudible at all residential premises surrounding the Quarry Site.
Source: DA 344-11-2001 – Condition 2.2	

It is noted that under *Condition 2.3* of DA 344-11-2001, material may be delivered to the Quarry Site outside of the hours of operation if required by police or other authorities for safety reasons, and/or the operation or personnel or equipment are endangered. In such circumstances prior notification shall be provided to the EPA and affected residents as soon as practically possible, or within a reasonable period in the case of emergency.

2.7 EMPLOYMENT, CAPITAL COST AND ECONOMIC CONTRIBUTIONS

Six full-time equivalent personnel are currently employed at the Quarry with no further increase required in order to extend the stockpile areas or operate the fine aggregate and sand processing infrastructure. The Proponent has committed to employing locally, with the majority of the workforce residing in the Lithgow City Local Government Area (LGA).

The capital cost associated with the Proposed Modification relates to the cost of the additional processing infrastructure and earthworks associated with the construction of the stockpile extension areas (including water management infrastructure). The Proponent estimates these costs to be approximately $1,100,000.

The Proponent contributes to the local economy of the Lithgow City LGA through the payment of wages and the purchase of goods and services. The Proponent is committed to purchasing locally where a reasonable alternative is available. The flow-on benefits of these contributions is felt in the local economy through expenditure of these wages and payments. The Proponent also contributes to the NSW and Australian economies through the payment of royalties on the quartzite mined, rates, payroll and other taxes.

2.8 QUARRY SITE DECOMMISSIONING AND REHABILITATION

2.8.1 Introduction

The Proponent would continue to implement a progressive approach to the rehabilitation of disturbed areas at the Quarry to incorporate the additional areas of disturbance, namely the ESEA and WSEA, into the overall rehabilitation plan as nominated in the MOP (RME, 2016).

As far as practical, a progressive approach to rehabilitation would be adopted, i.e. whereby areas of the Quarry no longer required for operations are quickly shaped and vegetated to provide a stable landform. It is noted however, that the nature of Quarry operations requires that only limited areas for rehabilitation would be available until much closer to the exhaustion of the quartzite resource.

It is also noted that the Proponent is currently in the planning phase for a possible extension of operations at the Quarry, with a development application likely to be submitted in 2018. The following subsections assume no such application is made or that approval is not forthcoming, and describe the site decommissioning and rehabilitation activities that would be undertaken following completion of the currently approved operations.

The following subsections have been prepared with reference to the *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* (MOP Guidelines) as these provide for definition of performance targets and measurement over the life of the Quarry. It is noted that rehabilitation is described for the Quarry Site in its totality, noting that only those aspects relevant to the WSEA, ESEA and additional processing infrastructure are modifications from the approved rehabilitation activities described in the MOP.

2.8.2 Objectives

In the short to medium term, the Proponent's rehabilitation objectives would be to stabilise all earthworks, drainage lines and disturbed areas not actively included in Quarry operations.

Over the life of the Quarry, the objectives of rehabilitation would follow from those nominated in the MOP (RME, 2016).

1. Stabilisation of the land to minimise environmental impacts.
2. Reshaping the processing pad and stockpile areas to resemble, as much as possible, the original landform.
3. Establishing a native open forest community that is self-sustaining, low maintenance, and integrated with the native vegetation surrounding the Quarry Site.
4. Modifying the final void to make it safe and stable.
5. Removing all buildings, equipment and Quarry-related infrastructure (including the clean water pipeline).
6. Removing all non-essential roads within the Quarry Site.
7. Retaining all water management features, including drains and dams.
8. Ongoing consultation with landholders regarding the final rehabilitation (as the quarry expands).

The long term rehabilitation objective remains to restore the Quarry Site to resemble the surrounding bushland and to not require maintenance in addition to what may be required in the surrounding bushland.

2.8.3 Final Landform and Land Use

Figure 7 presents the proposed modified final landform. In summary, the modified final landform would comprise the following components.

- The Quarry Site Entrance and Access Road would be retained for use by future land owner / user.
- All buildings and other structures, including concrete foundations and slabs would be removed from the Quarry Site (unless required for future land use).
- An open cut void (to a depth of 930m AHD) would be retained with available overburden placed against the final quarry faces to allow for vegetation growth against these.
- Material currently stockpiled within the former Hoskins Quarry (Supplementary Stockpile Area) would be removed and the former quarry left in the form it was prior to commencement of operations under DA 344-11-2001.
- The disturbance of the remaining Quarry Site to the east of the central clean water drain would be profiled to replicate the pre-disturbance landform.
- The pipe installed to transfer clean water from north to south across the Quarry Site would be excavated and removed with the central clean water drain reinstated.
- The main water storages of the Quarry Site would be retained.
- The WSEA would be reprofiled to create a rolling hillslope, similar in form to the pre-disturbance landform.

In keeping with the commitments made in the EIS (Pacrim, 2001) and MOP (RME, 2016), the proposed final land use for the Quarry Site, including the rehabilitated stockpile extension areas would be nature conservation. Specifically, the Quarry Site would be revegetated to re-establish the native open forest community which previously occurred across the areas disturbed (refer to Section 4.2.3).

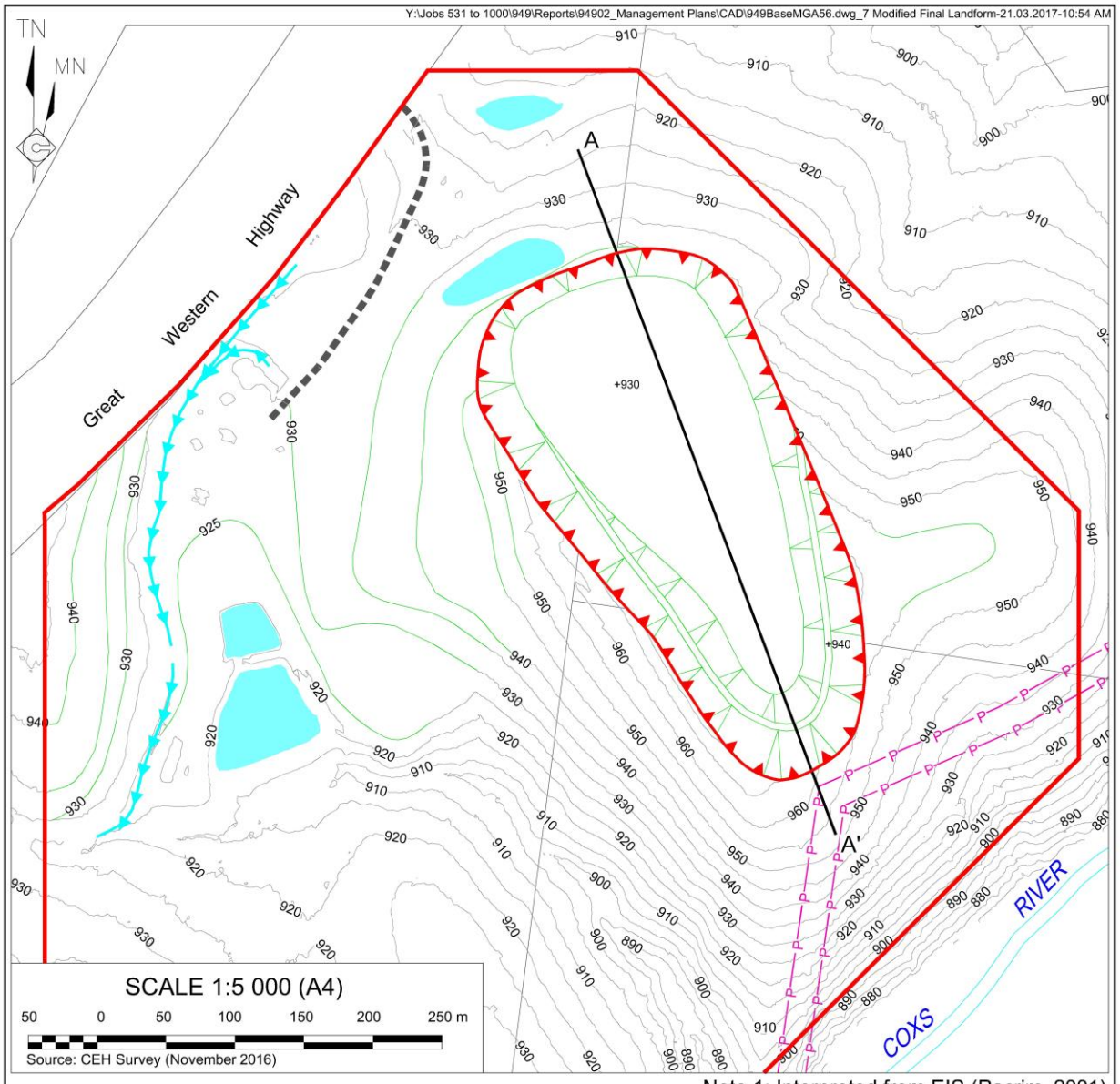
2.8.4 Strategic Rehabilitation Management

2.8.4.1 Rehabilitation Domains

Rehabilitation domains refer to areas of related disturbance based on processes and use prior to rehabilitation and for which decommissioning and rehabilitation activities would be similar. A description of each domain, and specific rehabilitation objectives (as taken from the MOP), is as follows.

Domain 1 – Infrastructure Areas

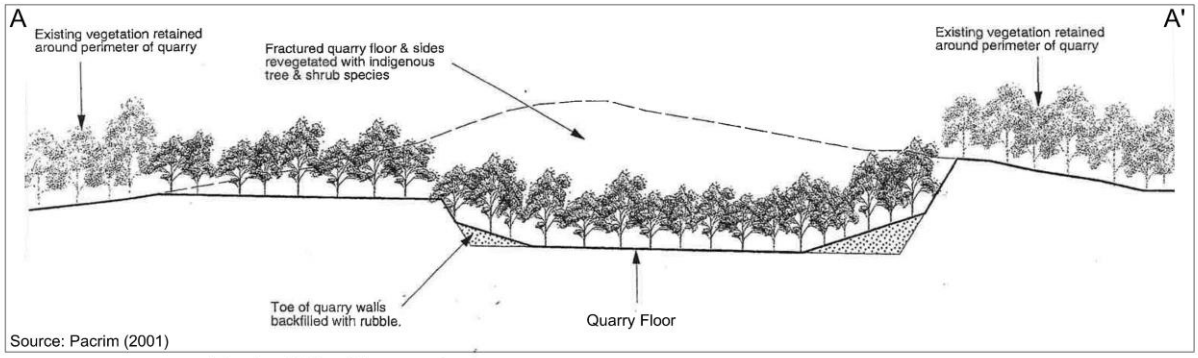
This domain would include the Quarry Site Entrance and Access Road, offices and car park, weighbridge and miscellaneous surrounding hardstand surfaces.



Note 1: Interpreted from EIS (Pacrim, 2001)

REFERENCE

- Quarry Site (ML1633)
- Approved Extraction Area ①
- Access Road
- Cadastral Boundary
- Transmission Line Corridor
- Existing Contour (mAHD)(Interval = 5m)
- Proposed Final Contour (mAHD)(Interval = 5m)
- Watercourse/Drainage Line
- Clean Water Drain
- Dam



Typical Section
Not to Scale

Figure 7
MODIFIED FINAL LANDFORM

The rehabilitation objectives for this domain are as follows.

- The entrance and sealed access road are to be retained.
- All other buildings and infrastructure are to be decommissioned and removed.
- The remaining landform is to be profiled, respread with soil or available growth medium and revegetated as a self-sustaining native open forest community.

Domain 2 – Surface Water Management Structures

This domain includes all clean and dirty water dams, diversion drains and associated infrastructure.

The rehabilitation objectives for this domain are as follows.

- Silt cells and water storage sumps are to be decommissioned, backfilled and profiled.
- The central clean water drain is to be reinstated.
- The remaining landform is to be profiled, respread with soil or available growth medium and revegetated as a self-sustaining open forest community.

Domain 3 – Processing and Stockpile Areas

This domain includes the ROM Pad, processing area, and all stockpile areas.

The rehabilitation objectives for this domain are as follows.

- All plant is to be decommissioned and removed.
- All remaining material is to be sold and despatched or used in final landform creation, e.g. within the final void.
- The Supplementary Stockpile Area (former Hoskins Quarry) is to be returned to the landform which pre-dated operations under DA 344-11-2001.
- The landform is to be profiled, respread with soil or available growth medium and revegetated as a self-sustaining open forest community.

Domain 4 – Void Areas

This domain includes the final open cut void and main haul ramp.

The rehabilitation objectives for this domain are as follows.

- Available overburden or unsold material is to be replaced against the final faces of the void and shaped to reduce the height of any retained wall.
- A perimeter bund is to be retained for public safety.
- The void floor and profiled slopes are to be respread with soil or available growth medium and revegetated as a self-sustaining open forest community.

2.8.4.2 Rehabilitation Phases

Following the guidance provided by the MOP Guidelines, the Proponent has adopted a hierarchical approach to the rehabilitation of the Quarry whereby the rehabilitation is considered as progressive phases, each with its own objectives, criteria for completion and indicators of performance against these criteria.

A summary of each phase of the rehabilitation hierarchy is as follows.

Decommissioning

The decommissioning phase involves the cessation of infrastructure usage, dismantling or demolition, removal and remediation of the land on which the infrastructure was located. The objectives associated with this phase of rehabilitation are as follows.

- To maximise the re-use or recycling of materials.
- To stabilise the area surrounding the infrastructure to be decommissioned in order to prevent pollution to air, land or water.
- To remediate any contamination and ensure the area is non-polluting prior to commencement of the landform establishment phase.

Landform Establishment

The landform establishment phase involves the earthworks required to create a landform suitable for the proposed final land use and which blends with the adjacent topography. This phase would also include the construction of any drainage structures needed for the area.

The objectives associated with this phase of rehabilitation are as follows.

- To stabilise all disturbed areas and minimise erosion and dust generation.
- To provide a low maintenance, geotechnically stable and safe landform suitable for the intended final land use.
- To achieve the nominated design for each landform.
- To blend the created landform with the surrounding topography.

Growth Media Development

The growth media development phase involves the replacement of soil over disturbed areas and preparation for revegetation including fertiliser or ameliorant application, and ripping or scarifying the soil.

The objectives associated with this phase of rehabilitation are as follows.

- To achieve a soil profile capable of sustaining the specified final land use.
- To minimise the potential for erosion, sedimentation and dust generation prior to establishment of vegetation.

Ecosystem and Land Use Establishment

The ecosystem and land use establishment phase involves the revegetation of the rehabilitated landform with species commensurate with the targeted final land use.

The objectives associated with this phase of rehabilitation are as follows.

- To reduce the visual impact upon surrounding residents by early establishment of vegetation in areas where operations have been completed, i.e. on the external face of visibility bunds, exposed terminal faces of the mining area and completed lifts of the overburden emplacement.
- To select and establish vegetation with the species diversity commensurate to the relevant ecological community or agricultural land use.

It is noted that vegetation establishment activities are ongoing in accordance with a *Landscape Planting Plan* for the Quarry, prepared and implemented in accordance with *Condition 2.48* of DA 344-11-2001.

Ecosystem and Land Use Sustainability

The ecosystem and land use sustainability phase involves the management and maintenance of the revegetated landform whilst completion criteria for the nominated landform and land use are achieved. This phase may be ongoing for a long period of time, depending on what the final land use outcome is, and will include any remedial works or revegetation deemed necessary to achieve the final completion criteria.

The objectives associated with this phase of rehabilitation are as follows.

- To re-instate ecological communities with biodiversity commensurate with or greater than those communities disturbed.
- To ensure that the ongoing viability of these ecological communities are sustainable following the active management by the Proponent.
- To integrate the rehabilitated ecological communities with those surrounding the disturbed areas.

2.8.5 Rehabilitation Methods and Procedures

Rehabilitation methods and procedures would be consistent with the methods described in the MOP (RME, 2016). In summary, rehabilitation of the ESEA and WSEA would comprise the following activities.

Decommissioning

- Removal of all remaining stockpiles. If unsold at the cessation of operations, these materials would be used to assist in the creation of the nominated final landform (see **Figure 7**).

Landform Establishment

- In the case of the WSEA, cut and fill works would be completed to create the rolling hill slope identified on **Figure 7**. In sympathy to the surrounding topography, the slopes would not exceed 18° and be created to be primarily concave in form. A concave landform is preferable to a flat or convex slope as it provides for the retarding of flow velocity and therefore erosive force of water flowing over the final landform.
- A contour bank would be retained approximately mid-way down the final slope of the WSEA. This structure would collect and divert runoff to the south at a non-erosive velocity and discharge into the retain water storage (formerly the sediment basin operated for the WSEA).

Growth Media Development

- The profiled landform would be ripped parallel to the contour to assist in future water infiltration and keying of soil.
- Previously excavated and stockpiled soil would then be placed on the shaped landform in accordance with the following procedures.
  - Prior to respreading, the soil would be sprayed with a herbicide to prevent the relocation of weed species from stockpile to rehabilitation.
  - The soil would be replaced as a single blended topsoil / subsoil unit with the depth of respread soil to vary between 300mm and 600mm in depth (deeper on flatter areas and shallower on steeper areas).
  - The surface of the shaped landform would be left even but slightly scarified. This would assist in maintaining soil stability, maximising seed retention and germination and minimising erosion.
  - A slow-release fertiliser may be used, as required, in conjunction with organic matter (mulch from previously cleared vegetation) to improve the Cation Exchange Capacity (CEC) of the soil to enable longer retention of nutrients.

Ecosystem and Land Use Establishment

- A seed mix of locally endemic native grass, shrub and tree species would be sown or planted as tubestock to establish a grassy woodland setting.
- Any tubestock would be watered on initial planting, however, future watering would only be in response to signs of stress (to avoid habituation to watering).

Ecosystem and Land Use Sustainability

- Ongoing monitoring of the success of rehabilitation would be undertaken in accordance with the procedures outlined in the MOP, and remedial action would be implemented should the progression of rehabilitation not be satisfactory.

2.8.6 Implementation

2.8.6.1 Responsibility and Accountability

Responsibility for the implementation of rehabilitation would fall to the Quarry Manager, supported by Quarry operators. **Table 2** provides an overview of the various tasks and likely allocation of responsibilities.

Table 2
Accountable Positions and Tasks (Rehabilitation)

Position	Accountable Task
Quarry Manager	• Ensure that the development and operation of quarry complies with the conditions of development consent, all NSW Acts and Regulations, and issued approvals, permits and licences. • Ensure funds required for rehabilitation of the Quarry Site are provided for. • Ensure that the mining area remains within the approved limits and conditions of development consent. • Understand the commitments made in this *Environmental Assessment* with respect to rehabilitation. • Ensure rehabilitation monitoring obligations are adhered to. • Provide clear, unambiguous instruction to mobile equipment operators as to requirements of final landform. • Ensure soil and cleared vegetation stockpiles are managed appropriately. • Document rehabilitation as completed and make data available for annual reporting.
Mobile Equipment Operators	• Understand approved limits of disturbance (do not clear vegetation or strip soil unless under clear instruction). • Construct landforms as nominated in this *Environmental Assessment* or as instructed by quarry management. • Replace soil in reverse order to stripping.

2.8.6.2 Rehabilitation Funding

On approval, the Proponent would recalculate the cost to complete the proposed rehabilitation (in 2017 dollar value) using the DRE's rehabilitation security calculator. Concurrently with an application to amend the MOP, the Proponent would provide for an increase in the rehabilitation security held by the DRE for the rehabilitation of the Quarry on ML 1633.

The Proponent, as part of normal budgeting process, would allocate a value to be spent each year for the purposes of rehabilitation. The cost to rehabilitate the Quarry Site would be reviewed periodically to assess rehabilitation completed, costs to complete rehabilitation and likely allocation of funds over the ensuing years to rehabilitation.

2.9 ALTERNATIVES CONSIDERED

2.9.1 Alternative Stockpile Areas

Increasing the area available for product stockpiling is identified in Section 1.7 as important in securing the future for the Quarry. That is, in order to carry sufficient stocks of a variety of aggregate products, an increase in the total area available for stockpiling is required.

No alternative locations within the Quarry Site provide better proximity to the existing operations and hence the clearing of the areas for which approval is sought was undertaken. As these areas have already been cleared, and there are no obviously preferential locations for stockpiling, these locations are considered the most appropriate. The impact on the local environment of the completed clearing and proposed ongoing use is assessed in Section 4.

2.9.2 No Stockpile Extension Area Development

The alternative of rehabilitating the cleared stockpile area extensions and returning this land to native vegetation has been considered but ultimately rejected for the following reasons.

- There is a need for an increase in available stockpile area to ensure the ongoing feasibility of the Quarry (refer to Section 1.7).
- The Proponent is also commencing resource investigations and other planning for a potential extension of Quarry operations beyond 2019 (when DA 344-11-2001 expires). This would potentially require an extension of the mining area over the nominated stockpile area extensions, making any remedial rehabilitation works redundant should the Quarry extension proceed.

In any event, should no further extension of the Quarry beyond 2019 proceed, there would be little difference in the final landform generated by immediate remediation and rehabilitation and that proposed as part of the Proposal (refer to Section 2.8.3 and **Figure 7**).

2.9.3 Decommissioning of Fine Aggregate and Sand Production

The alternative of decommissioning the fine aggregate and sand processing plant and associated silt cells has been considered. However, as noted in Section 1.7, the ability to produce fine aggregates and sand is considered important to the ongoing feasibility of the Quarry. As is discussed in Section 4, the continued operation of this component of processing activities has little impact on overall environmental impacts of the Quarry on the local environment.

3. ISSUE IDENTIFICATION AND PRIORITISATION

3.1 INTRODUCTION

In order to undertake a comprehensive *Environmental Assessment* of the Proposed Modification, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. Issue identification was completed through a combination of the following methods.

- A review of community consultation undertaken by the Proponent.
- Targeted government consultation in order to identify environmental issues of concern or relevance.
- A review of environmental planning documentation in order to identify relevant environmental constraints and/or issues.
- A review of the environmental performance at the Mine in order to identify those aspects of the environment that are, have been or are likely to be affected by mining operations.
- The experience of Mine personnel and the authors of this *Environmental Assessment* in relation to the likely impacts.

Section 3.2 provides the results of the issue identification.

On identification of those environmental issues that could be affected by the Proposed Modification, an analysis of the potential for impact on each of these has been undertaken in order to identify the priority and scale of assessment required (see Section 3.3).

3.2 ISSUE IDENTIFICATION

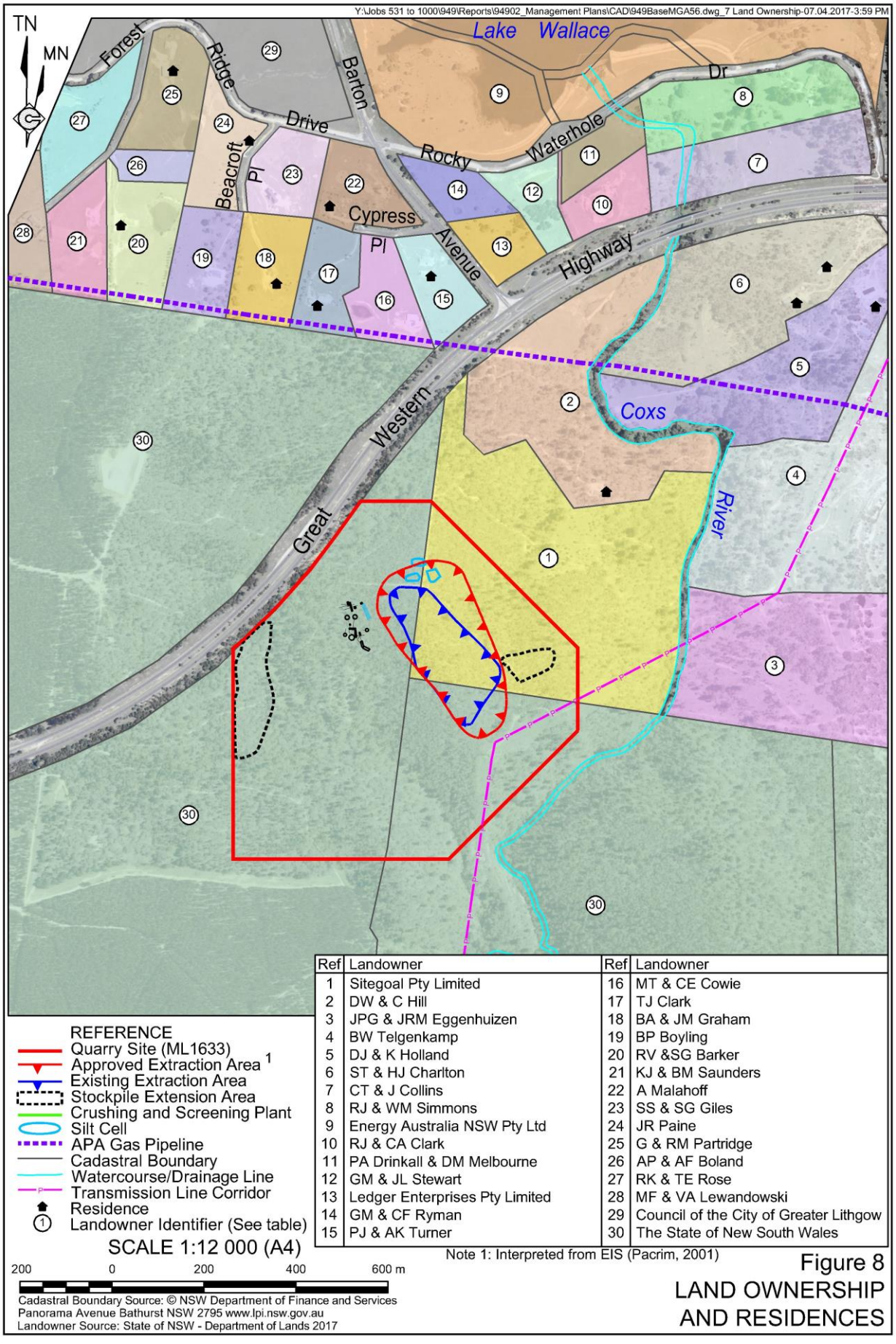
3.2.1 Consultation

3.2.1.1 Community Consultation

Following the original application of Sitegoal Pty Ltd to develop the Quarry, it is understood Lithgow City Council objected to the development principally relating to the impact this might have on development of land between the Great Western Highway and Wallerawang for rural residential style blocks. The land ownership and residence plan of **Figure 8** illustrates that this development has taken place with residences now constructed on a number of these blocks.

While there has been no formal consultation between the Proponent and neighbouring land owners and residents, the local community is kept up to date on activities at the Quarry in several ways.

- A Community Consultative Committee (CCC) has been established and meets approximately every six months (with the facility to meet more regularly to address specific issues as hey arise). The function of the CCC is to provide a forum for the Proponent to inform the local community of ongoing or notable operations and the local community an opportunity to raise issues of concern or relevance. With the exception of minor issues related to blast notification and equipment reversing alarms, no major issues have been raised by the CCC.



Ref	Landowner	Ref	Landowner
1	Sitegoal Pty Limited	16	MT & CE Cowie
2	DW & C Hill	17	TJ Clark
3	JPG & JRM Eggenhuizen	18	BA & JM Graham
4	BW Telgenkamp	19	BP Boyling
5	DJ & K Holland	20	RV &SG Barker
6	ST & HJ Charlton	21	KJ & BM Saunders
7	CT & J Collins	22	A Malahoff
8	RJ & WM Simmons	23	SS & SG Giles
9	Energy Australia NSW Pty Ltd	24	JR Paine
10	RJ & CA Clark	25	G & RM Partridge
11	PA Drinkall & DM Melbourne	26	AP & AF Boland
12	GM & JL Stewart	27	RK & TE Rose
13	Ledger Enterprises Pty Limited	28	MF & VA Lewandowski
14	GM & CF Ryman	29	Council of the City of Greater Lithgow
15	PJ & AK Turner	30	The State of New South Wales

Note 1: Interpreted from EIS (Pacrim, 2001)

Figure 8
LAND OWNERSHIP AND RESIDENCES

- A community information / complaints line is maintained by the Proponent. As complaints or requests for information are received, the Proponent is committed to responding as quickly and comprehensively as possible (refer to Section 3.2.3.2).
- Representatives of the Proponent also meet with, or correspond with by phone or email, local and other concerned stakeholders on an ad hoc basis, i.e. opportunistically or as issues are identified.
- Representatives of the Proponent or their consultants visit several of the surrounding properties to undertake monitoring activities (noise, air and vibration) providing an opportunity for issues to be identified and discussed.

Due to the low impact nature of operations to date, there have been very few issues raised by the local community since commencement.

3.2.1.2 Government Agency Consultation

Once it was confirmed that modification to DA 344-11-2001 was the most appropriate approach to rectifying the non-compliance identified by the DPE, confirmation was sought from the DPE as to the appropriate assessment pathway and key assessment requirements. The DPE confirmed that application to modify PA 09_0155 should be made under Section 75W of the EP&A Act, in accordance with the transitional arrangements of Clause 8J(8)(C) of the EP&A Reg.

As instructed by the DPE, the Proponent also consulted with the following government agencies seeking information on key assessment requirements from each.

- Lithgow City Council (LCC): as the Quarry is located within this LGA.
- Department of Industry – Division of Resources & Energy (DRE): as the authority responsible for the issuing and regulation of mineral authorities held by the Proponent.
- WaterNSW: as the Proposed Modification has the potential to impact on the Sydney Drinking Water Catchment.
- Office of Environment & Heritage (OEH): given the potential occurrence of threatened species within and adjoining the area of direct impact.
- Environment Protection Authority (EPA): for consideration of any potential changes to polluting emissions.
- Department of Primary Industries – NSW Office of Water: for consideration of water licensing matters associated with the use of water for the screening and separation of the smaller diameter quartzite aggregates and sand.

The key responses and assessment requirements of the DPE and consulted government agencies, which can be reviewed in full as **Appendix 3**, are summarised as follows.

Department of Planning & Environment

The Proponent originally intended to submit applications to modify DA 344-11-2001 for the purpose of the stockpile extensions and processing operations separately. Following this approach, separate Project Overviews of each modification were supplied to the DPE on 31 January 2017 and 15 February 2017 with a request for clarification as to the appropriate section under the EP&A Act for application to be made and instruction on the information to be supplied with each application. The DPE confirmed in an email of 1 February 2017 that application should be made under Section 75W of the EP&A Act (applying the transitionary provisions of Clause 8j(8)(C) the EP&A Reg). No formal Secretary's Environmental Assessment Requirements (SEARs) were issued, however, the DPE indicated the following required consideration within the *Environmental Assessment*.

- The potential for impact on the Coxs River, which forms part of the Sydney drinking water catchment.
- Assessment of threatened species, in particular but no limited to Bathurst (Purple) Copper Butterfly and Yellow Sheath-tail Bat which have been previously identified on the site.
- Provision for a biodiversity offset associated with the additional disturbance.

On consideration of the request for assessment requirements for the second application, the DPE instructed the Proponent to combine the two modifications into a single application.

The DPE also instructed the Proponent to consult with the following government agencies.

- Lithgow City Council (LCC);
- WaterNSW;
- the Department of Industry - Division of Resources and Energy (DRE);
- the NSW Office of Environment and Heritage (OEH);
- the Environmental Protection Authority (EPA); and
- the Department pf Primary Industries – NSW Office of Water (DPI-Water).

The responses of the government agencies, which can be viewed in full as **Appendix 3**, are summarised as follows.

Lithgow City Council

In an email sent to RWC on 15 February 2017 LCC confirmed that the environmental issues raised in a Project Overview supplied to LCC on 1 February 2017 as most critical to the assessment. Specific reference was made to the assessment of any visual impacts that may occur.

Department of Industry – Division of Resources & Energy

The DRE provided 'standard mining development rehabilitation SEARs and requested that these be applied to the Proposed Modification where relevant (noting the relatively minor nature of the modification).

The DRE also noted that the MOP for the Quarry would require updating on approval of the modification to ensure consistency between this document and DA 344-11-2001.

WaterNSW

In a response received on 8 February 2017, WaterNSW identified one of its principal objectives being to ensure that the Sydney drinking water catchment (see **Figure 9)** is managed and protect so as to promote water quality, the protection of public health and public safety, and the protection of the environment. WaterNSW notes that it has adopted a set or principles for managing mining impacts in declared catchments and in relation to the proposed modification requests that the *Environmental Assessment*:

- detail how the proposed modification would be consistent with Water NSW's mining principles to ensure water quantity, water quality and sound and robust evidence regarding environmental impacts;
- demonstrate how the carrying out of the proposed modification would have a neutral or beneficial effect on receiving waters; and
- provide for an update to the existing *Water Management Plan* to ensure adequacy of the measures contained within this for the ongoing operation of the Quarry.

Office of Environment & Heritage

In correspondence received on 20 February 2017, the OEH recommended that the Proponent assess habitat adjacent to the two stockpile extension areas in order to contribute to the assessment of the biodiversity values likely to have occurred prior to the clearing. The OEH recommended that the *Environmental Assessment* address impacts on the following environmental parameters.

- Biodiversity and offsetting. The OEH made specific referenced to the application of the *NSW Biodiversity Offsets Policy for Major Projects* (OEH, 2014a), which is underpinned by the Framework for Biodiversity Assessment (FBA) (OEH, 2014b), assess biodiversity values. Specific consideration of potential impacts on the Wollemi Mint-bush was requested.
- Aboriginal cultural heritage.
- Historic heritage.
- Water and soils.
- Flooding.

Specific guidance on the assessment requirements for each of the parameters noted above was provided and can be viewed in **Appendix 3**.

Environmental Protection Authority

When consulted the EPA declined to provide assessment requirements.

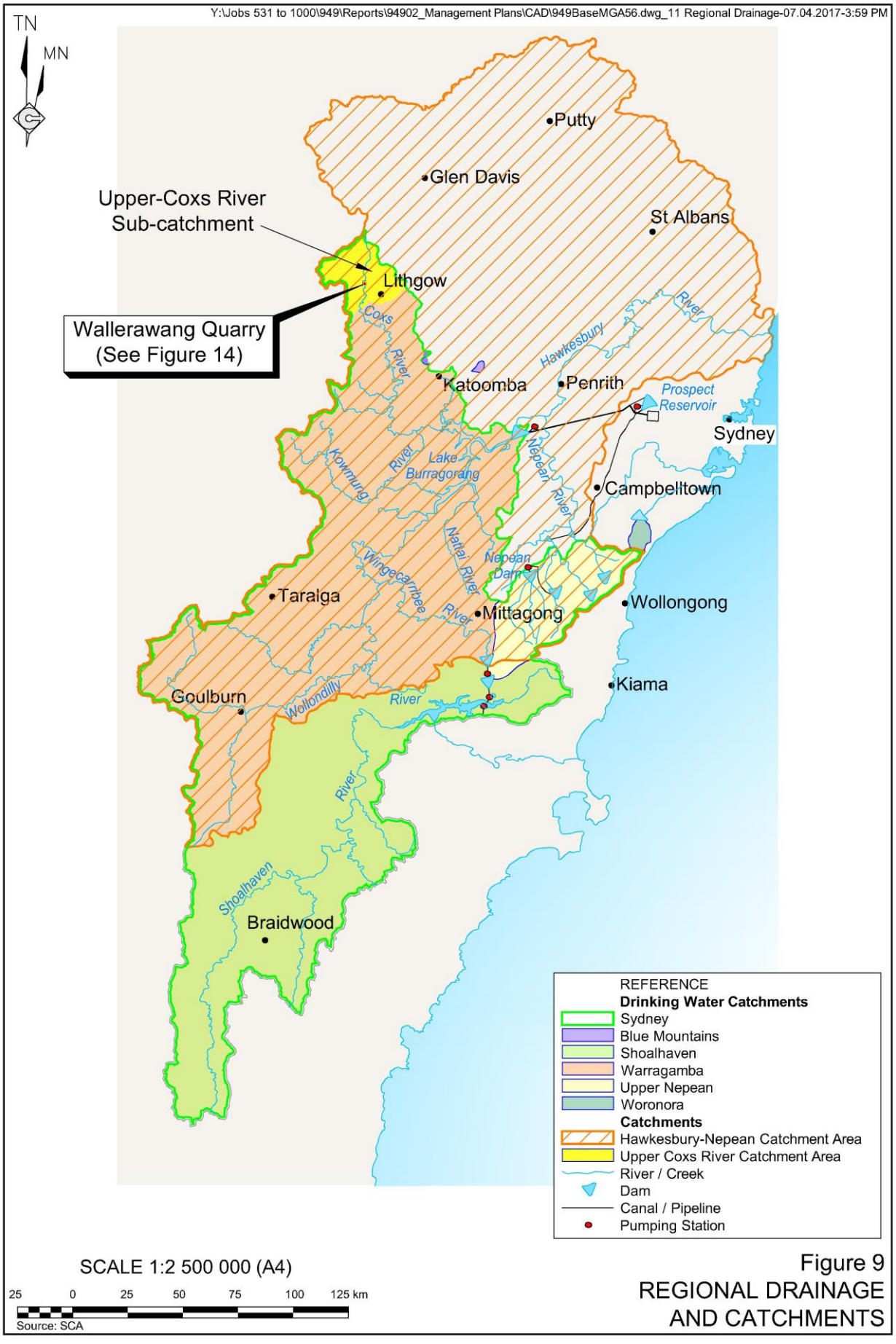


Figure 9
REGIONAL DRAINAGE AND CATCHMENTS

Department of Primary Industries – NSW Office of Water

In correspondence received on 24 February 2017, DPI-Water provided the following recommendations for inclusion in the *Environmental Assessment*.

- An update of the annual volumes of groundwater proposed to be taken by the activity (the whole quarry not just for the proposed modifications) (including through inflow and seepage) from the Sydney Basin Coxs River Fractured Rock Groundwater Source.
- A detailed assessment against the *NSW Aquifer Interference Policy* (2012) (AIP) using DPI Water's assessment framework.
- Assessment of impacts on groundwater sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Full technical details and data of all groundwater modelling, and an independent peer review.
- Proposed groundwater monitoring activities and methodologies.
- Details of the final landform of the site, including final void management (where relevant) and rehabilitation measures.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.

In response to these recommendations, correspondence was sent to DPI-Water (on 27 February and 17 March) noting the proposed modification seeks no change to activities at the Quarry which could result in aquifer interference. That is, there will be no change to the depth or extent of the open cut which was designed to remain above the groundwater table. DPI-Water responded on 20 March 2017 reiterating the previously quoted requirements on the basis that:

a) the original groundwater assessment for the Quarry was deficient;

b) The AIP has been released since the issue of DA 344-11-2001; and

c) there is no record of the approved depth of the Quarry.

It is noted that the Environmental Assessment has been prepared to consider the potential impacts of the proposed modification on local water resources and licensing / permitting requirements as relevant to the changes proposed. Importantly, the Proposed Modification does not propose any such changes. The above notwithstanding, the Environmental Assessment includes an assessment of the Quarry against the AIP.

3.2.2 Review of Planning Issues

3.2.2.1 Introduction

A number of planning instruments apply to the operations at the Quarry. These planning instruments were reviewed to identify any environmental aspects requiring consideration in the *Environmental Assessment*. A brief summary of each relevant planning instrument, relevance to

the Proposed Modification and how these have been considered in the *Environmental Assessment*, is provided in Sections 3.2.2.2 and 3.2.2.3 for State and local planning issues respectively.

3.2.2.2 State Planning Issues

Application of Part 3A of the EP&A Act

Modification to DA 344-11-2001 is required under the EP&A Act as the proposed modification would change the terms of the determination made by the Minister (for Infrastructure and Planning).

As a development consent granted by the Minister under Part 4 of the EP&A Act (relating to State significant development) before 1 August 2005, Clause 8J(8)(c) of the EP&A Reg identifies that Section 75W of the now repealed Part 3A of the EP&A Act applies for the purpose of the modification.

No formal Secretary's Environmental Assessment Requirements were deemed necessary by the DPE (refer to Section 3.2.1.2).

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

The State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (Mining SEPP) specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development. **Table 3** presents a summary of the matters that the Minister or his/her delegate needs to consider when assessing a new or modified Proposal (Part 3 – Clauses 12 to 17 of the SEPP) and a reference to the section(s) in this Environmental Impact Statement where each relevant element of the Mining SEPP is addressed.

Table 3
Application of Mining SEPP

Page 1 of 3

Clause	Description	Section
12AB: Non-discretionary development standards for mining	1. The object of this clause is to identify development standards on particular matters relating to mining that, if complied with, prevents the consent authority from requiring more onerous standards for those matters (but that does not prevent the consent authority granting consent even though any such standard is not complied with).	Noted
	2. The matters set out in this clause are identified as non-discretionary development standards for the purposes of section 79C (2) and (3) of the Act in relation to the carrying out of development for the purposes of mining. Note: The development standards do not prevent a consent authority from imposing conditions to regulate project-related noise, air quality, blasting or ground vibration impacts that are not the subject of the development standards.	Noted
	3. Cumulative noise level. The development does not result in a cumulative amenity noise level greater than the acceptable noise levels, as determined in accordance with Table 2.1 of the *Industrial Noise Policy*, for residences that are private dwellings.	4.8
	4. Cumulative air quality level. The development does not result in a cumulative annual average level greater than 30µg/m^3 of PM_{10} for private dwellings.	4.7

Table 3 (Cont'd)
Application of Mining SEPP

Clause	Description	Section
12AB: Non-discretionary development standards for mining	5. Airblast overpressure. Airblast overpressure caused by the development does not exceed: (a) 120 dB (Lin Peak) at any time, and (b) 115 dB (Lin Peak) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver.	N/R
	6. Ground vibration. Ground vibration caused by the development does not exceed: (a) 10mm/sec (peak particle velocity) at any time, and (b) 5mm/sec (peak particle velocity) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver.	N/R
	7. Aquifer interference. Any interference with an aquifer caused by the development does not exceed the respective water table, water pressure and water quality requirements specified for item 1 in columns 2, 3 and 4 of Table 1 of the Aquifer Interference Policy for each relevant water source listed in column 1 of that Table. Note: The taking of water from all water sources must be authorised by way of licences or exemptions under the relevant water legislation.	4.5
	8. The Minister is to review a non-discretionary development standard under this clause if a government policy on which the standard is based is changed.	Noted
12: Compatibility with other land uses	Consideration is given to:	
	- the existing uses and approved uses of land in the vicinity of the development;	4.6
	- the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	
	- any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	
	Measures proposed to avoid or minimise any incompatibility are considered.	N/A[1]
12A: Consideration of voluntary land acquisition and mitigation policy	Consideration is given to any applicable provisions of the voluntary land acquisition and mitigation policy and, in particular:	
	(a) any applicable provisions of the policy for the mitigation or avoidance of noise or particulate matter impacts outside the land on which the development is to be carried out, and	N/R
	(b) any applicable provisions of the policy relating to the developer making an offer to acquire land affected by those impacts.	N/R
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	NR[1]
	Measures taken by the Proponent to avoid or minimise any incompatibility are considered.	
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	

Table 3 (Cont'd)
Application of Mining SEPP

Clause	Description	Section
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:	
	- impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	3.3.3, 3.3.4, 4.3
	- impacts on threatened species and biodiversity are avoided or minimised; and	4.2
	- greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	3.3.8, 4.7
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	2.8, 4.6
16: Transportation	The following transport related issued are considered.	2.5, 3.3.10
	- The transport of some or all of the materials from the site by means other than public road.	
	- Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	
	- The preparation of a code of conduct for the transport of materials on public roads.	
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including:	2.8, 3.3.5, 4.6
	- the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	
	- the appropriate management of development generated waste;	
	- remediation of any soil contaminated by the development; and	
	- the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	

NR = Not relevant. N/A = Not Applicable

Note 1: Clause 13 is not considered relevant on the basis that the Mine has already been approved and as such the significance of the resource and economic benefits to the State have already been considered

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The aims of this SEPP are to integrate the provision of healthy water catchments with development in catchment areas by ensuring that consent authorities must not grant consent to a proposed development unless it is satisfied that the proposed development will have a neutral or beneficial effect on water quality and not hinder the achievement of water quality objectives for the Sydney drinking water catchment.

The Site is located within the Warragamba catchment which forms part of Sydney's water supply (see **Figure 9**) and as such the following must be considered when assessing the Proposal.

- Incorporation of the current recommended practices and standards of WaterNSW or demonstration that proposed practices and performance standards meet or exceed these practices and standards.
- Demonstration of neutral or beneficial effect on water quality.

The former Sydney Catchment Authority (which now forms part of WaterNSW) provide guidelines for the assessment of a neutral or beneficial effect on water quality and **Table 4** provides a summary of these and where these have been addressed in the *Environmental Assessment*.

Table 4
Neutral or Beneficial Water Quality Impact Assessment Guidelines

Guideline	Description	Section
Are there any identifiable potential impacts on water quality? What pollutants are likely? During construction and/or post construction?	It is important to identify any possible impacts, not go straight to a conclusion that there won't be any impacts because they will be contained by appropriate safeguards.	4.3.3, 4.3.6.2
For each pollutant, list the safeguards needed to prevent or mitigate potential impacts on water quality (these may be SCA endorsed current recommended practices (CRPs) and/or equally effective other practices)?	These are the safeguards, or water quality protection measures, that need to be in place during the construction and operational stages of the project. Wherever possible these safeguards should be based on SCA endorsed Current Recommended Practices (CRPs) & Standards.	4.3.4
Will the safeguards be adequate for the time required? How will they need to be maintained?	Measures should be designed to cope with expected seasonal weather conditions, e.g. high intensity summer storms.	4.3.4
Will all impacts on water quality be effectively contained on the site by the identified safeguards (above) and not reach any watercourse, water body or drainage depression? Or will impacts on water quality be transferred outside the site for treatment? How? Why?	The level of analysis should be in proportion to the risks related to the type of activity and sensitivity of the site. For routine projects, a qualitative assessment would be sufficient to deem the achievement of neutral or beneficial effect. For large scale projects or where they are located in particularly sensitive areas, some form of pollutant modelling is recommended.	4.3.6
Is it likely that a neutral or beneficial effect on water quality will occur? Why?	When the activity has been completed, will the level of pollutants be the same as they were before work commenced (i.e. neutral effect)? Or lower than before (beneficial effect)? Or worse than before (adverse effect)?	4.3.6.4

Notably, as the Minister is the consent authority, concurrence of the Chief Executive of WaterNSW is not required (as nominated by Clause 11 of the SEPP). WaterNSW has been consulted, however, and the noted assessment requirements (refer to Section 3.2.1.2) addressed.

SEPP 33 – Hazardous and Offensive Development

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

The Proposed Modification would not result in any modifications to the types, volumes, storage or use of hazardous or dangerous goods within the Mine Site. As a result, SEPP 33 is not relevant to this application.

SEPP 44 – Koala Habitat Protection

The Lithgow City LGA is identified (as the former Greater Lithgow LGA) in Schedule 1 of *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) as an area that could provide habitat for Koalas. As a result, the Minister is required to consider whether potential or core Koala habitat would be disturbed by the Proposal.

The clearing associated with the Proposed Modification has not resulted in disturbance of any tree species identified as feed tree species by Schedule 2 of SEPP 44, nor have Koalas been identified on or in the immediate vicinity of the Quarry (Lesryk, 2017). As a result, no further assessment is required.

3.2.2.3 Local Planning Issues

The Mine Site lies entirely within Lithgow City Local Government Area with local environmental planning provisions undertaken in accordance with the *Lithgow Local Environment Plan 2014* ("Lithgow LEP").

Zoning and Permissibility (Zoning Considerations)

The Quarry occurs on land within two zones of the Lithgow LEP. The WSEA located on land zoned RU3 – Forestry and the ESEA on land zoned E4 – Environmental Living (refer to **Figure 10**).

Open cut mining is permissible with development consent within the RU3 zone. Within the E4 zone, mining is permissible by virtue of Clause 7(1) of the Mining SEPP which states:

> "*Development for any of the following purposes may be carried out with development consent:*
>
> *(b) mining carried out:*
>
> *(i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or*
>
> (ii) *on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,*"

Extensive agriculture is permissible within the E4 Zone.

Heritage Conservation

Miscellaneous provision 5.10 provides for the conservation of:

a) environmental heritage of Lithgow;

b) the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views;

c) archaeological sites; and

d) Aboriginal objects and Aboriginal places of heritage significance.

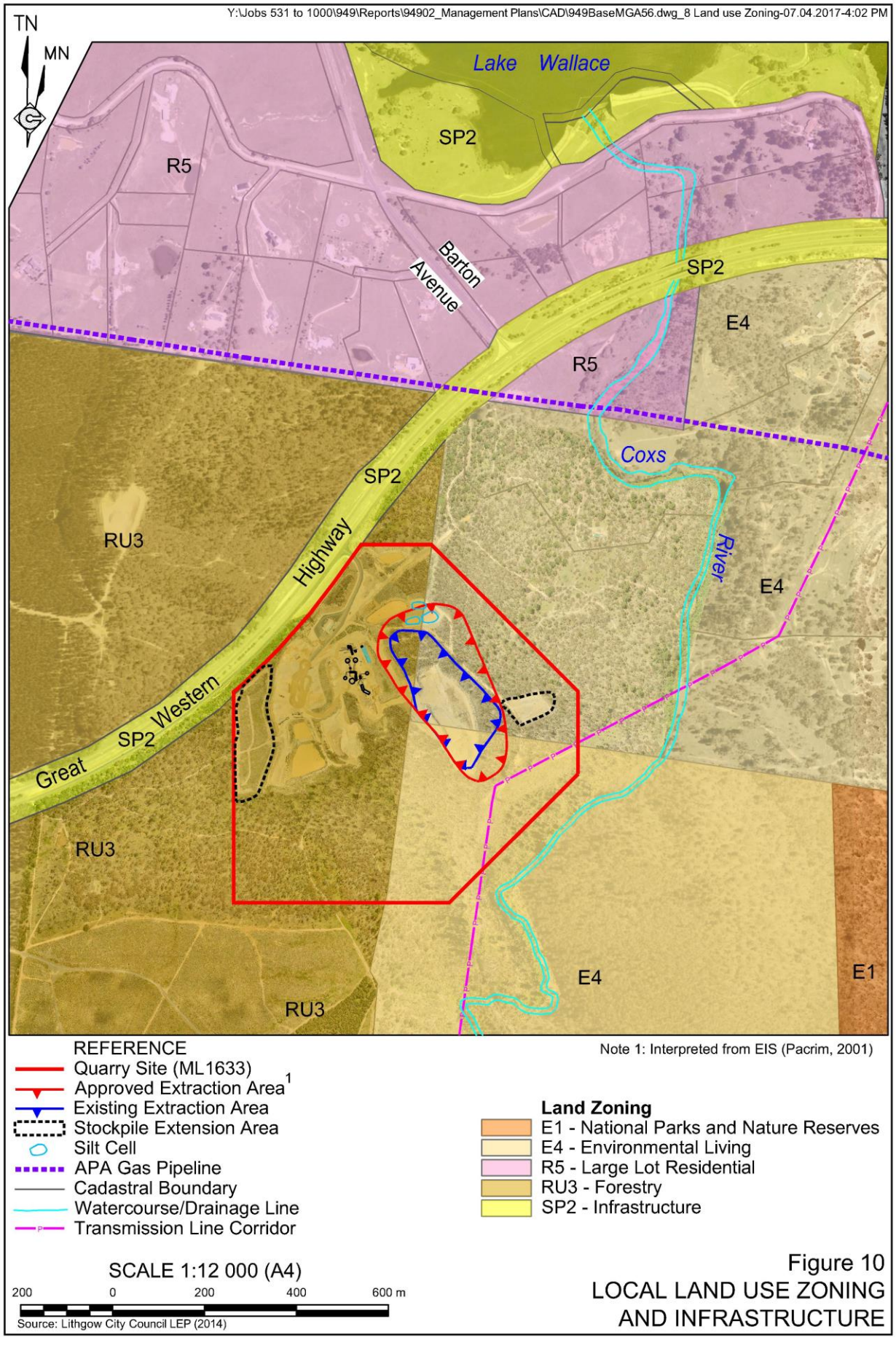


Figure 10
LOCAL LAND USE ZONING AND INFRASTRUCTURE

One Aboriginal site occurs within the Quarry Site in the form of an open campsite consisting of scattered artefacts on the northern side of the former Hoskins Quarry (see **Figure 11**). In accordance with the recommendations provided by the consultant archaeologist and Bathurst Local Aboriginal Land Council at the time, the artefact remains undisturbed and has been protected through the installation of a fence.

A review of Lithgow LEP 2014 Heritage Map Sheet HER_002F confirms that there are no other identified sites of environmental heritage on or adjoining the Quarry Site.

Earthworks

Additional local provision 7.1 has the noted objective to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land.

The impacts of the proposed earthworks of the Proposed Modification are considered throughout Section 4 to address the requirements of Clause 7.1(3).

Flood Planning

Additional local provision 7.2 has the noted objectives to:

a) minimise the flood risk to life and property associated with the use of land;

b) allow development on land that is compatible with the land's flood hazard, taking into account projected changes as a result of climate change; and

c) avoid significant adverse impact on flood behaviour and the environment.

A review of Lithgow LEP 2014 Flood Planning Map Sheet FLD_002 confirms that the Quarry Site is not located within the nominated flood planning area (see **Figure 11**). There is no catchment based flood mapping for the Coxs River in the vicinity of the Quarry Site, however, noting the Quarry Site is approximately 60m above the Coxs River it will be well above the 1:100 average recurrence interval (ARI) flood level. On the basis of the preceding, a detailed flood impact assessment to address the requirements of Clause 7.1(3) is not required. Aspects of surface water management are considered in further in Section 4.3.

Terrestrial Biodiversity

Additional local provision 7.4 has the noted objective to maintain terrestrial biodiversity by:

a) protecting native fauna and flora;

b) protecting the ecological processes necessary for their continued existence; and

c) encouraging the conservation and recovery of native fauna and flora and their habitats.

Figure 11 identifies the Quarry Site over environmentally sensitive biodiversity, as nominated by the Lithgow LEP 2014 Environmental Sensitive Areas – Biodiversity Map Sheet BIO_002. Further consideration of the impacts of the Proposed Modification on biodiversity is provided by Lesryk (2017) and Section 4.2.

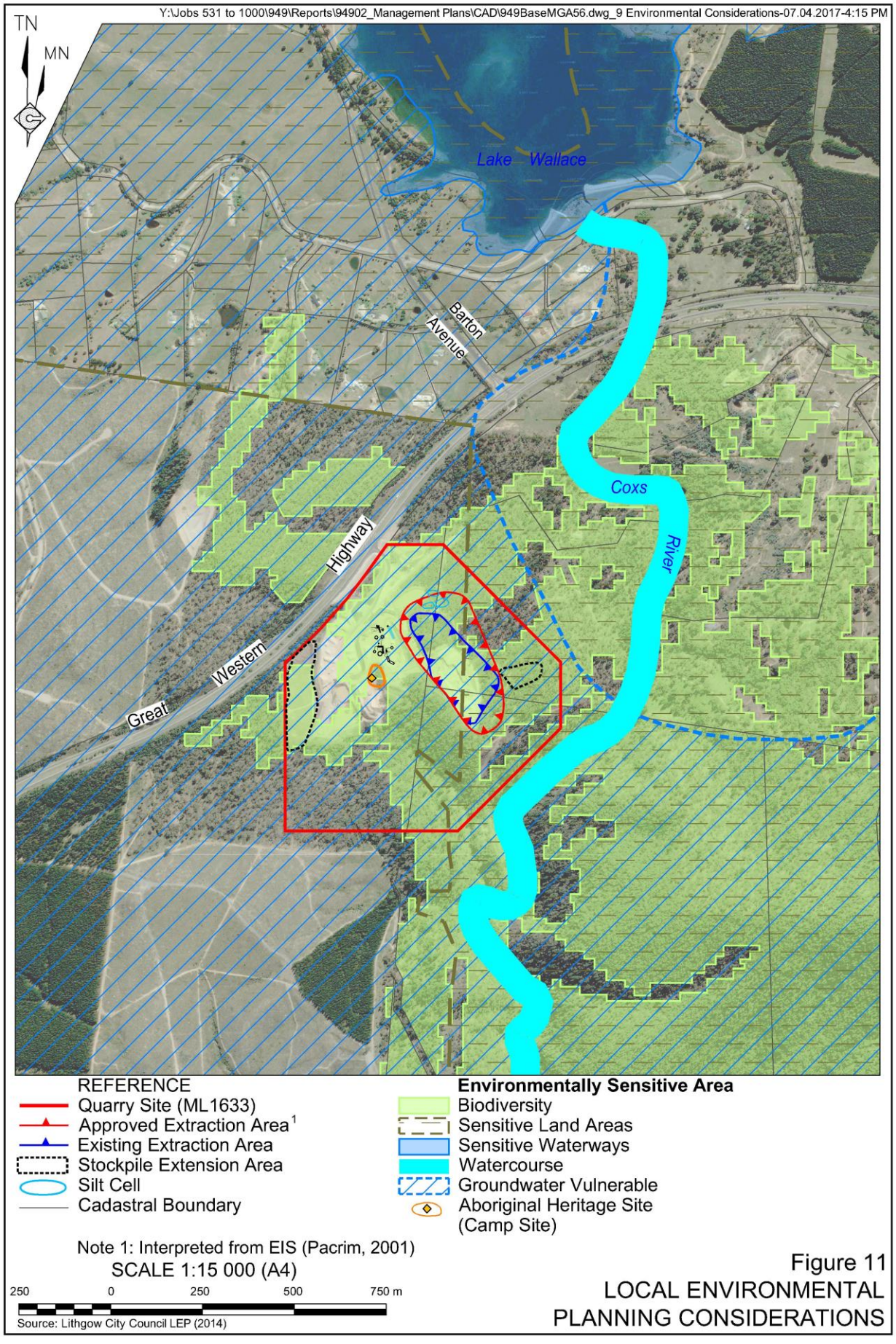


Figure 11
LOCAL ENVIRONMENTAL PLANNING CONSIDERATIONS

Groundwater Vulnerability

Additional local provision 7.5 has the noted objectives to:

a) to maintain the hydrological functions of key groundwater systems; and

b) to protect vulnerable groundwater resources from depletion and contamination as a result of development.

Figure 11 identifies the Quarry Site as occurring over land with groundwater vulnerability, as nominated by the Lithgow LEP 2014 Environmental Sensitive Areas – Water Map Sheet CL1_002. While the Proposed Modification does not propose any change to operations which would impact directly on local groundwater, further assessment of Quarry operations against the AIP is provided in Section 4.5.

Riparian land and watercourses

Additional local provision 7.6 has the noted objective to protect and maintain the following:

a) water quality within watercourses;

b) the stability of the bed and banks of watercourses;

c) aquatic and riparian habitats; and

d) ecological processes within watercourses and riparian areas.

The Quarry does not impact directly with any LEP nominated watercourse (refer to **Figure 11**). However, the Proposed Modification could result in changes with the potential to affect water quality of discharge to the Coxs River, which in turn could impact of aquatic and riparian habitats and ecological processes. Section 4.3 considers the potential impact of the Proposed Modification on local water quality and Section 4.2 impacts on biodiversity.

3.2.3 Environmental Performance

3.2.3.1 Environmental Monitoring

The Proponent currently undertakes the following monitoring at and surrounding the Quarry.

- Dust is monitored at four deposited dust gauges on and surrounding the Quarry Site.

  With exceptions able to be explained by environmental factors external to Quarry operation, the results of this monitoring has demonstrated compliance with the criteria of DA 344-11-2001 and EPL 13172 (refer also to Section 4.7.2.2).

- Noise is monitored every six months at receivers surrounding the Quarry.

  Compliance with the noise criteria of DA 344-11-2001 and EPL 13172 have been demonstrated on each occasion (refer also to Section 4.8.2.2).

- Air overpressure and ground vibration are monitored for every blast.

  Compliance with the criteria of DA 344-11-2001 and EPL 13172 have been demonstrated on each occasion.

- Water is sampled and analysed on discharge to confirm compliance with the quality criteria of EPL 13172. Water is also sampled annually within the Coxs River upstream and downstream of the Quarry.

  Results to date have confirmed compliance with the water quality criteria of EPL 13172, noting that the criteria do not apply under rainfall conditions exceeding 5-day, 95th percentile conditions (55.6mm over 5 consecutive days). The Proponent applies an anionic acrylamide copolymer flocculent (HydroBond® HB-4118) to water within the Quarry sediment basins to assist in settlement of water prior to controlled discharge. The MSDS for HydroBond® HB-4118 confirms this product has a LC_{50} greater than 100mg/L for fish and EC_{50} greater than 100mg/L for water invertebrates (see **Appendix 8**).

- Performance against the objectives and commitments of the Quarry Soil and Water Management Plan (Incorporating a Stormwater Management Scheme) (SWMP) is undertaken in the form of a Self-auditing Program.

  In accordance with the SWMP, sediment control structures will be inspected (at least monthly and immediately following heavy rainfall) to ensure adequate capacity is retained (where applicable) and are not eroding or causing erosion. Where erosion or sediment build-up is observed, remedial or supplementary actions are taken by the Proponent. A written log of inspections is to be maintained at the Quarry.

- Annual monitoring of remnant vegetation on the Quarry Site is undertaken for Purple Copper Butterfly and its habitat.

  Commenced in October 2016, no Purple Copper Butterfly have been identified on the Quarry Site (Lesryk, 2016). Areas of available habitat remain on the Quarry Site and have been mapped and condition recorded. Other than the disturbance for which approval is sought, the Quarry does not appear to be having any negative effect on the patches of *Bursaria spinose spp. lasiophylla* which provide habitat for the Purple Copper Butterfly.

Environmental monitoring at the Quarry to date demonstrates general compliance with criteria.

3.2.3.2 Environmental Incidents and Complaints

Complaints

Since June 2014, three complaints related to noise have been received. Of these, one referred to the noise generated by reversing alarms and was resolved by replacing with low frequency alarms. Another complaint related to loud banging noises and was resolved by modified the method of truck loading. A third anonymous complaint referred to a loud noise at 4.30am with claims of photographic evidence to support night time activities. The Proponent confirms that no activities outside the approved hours of operation have been undertaken at the Quarry.

Incidents

No environmental incidents have been reported since the commencement under DA 344-1-2001. The non-compliant clearing for which the Proposed Modification seeks regularization of DA 344-11-2001 has been acknowledged, as are the various non-compliances identified as a result of an Independent Environmental Audit of the Quarry (refer to Section 3.2.3.3).

3.2.3.3 Independent Environmental Audit

In accordance with Condition 3.8 of DA 344-11-2001, an Independent Environmental Audit of the Mine ("the Audit") was completed by SLR Consulting Pty Ltd in October 2015 (SLR, 2016). The Audit considered overall environmental performance, adequacy of environmental management plans and compliance against the various conditions of:

- DA 344-11-2001.
- Environment Protection Licence (EPL) 13172.
- Mining Lease (ML) 1633.

The Audit identified a number of non-compliances with most relating to:

- the lack of approval for management plans;
- implementation of management plans;
- implementation of monitoring programs; and
- environmental reporting.

The Audit identified the non-compliances were classified as a low risk level or administrative and resulting in minimal environmental impacts. In May 2016, an Action Plan was prepared documenting the approach and schedule to correcting non-compliances. Confirmation of the actioning of all outstanding non-compliances was provided to the DPE in October 2016.

3.2.4 Summary

On review of environmental performance of the Quarry, the issue with the greatest potential for adverse impacts relates to the clearing of native vegetation and potential impact on the previously recorded population of Purple Copper Butterfly and other threatened species (Biodiversity).

Other issues identified through consultation, review of planning documentation and review of environmental performance are as follows.

- Water Resources.
  - Surface Water. The addition of the fine aggregate and sand processing operations requires the operation and maintenance of silt cells and increases the water requirements of the Quarry. As a consequence, there is an increased potential for the release of sediment-laden water from the Quarry. The inclusion of the washing component of also requires consideration of the implications on the Quarry water balance.

  - Groundwater. As noted in Section 3.2.1.2, the Proposed Modification does not propose any change to activities which would interact directly with groundwater. However, in light of the feedback received from DPI-Water, consideration of the Quarry operation against the AIP will be completed.

- Rehabilitation and final land use. The Proposed Modification requires a modification to the final landform and rehabilitation of the Quarry. This has the potential to impact on local soil resources and local landforms.
- Noise and Air Quality. With an extension of the stockpile areas, there is a potential for changes to the exposure of surrounding residential receivers to noise and dust emissions generated by the Quarry.
- Visual Amenity. With an increase in disturbance, the potential exposure of the Quarry to surrounding vantage points would be increased.
- Cultural Heritage. Ongoing operations require consideration of the management of identified and potential sites of heritage significance.

Section 3.3 further considers these environmental issues to determine the level of priority and coverage to be assigned to each.

3.3 ISSUE PRIORITISATION AND COVERAGE

3.3.1 Introduction

For each of the environmental issues identified (refer to Section 3.2), an analysis of the possible impacts was undertaken to determine the specific assessment requirements and level of priority associated with each. This analysis was undertaken in conjunction with a review of the original *Environmental Impact Statement* (Pacrim, 2001) to determine whether the Proposed Modification would result in any material change to the impacts assessed originally (and therefore warrant further assessment).

3.3.2 Biodiversity

Figure 12 illustrates the proposed disturbance of the Proposed Modification in relation to the previously mapped locations of Purple Copper Butterfly and its habitat on the Quarry Site.

It is further noted that the disturbance associated with the WSEA (1.9ha) and ESEA (0.5ha) has occurred without targeted assessment of the areas to be disturbed and without consideration of a biodiversity offset strategy. As a consequence, it is possible that this disturbance could have a significant effect on Purple Copper Butterfly, other threatened species of flora and fauna, or native biodiversity more generally.

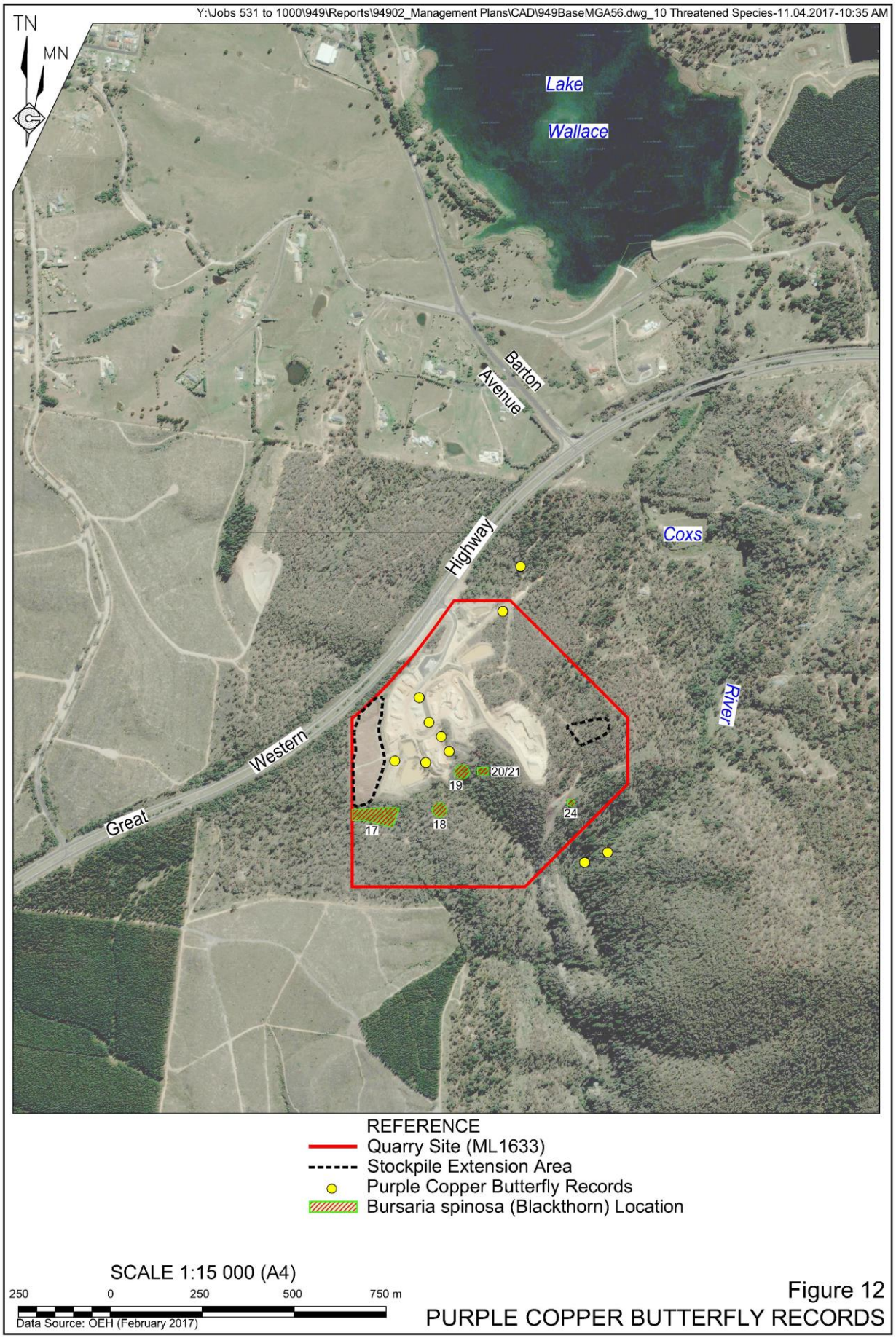


Figure 12
PURPLE COPPER BUTTERFLY RECORDS

On the basis of the known occurrence of an endangered species on the Quarry Site, and the lack to this point of targeted impact assessment with respect to this species or other threatened species, biodiversity is considered to be a ***high priority*** *issue with further assessment to include:*

- *the potential impact on Purple Copper Butterfly and its habitat;*
- *the potential impact on other threatened flora and fauna; and*
- *the requirement for an appropriate biodiversity offset for the clearing of land in addition to that approved by DA 344-11-2001.*

3.3.3 Surface Water Resources

The Quarry is currently operated in accordance with a *Water Management Plan* (WMP) (RWC, 2016). It is worthy of note that the WMP already accounts for the disturbance associated with the WSEA and water use and management associated with the operation of the fine aggregate and sand processing operations (and silt cells).

The WMP does not, however, include the ESEA or the additional silt drying cell proposed as an additional measure for managing the silt removed from the fine aggregates and sand by washing. The implications of these additional features of the Quarry Site, along with a general review of the WMP and site water balance, is necessary to confirm no adverse effect on water management on the Quarry Site or quality of any water discharged from the Quarry.

On the basis of the minor changes to the activities described in the WMP, and the potential for these to impact on the downstream environment, surface water is considered to be of ***moderate priority****. Further assessment is to include:*

- *review of modified catchments and design of erosion and sediment control features;*
- *review of the site water balance and assessment of potential for impacts associated with surplus or deficit of water on the Mine Site; and*
- *review of the potential for impacts on the receiving environment as a result of the modified activities.*

3.3.4 Groundwater Resources

The Proposed Modification would not result in any change to approved mining activities and hence no change to the previously assessed impact on groundwater resources. The previous assessment determined that the Quarry would not impact on groundwater resources which are located below the maximum depth of the mining area (Pacrim, 2001).

While it is noted that the Quarry Site occurs over an area identified as being of groundwater vulnerability by the Lithgow LEP (refer to **Figure 11**), and the request of DPI-Water to review impacts on groundwater, the potential for impact on groundwater resources is considered very low.

*Assessment of impact on groundwater is considered to be of **low-moderate priority**, solely on the basis of the request of DPI-Water for further assessment. Further assessment will:*

- *Consider the potential occurrence of groundwater below the Quarry Site; and*
- *Complete a review of potential impact against the requirements of the AIP.*

3.3.5 Rehabilitation, Final Landform and Land Use

As discussed in Section 2.8 and illustrated on **Figure 7**, the Proposed Modification would result in changes to the final landform from that presented in the 2001 EIS (Pacrim, 2001) and MOP (RME, 2016). Most notable of the changes would be the re-establishment of a sloping landform where the WSEA is to be constructed.

The construction and then rehabilitation of the WSEA would generally follow the principles nominated in the MOP (RME, 2016) and therefore provide for appropriate management of soil and cleared vegetation resources. The proposed final landform provides for a reinstatement of the pre-disturbance landform of the ESEA and partial reinstatement of the easterly facing slope of the WSEA and therefore likely return to pre-disturbance land capability.

The preferred land uses in the vicinity of the Quarry Site is the passive conservation of biodiversity with possible future agricultural or forestry activity (depending on the land title). As all disturbance associated with the Proposed Modification would be restricted to the Quarry Site, and assuming the Proposed Modification can be undertaken without adverse impact on the environmental parameters influencing these land uses, the Quarry will remain compatible with these land uses.

*On the basis of the above, land resources are considered to be of **low priority**. Further assessment is to include a review of the final landform against the rehabilitation objectives and criteria nominated in the MOP, along with a review as to whether this modified final landform will remain compatible with the approved final land uses and the uses of surrounding lands.*

3.3.6 Visual Amenity

While the fine aggregate and sand processing operations are indistinguishable from other processing operations, and the ESEA is effectively screened from all vantage points by retained vegetation, the WSEA would be visible from the Great Western Highway in both directions.

*On the basis of the above, Visual Amenity is considered to be of **moderate priority** with further assessment to include interpretation of the likely change in the visual amenity, review of acceptability and consideration of further mitigation.*

3.3.7 Noise

The activities associated with the stockpile area extensions do not require the use of any additional equipment and occur in close proximity to where this equipment already operates. The fine aggregate and sand processing plant is additional to that for which approval has been granted, however, based on the mode of operation (washing and screening of already crushed material) has limited potential for additional noise emission.

The potential for changes in noise emissions as a result of the Proposed Modification are considered to be very low.

3.3.8 Air Quality

As described for noise emissions above, the potential for significant increase in dust emissions as a result of the Proposed Modification is considered very low.

Further assessment is limited to a comparison of proposed changes and analytical assessment against the results of dust deposition monitoring completed to date.

3.3.9 Cultural Heritage

Archaeological survey of the Quarry Site was completed in December 1999 by Consultant Archaeologist Rex Silcox (BA (Hons)) and Bathurst Local Aboriginal Land Council (Silcox, 2000) identifying a single Aboriginal site (WQ1) containing 22 artefacts (see **Figure 11**). Silcox (2000) also noted that the rocky nature of the study area incorporating the Quarry was not suitable for long-term occupation and presented no archaeological constraint on development.

The Proposed Modification would not encroach on the identified Aboriginal heritage site of the Quarry Site, nor extend disturbance beyond the Quarry Site.

On the basis that the Proponent would continue to operate in accordance with its obligations under the National Parks & Wildlife Act 1974. No further assessment is warranted.

3.3.10 Other Environmental Issues

3.3.10.1 Transportation

The Proposed Modification requires no change to the current transport operations and the proposed earthworks would be undertaken solely on the Mine Site.

No further assessment is warranted.

3.3.10.2 Bushfire

While mining and ancillary activities associated with the Mine would increase the number and type of ignition sources in the local area, the proposed controls and safeguards and general clearing activities would ensure that the potential for fire initiation and spread on the Mine Site is minimised. The Proposed Modification would not introduce any new ignition sources nor impact on the controls in place and therefore would not have any affect on the bushfire hazard of the Mine.

No further assessment is warranted.

3.3.10.3 Socio-Economic Setting

The Proposed Modification has the potential for minor impacts upon the socio-economic setting of the surrounding environment.

*The changes are likely to be, on balance, positive as a result of additional noise attenuation and as a result Socio-economic Setting is considered to be of **low priority** for further assessment.*

3.3.11 Summary of Assessment Priority

Based on a review of the likely impacts associated with the identified issues, these have been ranked in order of priority.

1. Biodiversity (high priority).
2. Surface water resources (moderate priority).
3. Visual amenity (moderate priority).
4. Groundwater resources (low-moderate priority).
5. Land resources (low priority).
6. Noise (low priority).
7. Air quality (low priority)

This order of priority provides the order of assessment in Section 4.